Centers for Disease Control and Prevention
MMWR
Morbidity and Mortality Weekly Report
Recommendations and Reports / Vol. 70 / No. 4
July 23, 2021

Sexually Transmitted Infections Treatment Guidelines, 2021

U.S. Department of Health and Human Services
Centers for Disease Control and Prevention

Centers for Disease Control and Prevention
MMWR
发病率与死亡率周报
建议与报告 / 第70卷 / 第4期
July 23, 2021

性传播感染治疗指南，2021

美国卫生与公众服务部疾病控制与预防中心

本译本由机器翻译生成，供快速理解条文与内部培训使用；
涉及合规判断或法律适用时，请咨询专业顾问，并以官方英文文本为准。
翻译您自己的文件，请选择桐鸾译馆 · https://www.ivyivy.com.cn
扫码关注服务号

CONTENTS

Introduction 1
Methods 1
Clinical Prevention Guidance 2
STI Detection Among Special Populations 11
HIV Infection 24
Diseases Characterized by Genital, Anal, or Perianal Ulcers 27
Syphilis 39
Management of Persons Who Have a History of Penicillin Allergy .. 56
Diseases Characterized by Urethritis and Cervicitis 60
Chlamydial Infections 65
Gonococcal Infections 71
Mycoplasma genitalium 80
Diseases Characterized by Vulvovaginal Itching, Burning, Irritation, Odor, or Discharge 82
Pelvic Inflammatory Disease 94
Epididymitis 98
Human Papillomavirus Infections 100
Viral Hepatitis 113
Proctitis, Proctocolitis, and Enteritis 124
Ectoparasitic Infections 126
Sexual Assault and Abuse and STIs 128
References 135

The *MMWR* series of publications is published by the Center for Surveillance, Epidemiology, and Laboratory Services, Centers for Disease Control and Prevention (CDC), U.S. Department of Health and Human Services, Atlanta, GA 30329-4027.

Suggested citation: [Author names; first three, then et al., if more than six.] [Title]. MMWR Recomm Rep 2021;70(No. RR-#):[inclusive page numbers].

Centers for Disease Control and Prevention

Rochelle P. Walensky, MD, MPH, *Director*
Debra Houry, MD, MPH, *Acting Principal Deputy Director*
Daniel B. Jernigan, MD, MPH, *Acting Deputy Director for Public Health Science and Surveillance*
Rebecca Bunnell, PhD, MEd, *Director, Office of Science*
Jennifer Layden, MD, PhD, *Deputy Director, Office of Science*
Michael F. Iademarco, MD, MPH, *Director, Center for Surveillance, Epidemiology, and Laboratory Services*

MMWR Editorial and Production Staff (Serials)

Charlotte K. Kent, PhD, MPH, *Editor in Chief*
Christine G. Casey, MD, *Editor*
Mary Dott, MD, MPH, *Online Editor*
Terisa F. Rutledge, *Managing Editor*
David C. Johnson, *Lead Technical Writer-Editor*
Marella Meadows, *Project Editor*

Martha F. Boyd, *Lead Visual Information Specialist*
Alexander J. Gottardy, Maureen A. Leahy,
Julia C. Martinroe, Stephen R. Spriggs, Tong Yang,
Visual Information Specialists
Quang M. Doan, MBA, Phyllis H. King,
Terraye M. Starr, Moua Yang,
Information Technology Specialists

Ian Branam, MA, *Acting Lead Health Communication Specialist*
Shelton Bartley, MPH,
Lowery Johnson, Amanda Ray,
Jacqueline N. Sanchez, MS,
Health Communication Specialists
Will Yang, MA,
Visual Information Specialist

MMWR Editorial Board

Timothy F. Jones, MD, *Chairman*

Matthew L. Boulton, MD, MPH
Carolyn Brooks, ScD, MA
Jay C. Butler, MD
Virginia A. Caine, MD
Jonathan E. Fielding, MD, MPH, MBA
David W. Fleming, MD

William E. Halperin, MD, DrPH, MPH
Jewel Mullen, MD, MPH, MPA
Jeff Niederdeppe, PhD
Celeste Philip, MD, MPH
Patricia Quinlisk, MD, MPH
Patrick L. Remington, MD, MPH

Carlos Roig, MS, MA
William Schaffner, MD
Nathaniel Smith, MD, MPH
Morgan Bobb Swanson, BS
Abbigail Tumpey, MPH

目录

引言.....1 方法。 1
临床预防指导 2
特殊人群中的STI检测 11
HIV感染。 24
以生殖器、肛门或肛周溃疡为特征的疾病 27
梅毒 39
有青霉素过敏史者的管理...56 以尿道炎和宫颈炎为特征的疾病。 60
衣原体感染 65
淋球菌感染 71
支原体生殖支原体 80
以 Vulvovaginal 瘙痒、灼烧、刺激、异味或分泌物为特征的疾病。 82
盆腔炎性疾病 94
Epididymitis. 98
人乳头瘤病毒感染 100
病毒性肝炎。 113
直肠炎、直肠结肠炎和肠炎 124
体外寄生虫感染 126
性侵犯与性虐待及STI。 128
References. 135

*MMWR*系列出版物由美国卫生与公众服务部疾病控制与预防中心(CDC)监测、流行病学和实验室服务中心出版，Atlanta, GA 30329-4027。

建议引用格式：[作者姓名；前三位，若超过六位则加 et al.][标题]。MMWR Recomm Rep 2021;70(No.RR-#):[起止页码]。

疾病控制与预防中心

Rochelle P.Walensky，医学博士，公共卫生硕士，主
Debra Houry，医学博士，公共卫生硕士，代理首席副主任
Daniel B.Jernigan, MD, MPH, 公共卫生科学与监测代理副主任
Rebecca Bunnell，博士，教育硕士，科学办公室主任
Jennifer Layden，医学博士、哲学博士，科学办公室副主任
Michael F.Iademarco, MD, MPH, 监测、流行病学和实验室服务中心主任

MMWR编辑与制作人员(连续出版物)

Charlotte K.Kent，博士，公共卫生硕士，主编
Christine G.Casey, MD, 编辑
Mary Dott, MD, MPH, 在线编辑 Terisa F.Rutledge, 执行编辑
David C.Johnson,首席技术写作编辑
Marella Meadows,项目编辑

Martha F.Boyd,首席视觉信息专家
亚历山大·J· 戈塔迪，莫琳·A。莱希，
朱莉娅·C。马丁罗，斯蒂芬·R。斯普里格斯，唐阳，
视觉信息专家
Quang M. Doan，工商管理硕士，Phyllis H. King，
泰拉耶·M·斯塔尔，穆阿·杨，
信息技术专家

Ian Branam，文学硕士，代理负责健康传播专家
Shelton Bartley，公共卫生硕士
洛厄里·约翰逊，阿曼达·雷，
杰奎琳·N·桑切斯，理学硕士，
健康传播专家
Will Yang，文学硕士
视觉信息专家

MMWR编辑委员会委员会

Timothy F.Jones, MD, 主席

Matthew L.Boulton，医学博士，公共卫生硕士
Carolyn Brooks，理学博士，文学硕士
Jay C.Butler, md
Virginia A.Caine, md
乔纳森·E·菲尔丁，医学博士，公共卫生硕士，工商管理
David W.Fleming, md

威廉·E·哈尔佩林，医学博士，公共卫生博士，公共卫生硕士
朱厄尔·穆伦，医学博士，公共卫生硕士，公共管理硕士
杰夫·尼德德普，博士
Celeste Philip，医学博士，公共卫生硕士
帕特里夏·昆利斯基，医学博士，公共卫生硕士
Patrick L.Remington，医学博士，公共卫生硕士

卡洛斯·罗伊格，理学硕士，文学
威廉·沙夫纳，医学博士
纳撒尼尔·史密斯，医学博士，公共卫生硕
摩根·鲍勃·斯旺森，理学学士
Abbigail Tumpey，公共卫生硕士

Sexually Transmitted Infections Treatment Guidelines, 2021

Kimberly A. Workowski, MD[1,2]; Laura H. Bachmann, MD[1]; Philip A. Chan, MD[1,3]; Christine M. Johnston, MD[1,4]; Christina A. Muzny, MD[1,5]; Ina Park, MD[1,6]; Hilary Reno, MD[1,7]; Jonathan M. Zenilman, MD[1,8]; Gail A. Bolan, MD[1]

[1]Division of STD Prevention, National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention, CDC, Atlanta, Georgia; [2]Emory University, Atlanta, Georgia; [3]Brown University, Providence, Rhode Island; [4]University of Washington, Seattle, Washington; [5]University of Alabama at Birmingham, Birmingham, Alabama; [6]University of California San Francisco, San Francisco, California; [7]Washington University, St. Louis, Missouri; [8]Johns Hopkins University, Baltimore, Maryland

Summary

These guidelines for the treatment of persons who have or are at risk for sexually transmitted infections (STIs) were updated by CDC after consultation with professionals knowledgeable in the field of STIs who met in Atlanta, Georgia, June 11–14, 2019. The information in this report updates the 2015 guidelines. These guidelines discuss 1) updated recommendations for treatment of Neisseria gonorrhoeae, Chlamydia trachomatis, *and* Trichomonas vaginalis*; 2) addition of metronidazole to the recommended treatment regimen for pelvic inflammatory disease; 3) alternative treatment options for bacterial vaginosis; 4) management of* Mycoplasma genitalium*; 5) human papillomavirus vaccine recommendations and counseling messages; 6) expanded risk factors for syphilis testing among pregnant women; 7) one-time testing for hepatitis C infection; 8) evaluation of men who have sex with men after sexual assault; and 9) two-step testing for serologic diagnosis of genital herpes simplex virus. Physicians and other health care providers can use these guidelines to assist in prevention and treatment of STIs.*

Introduction

The term "sexually transmitted infection" (STI) refers to a pathogen that causes infection through sexual contact, whereas the term "sexually transmitted disease" (STD) refers to a recognizable disease state that has developed from an infection. Physicians and other health care providers have a crucial role in preventing and treating STIs. These guidelines are intended to assist with that effort. Although the guidelines emphasize treatment, prevention strategies and diagnostic recommendations also are discussed.

This report updates *Sexually Transmitted Diseases Treatment Guidelines, 2015* (*1*) and should be regarded as a source of clinical guidance rather than prescriptive standards. Health care providers should always consider the clinical circumstances of each person in the context of local disease prevalence. These guidelines are applicable to any patient care setting that serves persons at risk for STIs, including family planning clinics, HIV care clinics, correctional health care settings, private physicians' offices, Federally Qualified Health Centers, clinics for adolescent care, and other primary care facilities. These guidelines are focused on treatment and counseling and do not address other community services and interventions that are essential to STI and HIV prevention efforts.

Corresponding preparer: Kimberly A. Workowski, MD, Division of STD Prevention, National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention, CDC. Telephone: 404-639-1898; Email: kgw2@cdc.gov.

These STI treatment guidelines complement *Recommendations for Providing Quality Sexually Transmitted Diseases Clinical Services, 2020* (*2*) regarding quality clinical services for STIs in primary care and STD specialty care settings. This guidance specifies operational determinants of quality services in various clinical settings, describes on-site treatment and partner services, and indicates when STI-related conditions should be managed through consultation with or referral to a specialist.

Methods

These guidelines were developed by CDC staff who worked with subject matter experts with expertise in STI clinical management from other federal agencies, nongovernmental academic and research institutions, and professional medical organizations. CDC staff identified governmental and nongovernmental subject matter experts on the basis of their expertise and assisted them in developing questions to guide individual literature reviews. CDC staff informed the subject matter experts that they were being consulted to exchange information and observations and to obtain their individual input. All subject matter experts disclosed potential conflicts of interest. STI Treatment Guidelines, 2021, Work Group members are listed at the end of this report.

In 2018, CDC staff identified key questions about treatment and clinical management to guide an update of the 2015 STD treatment guidelines (*1*). To answer these questions and synthesize new information available since publication of the 2015 guidelines, subject matter experts and CDC staff

性传播感染治疗指南，2021

Kimberly A.Workowski，医学博士[1,2]； 劳拉·H·巴赫曼，医学博士[1]; Philip A.Chan，医学博士[1,3]; Christine M.Johnston，医学博士[1,4]； 克里斯蒂娜·A·穆兹尼，医学博士[1,5]；

朴仁雅，医学博士[1,6]； 希拉里·雷诺，医学博士[1,7]； 乔纳森·M·泽尼尔曼，医学博士[1,8]; Gail A.Bolan，医学博士[1]

1CDC 国家艾滋病、病毒性肝炎、性病和结核病预防中心性病预防部，佐治亚州亚特兰大；2埃默里大学，佐治亚州亚特兰大；
3 布朗大学，普罗维登斯，罗德岛；*4* 华盛顿大学，西雅图，华盛顿；*5* 阿拉巴马大学伯明翰分校，伯明翰，阿拉巴马；
6 加利福尼亚大学旧金山分校，加利福尼亚州旧金山；*7* 华盛顿大学，密苏里州圣路易斯；*8* 约翰斯·霍普金斯大学，马里兰州巴尔的摩

摘要

本指南针对已感染或存在性传播感染(STI)风险者的治疗，由CDC在与性传播感染领域专业人员协商后更新，这些专业人员于2019年6月11日至14日在佐治亚州亚特兰大召开会议。本报告中的信息更新了2015年指南。本指南讨论：1)淋病奈瑟菌、沙眼衣原体和阴道毛滴虫治疗的更新建议；2)在盆腔炎性疾病推荐治疗方案中加入甲硝唑；3)细菌性阴道病的替代治疗选择；4)生殖支原体的管理；5)人乳头瘤病毒疫苗建议和咨询信息；6)孕妇梅毒检测扩展的危险因素；7)丙型肝炎感染的一次性检测；8)男男性行为人群在性侵犯后的评估；以及9)生殖器单纯疱疹病毒血清学诊断的两步检测法。医师和其他卫生保健提供者可使用本指南协助性传播感染的预防和治疗。

引言

"性传播感染"(STI)一词指通过性接触引起感染的病原体，而"性传播疾病"(STD)一词指由感染发展而来的可识别的疾病状态。医师和其他卫生保健提供者在预防和治疗性传播感染方面发挥着关键作用。本指南旨在协助这一工作。尽管本指南侧重于治疗，但也讨论了预防策略和诊断建议。

本报告更新了性传播疾病治疗指南，*2015*(1)，应被视为临床指导的来源，而非规定性标准。卫生保健提供者应始终结合当地疾病流行情况考虑每个人的临床状况。本指南适用于任何为性传播感染风险人群提供服务的患者诊疗场所，包括计划生育诊所、HIV诊疗诊所、惩教卫生保健场所、私人医生诊所、联邦合格卫生中心、青少年诊疗诊所和其他初级保健机构。本指南侧重于治疗和咨询，不涉及对性传播感染和HIV预防工作至关重要的其他社区服务和干预措施。

通讯作者： Kimberly A.Workowski, MD，美国疾病控制与预防中心(CDC)国家 HIV/AIDS、病毒性肝炎、性传播疾病和结核病预防中心性传播疾病预防部。电话：404-639-1898；电子邮箱：kgw2@cdc.gov。

这些性传播感染治疗指南补充了建议提供高质量性传播疾病临床服务，*2020*(2)，涉及初级保健和性传播疾病专科诊疗环境中性传播感染的高质量临床服务。本指南明确了各种临床环境中高质量服务的操作性决定因素，描述了现场治疗和性伴服务，并指出何时应通过专科医生会诊或转诊来管理性传播感染相关疾病。

方法

本指南由CDC工作人员制定，他们与来自其他联邦机构、非政府学术和研究机构以及专业医学组织的、具有性传播感染临床管理专业知识的主题专家合作。CDC工作人员根据其专业知识确定了政府和非政府主题专家，并协助他们制定问题以指导各自的文献综述。CDC工作人员告知主题专家，咨询他们是为了交流信息和意见并获取其个人意见。所有主题专家均披露了潜在的利益冲突。2021年性传播感染治疗指南工作组成员列于本报告末尾。

2018年，美国疾病控制与预防中心(CDC)工作人员确定了关于治疗和临床管理的关键问题，以指导对2015年性传播疾病治疗指南的更新(1)。为回答这些问题并综合自2015年指南发布以来可获得的新信息，主题专家和CDC工作人员

collaborated to conduct systematic literature reviews by using an extensive MEDLINE database evidence-based approach for each section of the 2015 guidelines (e.g., using English-language published abstracts and peer reviewed journal articles). These systematic reviews were focused on four principal outcomes of STI therapy for each disease or infection: 1) treatment of infection on the basis of microbiologic eradication; 2) alleviation of signs and symptoms; 3) prevention of sequelae; and 4) prevention of transmission, including advantages (e.g., cost-effectiveness, single-dose formulations, and directly observed therapy) and disadvantages (e.g., adverse effects) of specific regimens. The outcome of the literature reviews guided development of background materials, including tables of evidence from peer-reviewed publications summarizing the type of study (e.g., randomized controlled trial or case series), study population and setting, treatments or other interventions, outcome measures assessed, reported findings, and weaknesses and biases in study design and analysis.

In June 2019, the subject matter experts presented their assessments of the literature reviews at an in-person meeting of governmental and nongovernmental participants. Each key question was discussed and pertinent publications were reviewed in terms of strengths, weaknesses, and relevance. Participants evaluated the quality of evidence, provided their input, and discussed findings in the context of the modified rating system used by the U.S. Preventive Services Task Force (USPSTF). The discussions were informal and not structured to reach consensus. CDC staff also reviewed the publications from other professional organizations, including the American College of Obstetricians and Gynecologists (ACOG), USPSTF, the American Cancer Society (ACS), the American Society for Colposcopy and Cervical Pathology (ASCCP), and the Advisory Committee on Immunization Practices (ACIP). The discussion culminated in a list of participants' opinions on all the key STI topic areas for consideration by CDC. (More detailed descriptions of the key questions, search terms, systematic search, evidence tables, and review process are available at https://www.cdc.gov/std/treatment-guidelines/default.htm).

CDC staff then independently reviewed the tables of evidence prepared by the subject matter experts, individual comments from the participants and professional organizations, and existing guidelines from other organizations to determine whether revisions to the 2015 STD treatment guidelines were warranted. CDC staff ranked evidence as high, medium, and low on the basis of each study's strengths and weaknesses according to the USPSTF ratings (https://www.uspreventiveservicestaskforce.org/uspstf/us-preventive-services-task-force-ratings). CDC staff then developed draft recommendations that were peer reviewed by public health and clinical experts as defined by the Office of Management and Budget for influential scientific information. A public webinar was held to provide an overview of the draft recommendations and invite questions and comments on the draft recommendations. The peer review comments, webinar, questions, and responses were considered by CDC staff in developing the final recommendations for the updated STI treatment guidelines. Recommendations for HIV, hepatitis C, cervical cancer screening, STI screening in pregnancy, human papillomavirus (HPV) testing, and hepatitis A virus (HAV) and hepatitis B virus (HBV) vaccination were developed after CDC staff reviewed existing published recommendations. The English-language literature was searched periodically by CDC staff to identify subsequently published articles warranting consideration.

Throughout this report, the evidence used as the basis for specific recommendations is discussed briefly. Publication of comprehensive, annotated discussions of such evidence is planned in a supplemental issue of the journal *Clinical Infectious Diseases* after publication of the treatment guidelines. When more than one therapeutic regimen is recommended and the listed regimens have similar efficacy and similar rates of intolerance or toxicity, the recommendations are listed alphabetically. If differences are specified, regimens are prioritized on the basis of these differences. Recommended regimens should be used primarily; alternative regimens can be considered in instances of notable drug allergy or other medical contraindications to the recommended regimens. Alternative regimens are considered inferior to recommended regimens on the basis of available evidence regarding the principal outcomes and disadvantages of the regimens.

Clinical Prevention Guidance

Prevention and control of STIs are based on the following five major strategies (*3*):

1. Accurate risk assessment and education and counseling of persons at risk regarding ways to avoid STIs through changes in sexual behaviors and use of recommended prevention services
2. Pre-exposure vaccination for vaccine-preventable STIs
3. Identification of persons with an asymptomatic infection and persons with symptoms associated with an STI
4. Effective diagnosis, treatment, counseling, and follow-up of persons who are infected with an STI
5. Evaluation, treatment, and counseling of sex partners of persons who are infected with an STI

合作开展系统性文献综述，针对2015年指南的每一部分采用基于广泛MEDLINE数据库证据的方法(例如，使用英文发表的摘要和同行评审期刊文章)。这些系统性综述聚焦于每种疾病或感染的性传播感染治疗的四个主要结局：1)基于微生物学清除的感染治疗；2)体征和症状的缓解；3)后遗症预防；以及4)传播预防，包括特定方案的优势(例如，成本效益、单剂制剂和直接观察治疗)和劣势(例如，不良反应)。文献综述的结果指导了背景材料的制定，包括来自同行评审出版物的证据表，概述了研究类型(例如，随机对照试验或病例系列)、研究人群和环境、治疗或其他干预措施、评估的结局指标、报告的研究结果以及研究设计和分析中的弱点和偏倚。

2019年6月，主题专家在由政府和非政府参与者参加的面对面会议上介绍了他们对文献综述的评估。会议对每个关键问题进行了讨论，并从优势、劣势和相关性方面审查了相关出版物。参与者评估了证据质量，提供了意见，并在美国预防服务工作组(USPSTF)所使用的改良评级系统背景下讨论了研究结果。讨论为非正式性质，未按达成共识的结构进行。CDC工作人员还审查了其他专业组织发布的出版物，包括美国妇产科医师学会(ACOG)、USPSTF、美国癌症协会(ACS)、美国阴道镜和宫颈病理学会(ASCCP)以及免疫实践咨询委员会(ACIP)。讨论最终形成了一份参与者对所有关键STI主题领域意见的清单，供CDC考虑。(关于关键问题、检索词、系统检索、证据表和审查流程的更详细描述可在https://www.cdc.gov/std/treatment-guidelines/ default.htm获取)。

随后，CDC工作人员独立审查了主题专家准备的证据表、参与者和专业组织的个人意见以及其他组织的现有指南，以确定是否有必要对2015年STD治疗指南进行修订。CDC工作人员根据USPSTF评级标准，基于每项研究的优势和劣势将证据分为高、中、低三个等级(https://www.uspreventiveservicestaskforce.org/uspstf/us-preventive-services-task-force-ratings)。随后，CDC工作人员制定了建议草案，由公共卫生和临床专家进行同行评审，这些专家系依据管理和预算办公室对影响力科学信息的定义确定的。举行了一次公开网络研讨会，概述建议草案，并邀请就建议草案提出问题 and 意见。CDC工作人员在制定更新版STI治疗指南最终建议时，考虑了同行评审意见、网络研讨会、问题及答复。关于HIV、丙型肝炎、宫颈癌筛查、妊娠期STI筛查、人乳头瘤病毒(HPV)检测以及甲型肝炎病毒(HAV)和乙型肝炎病毒(HBV)疫苗接种的建议，系在CDC工作人员审查现有已发表建议后制定。CDC工作人员定期检索英文文献，以识别随后发表、值得考虑的文献。

在本报告中，作为具体建议依据的证据均作了简要讨论。关于此类证据的全面、注释性讨论计划在治疗指南发布后，于*Clinical Infectious Diseases*杂志的增刊中发表。当推荐多种治疗方案且所列方案具有相似疗效和相似的不耐受或毒性发生率时，建议按字母顺序列出。如存在差异，则根据这些差异对方案进行优先排序。应主要使用推荐方案；在存在明显药物过敏或推荐方案的其他医学禁忌证时，可考虑替代方案。根据关于主要结局和方案缺点的现有证据，替代方案被认为劣于推荐方案。

临床预防指南

性传播感染的预防和控制基于以下五项主要策略(3):

1. 准确的风险评估，并对有风险者进行教育和咨询，内容涉及通过改变性行为和使用推荐的预防服务来避免性传播感染的方法
2. 针对疫苗可预防的性传播感染的暴露前疫苗接种
3. 识别无症状感染者以及与性传播感染相关的有症状者
4. 对性传播感染者进行有效诊断、治疗、咨询和随访
5. 对性传播感染者的性伴进行评估、治疗和咨询

STI and HIV Infection Risk Assessment

Primary prevention of STIs includes assessment of behavioral risk (i.e., assessing the sexual behaviors that can place persons at risk for infection) and biologic risk (i.e., testing for risk markers for STI and HIV acquisition or transmission). As part of the clinical encounter, health care providers should routinely obtain sexual histories from their patients and address risk reduction as indicated in this report. Guidance for obtaining a sexual history is available at the Division of STD Prevention resource page (https://www.cdc.gov/std/treatment/resources.htm) and in the curriculum provided by the National Network of STD Clinical Prevention Training Centers (https://www.nnptc.org). Effective interviewing and counseling skills, characterized by respect, compassion, and a nonjudgmental attitude toward all patients, are essential to obtaining a thorough sexual history and delivering effective prevention messages. Effective techniques for facilitating rapport with patients include using open-ended questions (e.g., "Tell me about any new sex partners you've had since your last visit" and "What has your experience with using condoms been like?"); understandable, nonjudgmental language (e.g., "What gender are your sex partners?" and "Have you ever had a sore or scab on your penis?"); and normalizing language (e.g., "Some of my patients have difficulty using a condom with every sex act. How is it for you?"). The "Five P's" approach to obtaining a sexual history is one strategy for eliciting information about the key areas of interest (Box 1). In addition, health care professionals can consider assessing sexual history by asking patients such questions as, "Do you have any questions or concerns about your sexual health?" Additional information about gaining cultural competency when working with certain populations (e.g., gay, bisexual, or other men who have sex with men [MSM]; women who have sex with women [WSW] or with women and men [WSWM]; or transgender men and women or adolescents) is available in sections of these guidelines related to these populations.

In addition to obtaining a behavioral risk assessment, a comprehensive STI and HIV risk assessment should include STI screening as recommended in these guidelines because STIs are biologic markers of risk, particularly for HIV acquisition and transmission among certain MSM. In most clinical settings, STI screening is an essential and underused component of an STI and HIV risk assessment. Persons seeking treatment or evaluation for a particular STI should be screened for HIV and other STIs as indicated by community prevalence and individual risk factors (see Chlamydial Infections; Gonococcal Infections; Syphilis). Persons should be informed about all the tests for STIs they are receiving and notified about tests for common STIs (e.g., genital herpes,

BOX 1. The Five P's approach for health care providers obtaining sexual histories: partners, practices, protection from sexually transmitted infections, past history of sexually transmitted infections, and pregnancy intention

1. Partners
- "Are you currently having sex of any kind?"
- "What is the gender(s) of your partner(s)?"

2. Practices
- "To understand any risks for sexually transmitted infections (STIs), I need to ask more specific questions about the kind of sex you have had recently."
- "What kind of sexual contact do you have or have you had?"
  - "Do you have vaginal sex, meaning 'penis in vagina' sex?"
  - "Do you have anal sex, meaning 'penis in rectum/anus' sex?"
  - "Do you have oral sex, meaning 'mouth on penis/vagina'?"

3. Protection from STIs
- "Do you and your partner(s) discuss prevention of STIs and human immunodeficiency virus (HIV)?"
- "Do you and your partner(s) discuss getting tested?"
- For condoms:
  - "What protection methods do you use? In what situations do you use condoms?"

4. Past history of STIs
- "Have you ever been tested for STIs and HIV?"
- "Have you ever been diagnosed with an STI in the past?"
- "Have any of your partners had an STI?"

Additional questions for identifying HIV and viral hepatitis risk:
- "Have you or any of your partner(s) ever injected drugs?"
- "Is there anything about your sexual health that you have questions about?"

5. Pregnancy intention
- "Do you think you would like to have (more) children in the future?"
- "How important is it to you to prevent pregnancy (until then)?"
- "Are you or your partner using contraception or practicing any form of birth control?"
- "Would you like to talk about ways to prevent pregnancy?"

STI和HIV感染风险评估

STI的一级预防包括行为风险评估(即评估可能使个体面临感染风险的性行为)和生物学风险评估(即检测STI和HIV获得或传播的风险标志物)。作为临床诊疗的一部分，医疗保健提供者应常规获取患者的性史，并按本报告所述处理风险降低事宜。获取性史的指导可在性病预防司资源页面(https://www.cdc.gov/std/treatment/resources.htm)以及国家STD临床预防培训中心网络提供的课程(https://www.nnptc.org)中获取。有效的访谈和咨询技巧--以尊重、同情和对所有患者持非评判性态度为特征--对于获取全面的性史和传递有效的预防信息至关重要。促进与患者建立融洽关系的有效技巧包括：使用开放式问题(例如，"请告诉我自上次就诊以来您是否有任何新的性伴侣"和"您使用安全套的体验是怎样的?")；使用易于理解、非评判性的语言(例如，"您的性伴侣是什么性别?"和"您的阴茎上是否出现过溃疡或结痂?")；以及使用正常化语言(例如，"我的一些患者在每个性行为中都使用安全套有困难。您是否适合您?")。获取性史的"五个P"方法是引出关键关注领域信息的一种策略(框1)。此外，医疗保健专业人员可以考虑通过询问患者诸如"您对您的性健康有任何疑问或担忧吗?"等问题来评估性史。关于在与特定人群(例如，男同性恋者、双性恋者或其他男男性行为人群[MSM]；与女性发生性行为的女性[WSW]或与女性和男性均发生性行为的女性[WSWM]；或跨性别男性和女性或青少年)合作时获得文化能力的更多信息，可在本指南与这些人群相关的章节中找到。

除了获取行为风险评估外，全面的STI和HIV风险评估应包括本指南推荐的STI筛查，因为STI是风险的生物学标志物，特别是对于某些MSM中HIV的获得和传播。在大多数临床环境中，STI筛查是STI和HIV风险评估的重要组成部分，但目前使用不足。因特定STI寻求治疗或评估的人员应接受HIV和其他STI的筛查，具体取决于社区流行率和个体风险因素(见衣原体感染；淋球菌感染；梅毒)。应告知人员他们正在接受的所有STI检测，并通知他们常见STI的检测(例如，生殖器疱疹、

框1. 医护人员获取性史的五个P方法：伴侣、行为、性传播感染防护、既往性传播感染史及妊娠意愿

1. **性伴**
   - "您目前是否有任何形式的性行为?"
   - "你的伴侣的性别是什么?"
2. **性行为方式**
   - "要了解任何性传播感染(STIs)，我需要更具体地询问您近期发生的性行为类型。"
   - "您目前或曾经有过哪种类型的性接触?"
     - "您是否有阴道性交，即'阴茎插入阴道'的性行为?" • "您是否有肛交，即'阴茎插入直肠/肛门'的性行为"
     - 性行为？"
     - "您是否有口交行为，即'口部接触阴茎/阴道'?"
3. **预防性传播感染**
   - "您和您的伴侣是否讨论过性传播感染(STI)的预防?和人类免疫缺陷病毒(HIV)?
   - "您和您的伴侣是否会讨论接受检测?"
   - 对于安全套："您使用什么防护方法?在什么在哪些情况下你会使用安全套?

4. **既往STI病史**
   - "您是否曾经接受过 STI 和 HIV 检测?"
   - "您过去是否曾被诊断患有性传播感染(STI)?"
   - "您的任何性伴侣是否曾患性传播感染?"

识别HIV和病毒性肝炎风险的附加问题：
- "您或您的任何伴侣是否曾经注射过药物?"
- "关于你的性健康，有什么是你对.....有疑问吗?

5. **妊娠意愿**
   - "你认为自己会想要(更多)孩子吗未来?
   - "对你来说，预防怀孕有多重要?(直到那时)?
   - "您或您的伴侣是否正在使用避孕措施，或者采取任何形式的避孕措施?"
   - "您想谈谈预防方法吗?妊娠的方法？"

trichomoniasis, *Mycoplasma genitalium*, and HPV) that are available but not being performed and reasons why they are not always indicated. Persons should be informed of their test results and recommendations for future testing. Efforts should be made to ensure that all persons receive STI care regardless of personal circumstances (e.g., ability to pay, citizenship or immigration status, gender identity, language spoken, or specific sex practices).

STI and HIV Infection Prevention Counseling

After obtaining a sexual history from their patients, all providers should encourage risk reduction by offering prevention counseling. Prevention counseling is most effective if provided in a nonjudgmental and empathetic manner appropriate to the patient's culture, language, sex and gender identity, sexual orientation, age, and developmental level. Prevention counseling for STIs and HIV should be offered to all sexually active adolescents and to all adults who have received an STI diagnosis, have had an STI during the previous year, or have had multiple sex partners. USPSTF recommends intensive behavioral counseling for all sexually active adolescents and for adults at increased risk for STIs and HIV (*4*). Such interactive counseling, which can be resource intensive, is directed at a person's risk, the situations in which risk occurs, and the use of personalized goal-setting strategies. One such approach, known as client-centered STI and HIV prevention counseling, involves tailoring a discussion of risk reduction to the person's situation. Although one large study in STI clinics (Project RESPECT) demonstrated that this approach was associated with lower acquisition of curable STIs (e.g., trichomoniasis, chlamydia, gonorrhea, and syphilis) (*5*), another study conducted 10 years later in the same settings but different contexts (Project AWARE) did not replicate this result (*6*).

With the challenges that intensive behavioral counseling poses, health care professionals might find brief prevention messages and those delivered through video or in a group session to be more accessible for the client. A review of 11 studies evaluated brief prevention messages delivered by providers and health counselors and reported them to be feasible and to decrease subsequent STIs in STD clinic settings (*7*) and HIV care settings (*8*). Other approaches use motivational interviewing to move clients toward achievable risk-reduction goals. Client-centered counseling and motivational interviewing can be used effectively by clinicians and staff trained in these approaches. CDC provides additional information on these and other effective behavioral interventions at https://www.cdc.gov/std/program/interventions.htm. Training in client-centered counseling and motivational interviewing is available through the STD National Network of Prevention Training Centers (https://www.nnptc.org).

In addition to one-on-one STI and HIV prevention counseling, videos and large group presentations can provide explicit information concerning STIs and reducing disease transmission (e.g., how to use condoms consistently and correctly and the importance of routine screening). Group-based strategies have been effective in reducing the occurrence of STIs among persons at risk, including those attending STD clinics (*9*). Brief, online, electronic-learning modules for young MSM have been reported to be effective in reducing incident STIs and offer a convenient client platform for effective interventions (*10*). Because the incidence of certain STIs, most notably syphilis, is higher among persons with HIV infection, use of client-centered STI counseling for persons with HIV continues to be encouraged by public health agencies and other health organizations (https://www.cdc.gov/std/statistics/2019/default.htm). A 2014 guideline from CDC, the Health Resources and Services Administration, and the National Institutes of Health recommends that clinical and nonclinical providers assess a person's behavioral and biologic risks for acquiring or transmitting STIs and HIV, including having sex without condoms, having recent STIs, and having partners recently treated for STIs (https://stacks.cdc.gov/view/cdc/44064). That federal guideline is for clinical and nonclinical providers to offer or make referral for regular screening for multiple STIs, on-site STI treatment when indicated, and risk-reduction interventions tailored to the person's risks. Brief risk-reduction counseling delivered by medical providers during HIV primary care visits, coupled with routine STI screening, has been reported to reduce STI incidence among persons with HIV infection (*8*). Other specific methods have been designed for the HIV care setting (https://www.cdc.gov/hiv/effective-interventions/index.html).

Primary Prevention Methods

Pre-Exposure Vaccination

Pre-exposure vaccination is one of the most effective methods for preventing transmission of HPV, HAV, and HBV, all of which can be sexually transmitted. HPV vaccination is recommended routinely for males and females aged 11 or 12 years and can be administered beginning at age 9 years. HPV vaccination is recommended through age 26 years for those not previously vaccinated (*11*). Sharing clinical decision-making about HPV vaccination is recommended for certain adults aged 27–45 years who are not adequately vaccinated in accordance with existing guidance (https://www.cdc.gov/vaccines/hcp/acip-recs/vacc-specific/hpv.html).

滴虫感染、生殖支原体和HPV)已有可用检测但未实施，以及为何这些检测并非总是指征所在。应告知受检者其检测结果及未来检测建议。应努力确保所有人无论个人情况如何(如支付能力、公民或移民身份、性别认同、所使用语言或特定性行为方式)均能获得STI诊疗服务。

STI与HIV感染预防咨询

在从患者处获取性史后，所有提供者应通过提供预防咨询来鼓励降低风险。预防咨询如果以非评判性和共情的方式提供，并适合患者的文化、语言、性别和性别认同、性取向、年龄和发展水平，则最为有效。应向所有性活跃青少年以及所有已收到STI诊断、在过去一年内曾患STI或有多个性伴侣的成年人提供STI和HIV预防咨询。USPSTF建议对所有性活跃青少年以及STI和HIV风险增加的成年人进行强化行为咨询(4)。这种互动式咨询可能资源密集，针对个人的风险、风险发生的情境以及使用个性化目标设定策略。一种这样的方法，称为以客户为中心的STI和HIV预防咨询，涉及根据个人情况量身定制风险降低的讨论。尽管在STI诊所进行的一项大型研究(Project RESPECT)表明，这种方法与可治愈STI(例如，滴虫感染、衣原体、淋病和梅毒)的较低获得率相关(5)，但10年后在相同环境但不同背景下进行的另一项研究(Project AWARE)未能重现这一结果(6)。

鉴于强化行为咨询带来的挑战，医疗保健专业人员可能会发现简短的预防信息和通过视频或小组会议传递的信息对客户更容易获得。一项对11项研究的综述评估了由提供者和健康咨询师传递的简短预防信息，并报告这些信息可行且能减少STD诊所环境(7)和HIV护理环境(8)中后续STI的发生。其他方法使用动机性访谈来推动客户实现可达到的风险降低目标。以客户为中心的咨询和动机性访谈可由受过这些方法培训的临床医生和工作人员有效使用。CDC在https://www.cdc.gov/ std/program/interventions.htm提供了关于这些和其他有效行为干预的更多信息。以客户为中心的咨询和动机性访谈的培训可通过性病国家预防培训中心网络(https://www.nnptc.org)。

除了一对一的STI和HIV预防咨询外，视频和大型小组演示可以提供关于STI和减少疾病传播的明确信息(例如，如何持续正确使用安全套以及常规筛查的重要性)。基于小组的策略在减少风险人群(包括那些就诊于STD诊所的人)中STI的发生方面是有效的(9)。据报道，针对年轻MSM的简短在线电子学习模块在减少 incident STI方面有效，并为有效干预提供了便利的客户平台(10)。由于某些STI(最显著的是梅毒)在HIV感染者中的发病率较高，公共卫生机构和其他卫生组织继续鼓励对HIV感染者使用以客户为中心的STI咨询(https://www.cdc.gov/std/ statistics/2019/default.htm)。CDC、卫生资源和服务管理局以及国家卫生研究院2014年的一份指南建议，临床和非临床提供者应评估个人获得或传播STI和HIV的行为和生物学风险，包括无安全套性行为、近期STI以及伴侣近期因STI接受治疗(https://stacks.cdc.gov/ view/cdc/44064)。该联邦指南要求临床和非临床提供者提供或转介多种STI的常规筛查、有指征时的现场STI治疗以及针对个人风险量身定制的风险降低干预措施。据报道，医疗提供者在HIV初级保健就诊期间提供的简短风险降低咨询，结合常规STI筛查，可减少HIV感染者中STI的发病率(8)。其他特定方法已为HIV护理环境设计(https://www.cdc.gov/hiv/effective-interventions/index.html)。

初级预防方法

暴露前疫苗接种

暴露前接种是预防HPV、HAV和HBV传播最有效的方法之一，这三种病毒均可通过性传播。推荐11或12岁男性和女性常规接种HPV疫苗，并可从9岁开始接种。对于既往未接种者，推荐至26岁接种HPV疫苗(11)。对于某些27-45岁未按现有指南充分接种的成人，推荐就HPV疫苗接种进行共同临床决策(https://www.cdc.gov/ vaccines/hcp/acip-recs/vacc-specific/hpv.html)。

Hepatitis B vaccination is recommended for all unvaccinated, uninfected persons who are sexually active with more than one partner or are being evaluated or treated for an STI (*12*). In addition, hepatitis A and B vaccines are recommended for MSM, persons who inject drugs, persons with chronic liver disease, and persons with HIV or hepatitis C infections who have not had hepatitis A or hepatitis B (*12*). HAV vaccine is also recommended for persons who are homeless (*13*). Details regarding HAV and HBV vaccination, including routine childhood vaccination, are available at https://www.cdc.gov/hepatitis and at the ACIP website (https://www.cdc.gov/vaccines/hcp/acip-recs/vacc-specific/index.html).

Condoms

External Condoms

When used consistently and correctly, external latex condoms, also known as male condoms, are effective in preventing the sexual transmission of HIV infection (http://www.ashasexualhealth.org/pdfs/Male_and_Female_Condoms.pdf). In heterosexual HIV mixed-status relationships (i.e., those involving one infected and one uninfected partner) in which condoms were used consistently, HIV-negative partners were 71%–80% less likely to become infected with HIV, compared with persons in similar relationships in which condoms were not used (*14*,*15*). Two analyses of MSM mixed-status couple studies estimated the protective effect of condom use to be 70% and 91%, respectively (*16*,*17*). Moreover, studies demonstrate that consistent condom use reduces the risk for other STIs, including chlamydia, gonorrhea, hepatitis B, and trichomoniasis (*18*–*21*). By limiting lower genital tract infections, condoms also might reduce the risk for pelvic inflammatory disease (PID) among women (*22*). In addition, consistent and correct use of latex condoms reduces the risk for HPV infection and HPV-associated diseases, genital herpes, syphilis, and chancroid when the infected area or site of potential exposure is covered (*23*–*27*). Additional information is available at https://www.cdc.gov/condomeffectiveness/index.html and www.factsaboutcondoms.com/professional.php. Condoms are regulated as medical devices and are subject to random sampling and testing by the Food and Drug Administration (FDA). Each latex condom manufactured in the United States is tested electronically for holes before packaging. The rate of condom breakage during sexual intercourse and withdrawal in the United States is approximately two broken condoms per 100 condoms. Rates of breakage and slippage might be slightly higher during anal intercourse (*28*,*29*). The failure of condoms to protect against STIs or unintended pregnancy usually results from inconsistent or incorrect use rather than condom breakage (*30*). Users should check the expiration or manufacture date on the box or individual package. Latex condoms should not be used beyond their expiration date or >5 years after the manufacturing date. Condoms made of materials other than latex are available in the United States and can be classified into two general categories: 1) polyurethane, polyisoprene, or other synthetic condoms and 2) natural membrane condoms.

Polyurethane external condoms provide protection against STIs and HIV and pregnancy comparable to that of latex condoms (*20*,*31*). These can be substituted for latex condoms by persons with latex sensitivity, are typically more resistant to deterioration, and are compatible with use of both oil-based and water-based lubricants. The effectiveness of other synthetic external condoms to prevent STIs has not been extensively studied, and FDA labeling restricts their recommended use to persons who are sensitive to or allergic to latex. Natural membrane condoms (frequently called natural skin condoms or [incorrectly] lambskin condoms) are made from lamb cecum and can have pores up to 1,500 nm in diameter. Although these pores do not allow the passage of sperm, they are more than 10 times the diameter of HIV and more than 25 times that of HBV. Moreover, laboratory studies demonstrate that sexual transmission of viruses, including HBV, herpes simplex virus (HSV), and HIV, can occur with natural membrane condoms (*31*). Therefore, natural membrane condoms are not recommended for prevention of STIs and HIV.

Providers should advise that condoms must be used consistently and correctly to be effective in preventing STIs and HIV while noting that any condom use is better than no condom use. Providing instructions about the correct use of condoms can be useful. Communicating the following recommendations can help ensure that patients use external condoms correctly:

- Use a new condom with each sex act (i.e., oral, vaginal, and anal).
- Carefully handle the condom to avoid damaging it with fingernails, teeth, or other sharp objects.
- Put the condom on after the penis is erect and before any genital, oral, or anal contact with the partner.
- Use only water-based or silicone-based lubricants (e.g., K-Y Jelly, Astroglide, AquaLube, or glycerin) with latex condoms. Oil-based lubricants (e.g., petroleum jelly, shortening, mineral oil, massage oils, body lotions, or cooking oil) can weaken latex and should not be used; however, oil-based lubricants typically can be used with polyurethane or other synthetic condoms.
- Ensure adequate lubrication during vaginal and anal sex, which might require using exogenous water-based lubricants.
- Hold the condom firmly against the base of the penis during withdrawal, and withdraw while the penis is still erect to prevent the condom from slipping off.

推荐所有未接种、未感染且与一个以上性伴性活跃或正在接受STI评估或治疗者接种乙型肝炎疫苗(12)。此外，推荐MSM、注射吸毒者、慢性肝病患者以及未感染过甲型肝炎或乙型肝炎的HIV或丙型肝炎感染者接种甲型和乙型肝炎疫苗(12)。还推荐无家可归者接种HAV疫苗(13)。关于HAV和HBV疫苗接种的详细信息，包括常规儿童期接种，可见于https://www.cdc.gov/ hepatitis以及ACIP网站(https://www.cdc.gov/ vaccines/hcp/acip-recs/vacc-specific/index.html)。

安全套

外用避孕套

持续且正确使用时，外用乳胶避孕套(也称为男用避孕套)可有效预防HIV感染的性传播(http:// www.ashasexualhealth.org/pdfs/Male_and_Female_Condoms.pdf)。在异性HIV血清不一致关系(即一方感染、一方未感染)中，持续使用避孕套时，与未使用避孕套的类似关系者相比，HIV阴性伴侣感染HIV的可能性低71%-80%(*14*, *15*)。两项针对MSM血清不一致伴侣研究的分析估计，使用避孕套的保护效应分别为70%和91%(*16*, *17*)。此外，研究表明持续使用避孕套可降低其他STI风险，包括衣原体、淋病、乙型肝炎和滴虫感染(*18 - 21*)。通过限制下生殖道感染，避孕套也可能降低女性盆腔炎性疾病(PID)风险(22)。此外，当感染部位或潜在暴露部位被覆盖时，持续且正确使用乳胶避孕套可降低HPV感染和HPV相关疾病、生殖器疱疹、梅毒和软下疳风险(*23 - 27*)。更多信息可见于https://www.cdc.gov/condomeffectiveness/index.html和www.factsaboutcondoms.com/professional.php。避孕套作为医疗器械受到监管，并由Food and Drug Administration(FDA)进行随机抽样和检测。美国生产的每个乳胶避孕套在包装前均经过电子孔洞检测。在美国，性交和撤出过程中避孕套破损率约为每100个避孕套破损2个。肛交时破损和滑脱率可能略高(*28*, *29*)。避孕套未能预防STI或非意愿妊娠通常是由于使用不持续或不正确，而非避孕套破损(30)。使用者应检查有效期或生产日期包装盒或独立包装上。乳胶安全套不应超过有效期或生产日期后>5年使用。美国有非乳胶材质的安全套，可分为两大类：1)聚氨酯、聚异戊二烯或其他合成材料安全套，以及2)天然膜安全套。

聚氨酯外用避孕套提供的STI、HIV和妊娠防护与乳胶避孕套相当(*20*, *31*)。对乳胶敏感者可用其替代乳胶避孕套，其通常更耐老化，并且可与油基和水基润滑剂兼容使用。其他合成外用避孕套预防STI的有效性尚未得到广泛研究，FDA标签将其推荐使用限制于对乳胶敏感或过敏者。天然膜避孕套(常称为天然皮肤避孕套或[错误地称为]羊皮避孕套)由羊盲肠制成，孔径可达1,500 nm。尽管这些孔不允许精子通过，但其直径超过HIV直径的10倍，超过HBV直径的25倍。此外，实验室研究表明，包括HBV、单纯疱疹病毒(HSV)和HIV在内的病毒可通过天然膜避孕套发生性传播(31)。因此，不推荐天然膜避孕套用于预防STI和HIV。

医务人员应告知，安全套必须坚持且正确使用才能有效预防STI和HIV，同时指出使用安全套总比不使用好。提供正确使用安全套的指导可能有益。传达以下建议有助于确保患者正确使用外用安全套：

- 每次性行为(即口交、阴道交、和肛交)。
- 小心处理安全套，避免损坏它指甲、牙齿或其他尖锐物体。
- 在阴茎勃起后、任何性接触之前戴上安全套与伴侣发生生殖器、口腔或肛门接触。
- 仅使用水基或硅基润滑剂(例如，K-Y Jelly、Astroglide、AquaLube或甘油)与乳胶安全套配合使用。油基润滑剂(如凡士林、起酥油、矿物油、按摩油、身体乳或食用油)可削弱乳胶，不应使用；但油基润滑剂通常可与聚氨酯或其他合成材料安全套配合使用。
- 确保阴道和肛交过程中有足够的润滑，这可能需要使用外源性水基润滑剂。
- 紧握避孕套于阴茎根部在抽出过程中，并在阴茎仍勃起时抽出，以防安全套滑脱。

Additional information about external condoms is available at https://www.cdc.gov/condomeffectiveness.

Internal Condoms

Condoms for internal vaginal use, also known as female condoms, are available worldwide (e.g., the FC2 Female Condom, Reddy condom, Cupid female condom, and Woman's condom) (*31*,*32*). Use of internal condoms can provide protection from acquisition and transmission of STIs, although data are limited. Internal condoms are more costly compared with external condoms; however, they offer the advantage of being controlled by the receptive partner as an STI and HIV prevention method, and the newer versions might be acceptable to all persons. Although the internal condom also has been used during receptive anal intercourse, efficacy associated with this practice remains unknown (*33*). Additional information about the internal condom is available at http://www.ashasexualhealth.org/pdfs/Male_and_Female_Condoms.pdf.

Cervical Diaphragms

In observational studies, diaphragm use has been demonstrated to protect against cervical gonorrhea, chlamydia, and trichomoniasis (*34*). However, a trial examining the effect of a diaphragm plus lubricant on HIV acquisition among women in Africa reported no additional protective effect when compared with the use of male condoms alone. Likewise, no difference by study arm in the rate of acquisition of chlamydia, gonorrhea, or herpes occurred (*35*,*36*). Diaphragms should not be relied on as the sole source of protection against HIV and other STIs.

Multipurpose Prevention Technologies

Methods that combine STI and HIV prevention with pregnancy prevention are known as multipurpose prevention technologies (MPTs) (*37*) (https://www.who.int/reproductivehealth/topics/linkages/mpts/en). Internal and external condoms are both examples of MPTs because they are effective prevention measures when used correctly for STI and HIV transmission or pregnancy prevention. The multicenter Evidence for Contraception Options and HIV Outcomes (ECHO) trial observed no statistically significant differences in HIV incidence rates among women randomly assigned to one of three contraceptive methods (depot medroxyprogesterone acetate [DMPA], levonorgestrel implant, and copper-containing intrauterine device [IUD]); however, rates of HIV infection were high in all groups, indicating a need for MPTs (*38*). Development of MPTs is complex and ongoing; products under study include microbicides with contraceptive devices (e.g., tenofovir with a vaginal ring contraceptive delivery package) and other innovative methods (*39*).

Topical Microbicides and Spermicides

Nonspecific topical microbicides are ineffective for preventing HIV infection (*40*–*45*). Tenofovir gel has been studied for prevention of herpes simplex virus 2 (HSV-2) and HIV infections (*46*,*47*). Adherence can be low (*48*), and prevention of HIV infection, especially among women, has not been demonstrated (*47*,*49*).Vaginal rings containing dapivirine have provided some reduction in HIV infection (*50*,*51*). For men and transgender women who have anal intercourse, tenofovir gel appears safe when applied before and after anal sex (*52*). Spermicides containing nonoxynol-9 (N-9) might disrupt genital or rectal epithelium and have been associated with an increased risk for HIV infection. Condoms with N-9 are no more effective than condoms without N-9; therefore, N-9 alone or in a condom is not recommended for STI and HIV prevention (*40*). N-9 use also has been associated with an increased risk for bacterial urinary tract infections among women (*53*,*54*).

Nonbarrier Contraception, Female Surgical Sterilization, and Hysterectomy

Contraceptive methods that are not mechanical barriers offer no protection against HIV or other STIs. The ECHO study observed no differences in HIV incidence rates among women randomly assigned to DMPA, levonorgestrel implant, or copper-containing IUD contraceptive methods (*38*). A systematic review of epidemiologic evidence reported that the majority of studies demonstrated no association between use of oral contraceptives and HIV acquisition among women (*55*). Whether hormonal contraception alters a woman's risk for other STIs is uncertain (*56*,*57*).

Sexually active women who use contraceptive methods other than condoms should be counseled about STI and HIV infection prevention measures. These include pre-exposure prophylaxis (PrEP) and postexposure prophylaxis (PEP), limiting the number of sex partners, and correct and consistent use of condoms.

Emergency Contraception

Unprotected intercourse exposes women to risks for STIs and unplanned pregnancy. Providers should offer counseling about the option of emergency contraception if pregnancy is not desired. Options for emergency contraception in the United States include copper-containing IUDs and emergency contraceptive pills (ECPs) (*58*,*59*). More information is available at https://www.acog.org/clinical/clinical-guidance/practice-bulletin/articles/2015/09/emergency-contraception?utm_source=redirect&utm_medium=web&utm_campaign=otn. ECPs are available in the following formulations: ulipristal

有关外用避孕套的更多信息，请访问https://www.cdc.gov/condomeffectiveness.

女用避孕套

用于阴道内使用的避孕套，也称为女用避孕套，在全球范围内可用(例如FC2 Female Condom、Reddy condom、Cupid female condom和Woman's condom)(*31*, *32*)。使用内用避孕套可提供针对STI获得和传播的保护，尽管数据有限。与外用避孕套相比，内用避孕套费用更高；然而，其优势在于可由接受方作为STI和HIV预防方法进行控制，且较新版本可能为所有人所接受。尽管内用避孕套也已用于接受性肛交，但与此实践相关的有效性仍未知(33)。关于内用避孕套的更多信息可见于http://www.ashasexualhealth.org/pdfs/Male_and_Female_Condoms.pdf。

宫颈膈膜

在观察性研究中，已证明使用子宫帽可预防宫颈淋病、衣原体和滴虫感染(34)。然而，一项在非洲女性中考察子宫帽加润滑剂对HIV感染影响的试验报告，与仅使用男用安全套相比，未显示出额外的保护效果。同样，各研究组在衣原体、淋病或疱疹的感染率方面也无差异(*35*, *36*)。不应将子宫帽作为预防HIV和其他STI的唯一保护来源。

多用途预防技术

将STI和HIV预防与妊娠预防相结合的方法被称为多用途预防技术(MPTs)(37)(https://www.who.int/ reproductivehealth/topics/linkages/mpts/en)。内用和外用安全套都是MPTs的例子，因为正确使用时，它们是预防STI和HIV传播或妊娠的有效措施。多中心避孕选择与HIV结局证据(ECHO)试验观察到，随机分配至三种避孕方法之一(醋酸甲羟孕酮长效注射剂[DMPA]、左炔诺孕酮植入剂和含铜宫内节育器[IUD])的女性中，HIV发病率无统计学显著差异；然而，所有组的HIV感染率均较高，表明需要MPTs(38)。MPTs的开发复杂且仍在进行中；正在研究的产品包括含避孕装置的杀微生物剂(例如，替诺福韦与阴道环避孕给药套装)和其他创新方法(39)。

局部杀菌剂和杀精剂

非特异性外用杀微生物剂对预防HIV感染无效(*40* - *45*)。替诺福韦凝胶已被研究用于预防单纯疱疹病毒2型(HSV-2)和HIV感染(*46*, *47*)。依从性可能较低(48)，且尚未证明可预防HIV感染，尤其是在女性中(*47*, *49*)。含达匹韦林的阴道环已在一定程度上减少HIV感染(*50*, *51*)。对于有肛交的男性和跨性别女性，在肛交前后使用替诺福韦凝胶似乎是安全的(52)。含壬苯醇醚-9(N-9)的杀精子剂可能破坏生殖器或直肠上皮，并与HIV感染风险增加相关。含N-9的安全套并不比不含N-9的安全套更有效；因此，不建议单独使用N-9或使用含N-9的安全套来预防STI和HIV(40)。使用N-9还与女性细菌性尿路感染风险增加相关(*53*, *54*)。

非屏障避孕、女性绝育术和子宫切除术

非机械屏障的避孕方法对HIV或其他STI不提供保护。ECHO研究观察到，随机分配至DMPA、左炔诺孕酮植入剂或含铜IUD避孕方法的女性中，HIV发病率无差异(38)。一项对流行病学证据的系统综述报告，大多数研究显示口服避孕药的使用与女性HIV感染之间无关联(55)。激素避孕是否会改变女性对其他STI的风险尚不确定(*56*, *57*)。

使用非安全套避孕方法的性活跃女性应接受关于STI和HIV感染预防措施的咨询。这些措施包括暴露前预防(PrEP)和暴露后预防(PEP)、限制性伴数量以及正确且坚持使用安全套。

紧急避孕

无保护性交使女性面临性传播感染和意外怀孕的风险。医疗服务提供者应就意外怀孕时的紧急避孕选择提供咨询。美国的紧急避孕选择包括含铜宫内节育器和紧急避孕药(ECPs)(*58*,*59*)。更多信息可在https://www.acog.org/clinical/clinical-guidance/practice- bulletin/articles/2015/09/emergency-contraceptionutm_source=redirect&utm_medium=web&utm_campaign=otn获取。ECPs有以下剂型：醋酸乌利司他

acetate in a single dose (30 mg) available by prescription, levonorgestrel in a single dose (1.5 mg) available over the counter or by prescription, or a combined estrogen and progestin pill regimen. Insertion of a copper-containing IUD ≤5 days after unprotected sex can reduce pregnancy risk from a sex act by approximately 99% (*60*). ECPs are most efficacious when initiated as soon as possible after unprotected sex. Ulipristal acetate is effective ≤5 days after unprotected sex, and levonorgestrel is most effective ≤3 days after unprotected sex but has some efficacy at ≤5 days. ECPs are ineffective (but not harmful) if the woman is already pregnant (*61*). A 2019 Cochrane review summarized the efficacy, safety, and convenience of different emergency contraception methods (*61*).

More information about emergency contraception is available in *Contraceptive Technology, 21st Edition* (*31*), in the 2016 U.S. Selected Practice Recommendations (U.S. SPR) for Contraceptive Use (emergency contraception) available at https://www.cdc.gov/reproductivehealth/contraception/mmwr/spr/emergency.html, and in the 2016 U.S. Medical Eligibility Criteria (U.S. MEC) for Contraceptive Use (copper IUDs for emergency contraception) available at https://www.cdc.gov/reproductivehealth/contraception/mmwr/mec/appendixj.html.

Providers should educate males and females about emergency contraception, especially if other methods of contraception were used incorrectly or not at all and pregnancy is not desired (*62*). An advance supply of ECPs can be provided or prescribed so that ECPs will be available when needed (*59*).

Male Circumcision

Male circumcision reduces the risk for HIV infection and certain STIs among heterosexual men. Three randomized, controlled trials performed in regions of sub-Saharan Africa, where generalized HIV epidemics involving predominantly heterosexual transmission were occurring, demonstrated that male circumcision reduces the risk for HIV acquisition among men by 50%–60% (*63*–*65*). In those trials, circumcision also was protective against other STIs, including high-risk genital HPV infection and genital herpes (*66*–*68*). Follow-up studies have demonstrated sustained benefit of circumcision for HIV prevention (*69*) and that the effect is not mediated solely through a reduction in HSV-2 infection or genital ulcer disease (GUD) (*70*).

The World Health Organization (WHO) and the Joint United Nations Programme on HIV/AIDS (UNAIDS) recommend that male circumcision efforts be scaled up as an effective intervention for preventing heterosexually acquired HIV infection (*71*) in countries with hyperendemic and generalized HIV epidemics within the context of ensuring universal access to comprehensive HIV prevention, treatment, care, and support (https://www.afro.who.int/publications/voluntary-medical-male-circumcision-hiv-prevention). In the United States, the American Academy of Pediatrics (AAP) recommends that newborn male circumcision be available to families that desire it because the benefits of the procedure, including prevention of penile cancers, urinary tract infections, GUD, and HIV infection, outweigh the risks. ACOG has also endorsed AAP's policy statement. In light of these benefits, the American Urological Association states that male circumcision should be considered an option for risk reduction, among other strategies (*72*). Additional information for providers counseling male patients and parents regarding male circumcision for preventing HIV, STIs, and other adverse health outcomes is available at https://www.cdc.gov/hiv/risk/male-circumcision.html.

No definitive data exist to determine whether male circumcision reduces HIV acquisition among MSM, although one meta-analysis of 62 observational studies reported that circumcision was protective against HIV acquisition in low- to middle-income countries but not in high-income countries (*73*). Further studies are needed to confirm any potential benefit of male circumcision for this population.

Pre-Exposure Prophylaxis for HIV

Daily oral antiretroviral PrEP with a fixed-dose combination of emtricitabine (FTC) and either tenofovir disoproxil fumarate (TDF) or tenofovir alafenamide (TAF) have demonstrated safety (*74*) and a substantial reduction in the rate of HIV acquisition for MSM (*75*). TDF/FTC has demonstrated safety and efficacy for mixed-status heterosexual couples (*76*) and heterosexual men and women recruited individually (*77*); however, no evidence is yet available regarding TAF/FTC among heterosexually active women. In addition, one clinical trial involving persons who inject drugs (*78*) and one involving heterosexual mixed-status couples (*76*) demonstrated substantial efficacy and safety of daily oral PrEP with TDF alone. High adherence to oral PrEP was strongly associated with protection from HIV infection. Studies conducted with MSM have demonstrated that taking PrEP at specific times before and after sexual intercourse was effective in preventing HIV; however, less experience exits with this regimen, it is not FDA cleared, and it has not been studied among other populations (*79*).

Comprehensive clinical practice guidelines are available for providers in prescribing PrEP to reduce the risk for HIV infection (*80*). Among HIV-negative sexually active men and women, bacterial STIs are key indicators of risk for HIV acquisition. Studies have documented the risk for HIV acquisition among MSM within 1 year after infection with rectal gonorrhea or chlamydia (one in 15 men), primary or secondary syphilis (one in 18), and among men with no

醋酸乌利司他单次剂量(30 mg)处方药，左炔诺孕酮单次剂量(1.5 mg)非处方药或处方药，或雌激素和孕激素联合药片方案。无保护性行为后≤5天内放置含铜IUD可将性行为导致的妊娠风险降低约99%(60)。ECPs在无保护性行为后尽早开始使用时最为有效。醋酸乌利司他在无保护性行为后≤5天内有效，左炔诺孕酮在无保护性行为后≤3天内最为有效，但在≤5天内仍有一定疗效。如果女性已经妊娠，ECPs无效(但无害)(61)。2019年Cochrane综述总结了不同紧急避孕方法的有效性、安全性和便利性(61)。

关于紧急避孕的更多信息是可参见《避孕技术》第*21*版(31)、2016年美国避孕使用精选实践建议(U.S.SPR)(紧急避孕)，网址为https://www.cdc.gov/reproductivehealth/contraception/ mmwr/spr/emergency.html，以及2016年美国避孕使用医学资格标准(U.S.MEC)(铜质IUD用于紧急避孕)，网址为https://www.cdc.gov/reproductivehealth/contraception/mmwr/mec/appendixj.html。

医务人员应向男性和女性提供紧急避孕教育，尤其是当其他避孕方法使用不正确或未使用且不希望妊娠时(62)。可提前提供或开具ECPs，以便在需要时可用(59)。

男性包皮环切术

男性包皮环切术可降低异性恋男性HIV感染和某些STI的风险。在撒哈拉以南非洲地区进行的三项随机对照试验表明，男性包皮环切术可将男性HIV感染风险降低50%-60%(*63* - *65*)，这些地区正在发生以异性传播为主的广泛HIV流行。在这些试验中，包皮环切术还可预防其他STI，包括高危生殖器HPV感染和生殖器疱疹(*66* - *68*)。随访研究表明，包皮环切术对HIV预防具有持续益处(69)，且该效果并非仅通过减少HSV-2感染或生殖器溃疡病(GUD)介导(70)。

世界卫生组织(WHO)和联合国艾滋病规划署(UNAIDS)建议，在确保普遍获得全面HIV预防、治疗、关怀和支持的背景下，在HIV高流行和广泛流行的国家扩大男性包皮环切术，作为预防异性性传播HIV感染的有效干预措施(71)。

(https://www.afro.who.int/publications/voluntary-medical-male- circumcision-hiv-prevention)。在美国，美国儿科学会(AAP)建议为有需求的家庭提供新生儿男性包皮环切术，因为该操作的益处，包括预防阴茎癌、尿路感染、GUD和HIV感染，超过其风险。ACOG也已认可AAP的政策声明。鉴于这些益处，美国泌尿学会指出，男性包皮环切术应被视为降低风险的选项之一，与其他策略并列(72)。关于为男性患者和父母提供男性包皮环切术以预防HIV、STI和其他不良健康结局咨询的更多信息，请访问https://www.cdc.gov/hiv/risk/ male-circumcision.html。

目前尚无确切数据确定男性包皮环切术是否能减少MSM中的HIV感染，尽管一项纳入62项观察性研究的meta分析报告称，包皮环切术在低至中等收入国家具有预防HIV感染的保护作用，但在高收入国家则无此作用(73)。需要进一步研究以确认男性包皮环切术对该人群的任何潜在益处。

HIV暴露前预防

每日口服抗逆转录病毒PrEP，使用恩曲他滨(FTC)与富马酸替诺福韦二吡呋酯(TDF)或替诺福韦艾拉酚胺(TAF)的固定剂量复方制剂，已证明具有安全性(74)，并能大幅降低MSM的HIV感染率(75)。TDF/FTC已证明对血清不一致的异性伴侣(76)和单独招募的异性恋男女(77)具有安全性和有效性；然而，尚无关于TAF/FTC在异性恋活跃女性中的证据。此外，一项涉及注射吸毒者的临床试验(78)和一项涉及异性血清不一致伴侣的临床试验(76)证明，单独使用TDF进行每日口服PrEP具有显著疗效和安全性。口服PrEP的高依从性与预防HIV感染密切相关。针对MSM进行的研究表明，在性交前后特定时间服用PrEP可有效预防HIV；然而，该方案的实践经验较少，尚未获得FDA批准，也未在其他人群中进行研究(79)。

已有全面的临床实践指南可供提供者用于开具PrEP以降低HIV感染风险(80)。在HIV阴性的性活跃男性和女性中，细菌性STI是HIV感染风险的关键指标。研究已记录MSM在感染直肠淋病或衣原体后1年内(15人中1人)、一期或二期梅毒后(18人中1人)的HIV感染风险，以及在无

rectal STI or syphilis infection (one in 53) (*81*–*83*). Sexually active adults and adolescents should be screened for STIs (e.g., chlamydia, gonorrhea, and syphilis) in accordance with recommendations, and persons with infection should be offered PrEP. The USPSTF recommends that persons at risk for HIV acquisition be offered PrEP (*84*). Persons at risk for HIV acquisition include HIV-negative persons whose sexual partner or partners have HIV infection (especially if viral load is detectable or unknown), persons who have had gonorrhea or syphilis during the previous 6 months, and injecting drug users who share injection equipment (*84*). Clinical practice guidelines recommend STI screening for persons taking PrEP (*80*) because increased rates of STI acquisition have been described (*85*–*87*).

Pre-Exposure Prophylaxis for STIs

Providing HSV treatment to persons with HIV and HSV infection has not demonstrated benefit in reducing HIV acquisition among uninfected partners. A large randomized controlled trial evaluated mixed-status heterosexual couples among the partners with HIV infection who also were seropositive for HSV-2 (*88*). Use of acyclovir had no effect on HIV transmission. These findings are consistent with a previous trial that reported no benefit of acyclovir in preventing HIV acquisition among persons seropositive for HSV-2 (*89*).

Doxycycline prophylaxis has been examined for preventing bacterial STIs. In a pilot study, 30 MSM living with HIV with previous syphilis (two or more episodes since HIV diagnosis) were randomly assigned to doxycycline 100 mg for 48 weeks versus a financial incentive–based behavioral intervention (*90*). That study demonstrated a 73% reduction in any bacterial STI at any site, without substantial differences in sexual behavior. Additional studies examining doxycycline prophylaxis are under way or in development (*91*).

Postexposure Prophylaxis for HIV and STIs

Guidelines for using PEP aimed at preventing HIV and other STIs as a result of sexual exposure are available at https://www.cdc.gov/hiv/pdf/programresources/cdc-hiv-npep-guidelines.pdf. Sexually active persons seeking HIV PEP should be evaluated for PrEP after completing their PEP course and testing negative for HIV. HIV PEP is also discussed elsewhere in this report (see Sexual Assault and Abuse and STIs). Genital hygiene methods (e.g., vaginal washing and douching) after sexual exposure are ineffective in protecting against HIV and STIs and might increase the risk for bacterial vaginosis (BV), certain STIs, and HIV infection (*92*).

STI PEP in the form of doxycycline 200 mg taken after unprotected anal sex has been studied among MSM and transgender women; results demonstrated reduction in incident chlamydia and syphilis by 70% and 73%, respectively, but no effect on gonorrhea (*93*). Other studies are under way or in development regarding doxycycline prophylaxis for bacterial STIs (*91*). No long-term data are available regarding the impact of STI PEP on antimicrobial resistance and the microbiome. Further studies are needed to determine whether STI PEP is an effective and beneficial strategy for STI prevention.

HIV Treatment as Prevention: Antiretroviral Treatment of Persons with HIV to Prevent HIV Among Partners

In 2011, the randomized controlled trial HPTN 052 demonstrated that, among HIV mixed-status heterosexual couples, HIV antiretroviral therapy (ART) for the infected partner decreased the risk for transmission to the uninfected partner by 96% (*94*). Therefore, ART not only is beneficial to the health of persons with HIV infection, it also reduces the risk for transmission. Additional studies of HIV mixed-status couples, heterosexual and MSM couples (PARTNER study), and MSM couples (Opposites Attract and PARTNERS2 studies) reported that patients with HIV taking ART who maintain an undetectable viral load demonstrate no risk for transmitting HIV to their HIV-negative sex partners (*95*–*97*). For those reasons, ART should be offered to all persons with HIV infection to obtain viral suppression. Detailed guidance regarding ART regimens is available in the U.S. Department of Health and Human Services' HIV treatment guidelines (*98*).

HIV Seroadaptive Strategies

Seroadaptive strategies for HIV prevention have largely originated within communities of MSM. They are predicated on knowledge of self and partner HIV status. One specific seroadaptive practice is serosorting, which includes limiting anal sex without a condom to partners with the same HIV status as their own or choosing to selectively use condoms with HIV mixed-status partners. Another practice among mixed-status couples is seropositioning, in which the person with HIV infection is the receptive partner for anal intercourse. Observational studies have consistently reported that serosorting confers greater risk for HIV infection than consistent condom use but has lower risk compared with anal intercourse without a condom and without serosorting (*99*–*101*). Serosorting practices have been associated with increased risk for STIs, including chlamydia and gonorrhea (*102*,*103*).

Serosorting is not recommended for the following reasons: many MSM who have HIV infection do not know they have HIV because they have not been tested recently, men's assumptions about the HIV status of their partners might be wrong, and some men with HIV infection might not disclose or might misrepresent their HIV status. All of these factors increase

直肠STI或梅毒感染(53人中1人)(*81 - 83*)。性活跃的成人和青少年应按照建议进行STI筛查(如衣原体、淋病和梅毒)，感染者应接受PrEP。USPSTF建议向有HIV感染风险者提供PrEP(84)。有HIV感染风险者包括其性伴或性伴们感染HIV的HIV阴性者(尤其是病毒载量可检测或未知时)、过去6个月内曾患淋病或梅毒者，以及共用注射器具的注射吸毒者(84)。临床实践指南建议对服用PrEP者进行STI筛查(80)，因为已有STI感染率增加的报道(*85 - 87*)。

性传播感染的暴露前预防

向HIV合并HSV感染者提供HSV治疗，并未证明能降低未感染伴侣的HIV感染风险。一项大型随机对照试验评估了血清不一致的异性伴侣中同时HSV-2血清阳性的HIV感染伴侣(88)。使用阿昔洛韦对HIV传播没有影响。这些发现与先前一项报告阿昔洛韦对HSV-2血清阳性者预防HIV感染无益的试验一致(89)。

多西环素预防已被研究用于预防细菌性STI。在一项初步研究中，30名既往有梅毒(自HIV诊断以来两次或以上发作)的HIV感染MSM被随机分配接受多西环素100 mg治疗48周或基于经济激励的行为干预(90)。该研究显示任何部位的任何细菌性STI减少了73%，性行为无实质性差异。其他研究多西环素预防的试验正在进行或筹备中(91)。

HIV和性传播感染暴露后预防

旨在预防因性暴露导致的HIV和其他STI的PEP使用指南可在https://www.cdc.gov/hiv/pdf/programresources/cdc-hiv-npep-Guidelines.pdf获取。寻求HIV PEP的性活跃者应在完成PEP疗程且HIV检测阴性后接受PrEP评估。HIV PEP在本报告其他部分也有讨论(见性侵犯和虐待与STI)。性暴露后的生殖器卫生方法(如阴道冲洗和灌洗)对预防HIV和STI无效，并可能增加细菌性阴道病(BV)、某些STI和HIV感染的风险(92)。

以多西环素200 mg在无保护肛交后服用的形式进行的STI PEP已在MSM和跨性别女性中研究；结果显示发病减少衣原体和梅毒分别减少70%和73%，但对淋病无效果(93)。关于多西环素预防细菌性STI的其他研究正在进行或开发中(91)。目前尚无关于STI PEP对 antimicrobial resistance 和微生物组影响的长期数据。需要进一步研究以确定STI PEP是否是STI预防的有效且有益的strategy。

HIV治疗即预防：对HIV感染者进行抗逆转录病毒治疗以预防其伴侣中的HIV

2011年，随机对照试验HPTN 052表明，在HIV混合状态的异性恋伴侣中，对感染方进行HIV抗逆转录病毒治疗(ART)可将传播给未感染方的风险降低96%(94)。因此，ART不仅有益于HIV感染者的健康，还降低了传播风险。针对HIV混合状态伴侣(包括异性恋和MSM伴侣，PARTNER研究)以及MSM伴侣(Opposites Attract和PARTNERS2研究)的其他研究报告称，接受ART并维持病毒载量检测不到的HIV患者没有将HIV传播给其HIV阴性性伴侣的风险(*95 - 97*)。基于这些原因，应向所有HIV感染者提供ART以实现病毒抑制。有关ART方案的详细指导可参见美国卫生与公众服务部的HIV治疗指南(98)。

HIV血清适应策略

用于HIV预防的血清适应策略主要起源于MSM社区。这些策略基于对自身和伴侣HIV状态的了解。一种具体的血清适应实践是血清分类，包括将无安全套肛交限制为与自身HIV状态相同的伴侣，或选择性地与HIV混合状态伴侣使用安全套。混合状态伴侣中的另一种实践是血清定位，即HIV感染者作为肛交的接受方。观察性研究一致报告，血清分类比持续使用安全套具有更高的HIV感染风险，但与无安全套且无血清分类的肛交相比风险较低(*99 - 101*)。血清分类实践与STI风险增加相关，包括衣原体和淋病(*102*, *103*)。

不推荐血清学配对，原因如下：许多感染HIV的MSM不知道自己感染HIV，因为他们近期未接受检测；男性对其伴侣HIV状态的假设可能是错误的；一些感染HIV的男性可能不会披露或可能歪曲其HIV状态。所有这些因素都会增加

the risk that serosorting can lead to HIV infection. Serosorting has not been studied among heterosexually active persons.

Abstinence and Reduction of Number of Sex Partners

Abstinence from oral, vaginal, and anal sex and participating in a long-term, mutually monogamous relationship with a partner known to be uninfected are prevention approaches to avoid transmission of STIs. For persons who are being treated for an STI (or whose partners are undergoing treatment), counseling that encourages abstinence from sexual intercourse until completion of the entire course of medication is vital for preventing reinfection. A trial conducted among women regarding the effectiveness of counseling messages when patients have cervicitis or vaginal discharge demonstrated that women whose sex partners have used condoms might benefit from a hierarchical message that includes condoms but women without such experience might benefit more from an abstinence-only message (*104*). A more comprehensive discussion of abstinence and other sexual practices that can help persons reduce their risk for STIs is available in *Contraceptive Technology, 21st Edition* (*31*).

Partner Services

The term "partner services" refers to a continuum of clinical evaluation, counseling, diagnostic testing, and treatment designed to increase the number of infected persons brought to treatment and to reduce transmission among sexual networks. This continuum includes efforts of health departments, medical providers, and patients themselves. The term "public health partner services" refers to efforts by public health departments to identify the sex and needle-sharing partners of infected persons to ensure their medical evaluation and treatment. Health departments are increasingly incorporating referral to additional services, as indicated, into the partner services continuum. Aside from the general benefit to patients and partners, service referrals and linkage can mitigate the circumstances that increase risk for future STI and HIV acquisition.

The types and comprehensiveness of public health partner services and the specific STIs for which they are offered vary by public health agency, their resources, and the geographic prevalence of STIs. In most areas of the United States, health departments routinely attempt to provide partner services to all persons with infectious syphilis (primary or secondary) and persons with a new diagnosis of HIV infection. Health departments should provide partner services for persons who might have cephalosporin-resistant gonorrhea. In contrast, relatively few U.S. health departments routinely provide STI partner services to persons with gonorrhea, chlamydia, trichomoniasis, or other STIs (*105*). Because STI diagnoses often can serve as risk markers for HIV acquisition (*83*), public health services might include follow-up of MSM with an STI to offer HIV PrEP. Public health services can also include HIV and STI prevention interventions including HIV and STI testing, linkage and relinkage of persons with HIV infection to HIV care clinics, and referral of partners of persons with STIs or HIV infection to HIV PrEP, as indicated (*106*–*109*). Clinicians should familiarize themselves with public health practices in their area; however, in most instances, providers should understand that responsibility for discussing the treatment of partners of persons with STIs rests with the diagnosing provider and the patient. State laws require a good faith effort by the provider to inform partners, and providers should familiarize themselves with public health laws.

Clinicians who do not notify partners of patients directly can still provide partner services by counseling infected persons and providing them with written information and medication to give to their partners (if recommended and allowable by state law), directly evaluating and treating sex partners, and cooperating with state and local health departments. Clinicians' efforts to ensure treatment of patients' sex partners can reduce the risk for reinfection and potentially diminish transmission of STIs (*110*). Therefore, clinicians should encourage all persons with STIs to notify their sex partners and urge them to seek medical evaluation and treatment. Exceptions to this practice include circumstances posing a risk for intimate partner violence (*111*). Available data are limited regarding the rate of intimate partner violence directly attributable to partner notification (*112*,*113*); however, because of the reported prevalence of intimate partner violence in the general population (*114*), providers should consider the potential risk before notifying partners of persons or encouraging partner notification. Time spent counseling patients about the importance of notifying partners is associated with improved notification outcomes (*115*). When possible, clinicians should advise persons to bring their primary sex partner with them when returning for treatment and should concurrently treat both persons. Although this approach can be effective for a main partner (*116*,*117*), it might not be a feasible approach for additional sex partners. Evidence indicates that providing patients with written information to share with sex partners can increase rates of partner treatment (*110*).

Certain health departments now use technology (e.g., email, texting, mobile applications, and social media outlets) to facilitate partner services for locating and notifying the sex partners of persons with STIs, including HIV (*118*,*119*). Patients now have the option to use Internet sites to send anonymous email or text messages advising partners of their exposure to an STI (*120*); anonymous notification via the

血清学配对可能导致HIV感染的风险。血清学配对尚未在异性性活跃人群中研究。

禁欲与减少性伴侣数量

禁欲(避免口交、阴道交和肛交)以及与已知未感染的伴侣建立长期、相互单一的性关系是避免STI传播的预防方法。对于正在接受STI治疗的人员(或其伴侣正在接受治疗)，鼓励在完成整个疗程前禁欲的咨询对于预防再感染至关重要。一项在女性中开展的关于宫颈炎或阴道分泌物患者咨询信息有效性的试验表明，性伴侣使用过安全套的女性可能受益于包含安全套的分层信息，而无此经历的女性可能更受益于仅禁欲的信息(104)。关于禁欲及其他有助于降低STI风险的性行为的更全面讨论可参见*Contraceptive Technology, 21st Edition*(31)。

伴侣服务

"伴侣服务"一词指的是一系列临床评估、咨询、诊断检测和治疗，旨在增加接受治疗的感染者数量并减少性网络中的传播。这一连续服务包括卫生部门、医疗服务提供者和患者自身的努力。"公共卫生伴侣服务"一词指公共卫生部门为识别感染者的性伴侣和针具共用伴侣以确保其医学评估和治疗所做的努力。卫生部门正越来越多地将转介至其他适当服务纳入伴侣服务连续体系。除了对患者和伴侣的一般益处外，服务转介和链接可以缓解增加未来STI和HIV感染风险的环境因素。

公共卫生伴侣服务的类型和全面性以及所针对的具体STI因公共卫生机构、其资源和STI地理流行率而异。在美国大多数地区，卫生部门常规尝试为所有传染性梅毒(一期或二期)患者和新诊断HIV感染者提供伴侣服务。卫生部门应为可能患有头孢菌素耐药淋病的人员提供伴侣服务。相比之下，相对较少的美国卫生部门常规为淋病、衣原体、

滴虫感染或其他STI(105)。由于STI诊断通常可作为HIV感染的风险标志(83)，公共卫生服务可能包括对患有STI的MSM进行随访以提供HIV PrEP。公共卫生服务还可包括HIV和STI预防干预措施，包括HIV和STI检测、将HIV感染者链接和重新链接至HIV护理诊所，以及根据需要将STI或HIV感染者的伴侣转介至HIV PrEP(*106* - *109*)。临床医生应熟悉其所在地区的公共卫生实践；然而，在大多数情况下，提供者应理解，讨论STI患者伴侣治疗的责任在于诊断提供者和患者。州法律要求提供者善意努力告知伴侣，提供者应熟悉公共卫生法律。

不直接通知患者伴侣的临床医生仍可通过以下方式提供伴侣服务：对感染者进行咨询并向其提供书面信息和药物以转交其伴侣(如果推荐且州法律允许)、直接评估和治疗性伴侣，以及与州和地方卫生部门合作。临床医生确保患者性伴侣接受治疗的努力可降低再感染风险并可能减少STI传播(110)。因此，临床医生应鼓励所有STI患者通知其性伴侣并敦促他们寻求医学评估和治疗。此做法的例外情况包括存在亲密伴侣暴力风险的情形(111)。关于直接归因于伴侣通知的亲密伴侣暴力发生率的现有数据有限(*112*, *113*)；然而，鉴于一般人群中亲密伴侣暴力的报告患病率(114)，提供者在通知患者伴侣或鼓励伴侣通知之前应考虑潜在风险。花时间对患者进行关于通知伴侣重要性的咨询与改善的通知结果相关(115)。在可能的情况下，临床医生应建议患者在返回治疗时携带其主要性伴侣，并应同时治疗双方。尽管这种方法对主要伴侣可能有效(*116*, *117*)，但对其他性伴侣可能不是可行的方法。证据表明，向患者提供可与性伴侣分享的书面信息可提高伴侣治疗率(110)。

某些卫生部门现在使用技术(例如电子邮件、短信、移动应用程序和社交媒体渠道)来促进伴侣服务，以定位和通知STI(包括HIV)感染者的性伴侣(*118*, *119*)。患者现在可以选择使用互联网站点发送匿名电子邮件或短信，告知伴侣其STI暴露情况(120)；通过互联网进行匿名通知

Internet is considered better than no notification at all. However, because the extent to which these sites affect partner notification and treatment is uncertain, patients should be encouraged to notify their partners in person or by telephone, email, or text message; alternatively, patients can authorize a medical provider or public health professional to notify their sex partners.

Expedited Partner Therapy

Expedited partner therapy (EPT) is a harm-reduction strategy and the clinical practice of treating the sex partners of persons with diagnosed chlamydia or gonorrhea, who are unable or unlikely to seek timely treatment, by providing medications or prescriptions to the patient as allowable by law. Patients then provide partners with these therapies without the health care provider having examined the partner (https://www.cdc.gov/std/ept). Unless prohibited by law or other regulations, medical providers should routinely offer EPT to patients with chlamydia when the provider cannot ensure that all of a patient's sex partners from the previous 60 days will seek timely treatment. If the patient has not had sex during the 60 days before diagnosis, providers should offer EPT for the patient's most recent sex partner. Because EPT must be an oral regimen and current gonorrhea treatment involves an injection, EPT for gonorrhea should be offered to partners unlikely to access timely evaluation after linkage is explored. EPT is legal in the majority of states but varies by chlamydial or gonococcal infection. Providers should visit https://www.cdc.gov/std/ept to obtain updated information for their state. Providing patients with packaged oral medication is the preferred approach because the efficacy of EPT using prescriptions has not been evaluated, obstacles to EPT can exist at the pharmacy level (*121*,*122*), and many persons (especially adolescents) do not fill the prescriptions provided to them by a sex partner (*123*,*124*). Medication or prescriptions provided for EPT should be accompanied by educational materials for the partner, including treatment instructions, warnings about taking medications (e.g., if the partner is pregnant or has an allergy to the medication), general health counseling, and a statement advising that partners seek medical evaluation as soon as possible for HIV infection and any symptoms of STIs, particularly PID.

Evidence supporting EPT is based on three U.S. clinical trials involving heterosexual men and women with chlamydia or gonorrhea (*125*–*127*). All three trials reported that more partners were treated when patients were offered EPT. Two reported statistically significant decreases in the rate of reinfection, and one observed a lower risk for persistent or recurrent infection that was statistically nonsignificant. A fourth trial in the United Kingdom did not demonstrate a difference in the risk for reinfection or in the numbers of partners treated between persons offered EPT and those advised to notify their sex partners (*128*). U.S. trials and a meta-analysis of EPT revealed that the magnitude of reduction in reinfection of index patients, compared with patient referral, differed according to the STI and the sex of the index patient (*110*,*125*–*127*). However, across trials, reductions in chlamydia prevalence at follow-up were approximately 20%, and reductions in gonorrhea were approximately 50% at follow-up.

Existing data indicate that EPT also might have a role in partner management for trichomoniasis; however, no partner management intervention has been reported to be more effective than any other in reducing trichomoniasis reinfection rates (*129*,*130*). No data support use of EPT in the routine management of patients with syphilis.

Data are limited regarding use of EPT for gonococcal or chlamydial infections among MSM, compared with heterosexuals (*131*,*132*). Published studies, including recent data regarding extragenital testing, indicated that male partners of MSM with diagnosed gonorrhea or chlamydia might have other bacterial STIs (gonorrhea or syphilis) or HIV (*133*–*135*). Studies have reported that 5% of MSM have a new diagnosis of HIV when evaluated as partners of men with gonococcal or chlamydial infections (*133*,*134*); however, more recent data indicate that, in certain settings, the frequency of HIV infection is much lower (*135*). Considering limited data and potential for other bacterial STIs among MSM partners, shared clinical decision-making regarding EPT is recommended. All persons who receive bacterial STI diagnoses and their sex partners, particularly MSM, should be tested for HIV, and those at risk for HIV infection should be offered HIV PrEP (https://www.cdc.gov/hiv/pdf/risk/prep/cdc-hiv-prep-guidelines-2017.pdf).

Reporting and Confidentiality

Accurate and timely reporting of STIs is integral to public health efforts in assessing morbidity trends, allocating limited resources, and assisting local health authorities with partner notification and treatment. STI and HIV/AIDS cases should be reported in accordance with state and local statutory requirements. Syphilis (including congenital syphilis), gonorrhea, chlamydia, chancroid, and HIV are reportable diseases in every state. Because the requirements for reporting other STIs differ by state, clinicians should be familiar with the reporting requirements applicable within their jurisdictions.

Reporting can be provider based, laboratory based, or both. Clinicians who are unsure of state and local reporting requirements should seek advice from state or local health department STI programs. STI and HIV reports are kept confidential. In most jurisdictions, such reports are protected

被认为优于完全不通知。然而，由于这些站点影响伴侣通知和治疗的程度尚不确定，应鼓励患者亲自或通过电话、电子邮件或短信通知其伴侣；或者，患者可以授权医疗提供者或公共卫生专业人员通知其性伴侣。

加速伴侣治疗

快速伴侣治疗(EPT)是一种危害减少策略，也是对确诊衣原体或淋病感染者的性伴侣(无法或不太可能及时寻求治疗者)进行治疗的临床实践，其方式为在法律允许的情况下向患者提供药物或处方。患者随后将这些治疗提供给伴侣，而无需医疗保健提供者检查伴侣(https://www.cdc.gov/std/ept)。除非法律或其他法规禁止，医疗提供者应常规向衣原体患者提供EPT，前提是提供者无法确保患者过去60天内的所有性伴侣都将及时寻求治疗。如果患者在诊断前60天内没有性行为，提供者应针对患者最近的性伴侣提供EPT。由于EPT必须为口服方案且当前淋病治疗涉及注射，对于在探索链接后不太可能获得及时评估的伴侣，应提供淋病EPT。EPT在大多数州是合法的，但因衣原体或淋球菌感染而异。提供者应访问https://www.cdc.gov/std/ept以获取其所在州的最新信息。向患者提供包装好的口服药物是首选方法，因为使用处方的EPT疗效尚未评估、药房层面可能存在EPT障碍(*121*, *122*)，且许多人(尤其是青少年)不会填写性伴侣提供给他们的处方(*123*, *124*)。为EPT提供的药物或处方应附有面向伴侣的教育材料，包括治疗说明、用药警告(例如，如果伴侣怀孕或对药物过敏)、一般健康咨询，以及建议伴侣尽快寻求HIV感染和任何STI症状(尤其是PID)的医学评估的声明。

支持EPT的证据基于三项美国临床试验，涉及感染衣原体或淋病的异性恋男性和女性(*125* - *127*)。所有三项试验均报告，当向患者提供EPT时，更多伴侣接受了治疗。两项报告再感染率有统计学显著下降，一项观察到持续或复发性感染风险较低，但无统计学显著性。英国的第四项试验未能证明

接受EPT者与被告知通知其性伴侣者之间在再感染风险或治疗伴侣数量方面的差异(128)。美国试验和EPT的荟萃分析显示，与患者通知相比，指示患者再感染减少的幅度因STI和指示患者性别而异(*110*, *125* - *127*)。然而，在各试验中，随访时衣原体患病率的降低约为20%，随访时淋病的降低约为50%。

现有数据表明，EPT也可能在滴虫感染的伴侣管理中发挥作用；然而，尚无伴侣管理干预措施被报告在降低滴虫感染再感染率方面比其他任何措施更有效(*129*, *130*)。没有数据支持在梅毒患者的常规管理中使用EPT。

与异性恋者相比，关于MSM中淋球菌或衣原体感染使用EPT的数据有限(*131*, *132*)。已发表的研究(包括关于生殖器外检测的近期数据)表明，确诊淋病或衣原体的MSM的男性伴侣可能存在其他细菌性STI(淋病或梅毒)或HIV(*133* - *135*)。研究报告，作为淋球菌或衣原体感染男性的伴侣接受评估时，5%的MSM为新诊断HIV(*133*, *134*)；然而，更近期的数据表明，在某些环境中，HIV感染频率要低得多(135)。考虑到数据有限以及MSM伴侣中其他细菌性STI的可能性，建议就EPT进行共享临床决策。所有被诊断为细菌性STI者及其性伴侣，尤其是MSM，应接受HIV检测，有HIV感染风险者应提供HIV PrEP(https://www.cdc.gov/hiv/pdf/risk/prep/cdc-hiv-prep-guidelines-2017.pdf)。

报告与保密

准确及时报告STI是公共卫生工作的重要组成部分，有助于评估发病率趋势、分配有限资源，并协助地方卫生当局开展性伴通知和治疗。STI和HIV/AIDS病例应按照州和地方的法律要求进行报告。梅毒(包括先天性梅毒)、淋病、衣原体、软下疳和HIV在每個州均为法定报告疾病。由于其他STI的报告要求因州而异，临床医生应熟悉其所在辖区适用的报告要求。

报告可以基于提供者、基于实验室或两者兼有。不确定州和地方报告要求的临床医生应向州或地方卫生部门STI项目寻求建议。STI和HIV报告予以保密。在大多数司法管辖区，此类报告受

by statute or regulation. Before conducting a follow-up of a person with a positive STI test result, public health professionals should consult the patient's health care provider, if possible, to inform them of the purpose of the public health visit, verify the diagnosis, determine the treatments received, and ascertain the best approaches to patient follow-up.

Retesting After Treatment to Detect Repeat Infections

Retesting 3 months after diagnosis of chlamydia, gonorrhea, or trichomoniasis can detect repeat infection and potentially can be used to enhance population-based prevention (*136*,*137*). Any person who has a positive test for chlamydia or gonorrhea, along with women who have a positive test for trichomonas, should be rescreened 3 months after treatment. Any person who receives a syphilis diagnosis should undergo follow-up serologic syphilis testing per current recommendations and follow-up testing for HIV (see Syphilis). Additional information regarding retesting is available elsewhere in this report (see Chlamydial Infections; Gonococcal Infections; Syphilis; Trichomoniasis).

STI Detection Among Special Populations

Pregnant Women

Intrauterine or perinatally transmitted STIs can have debilitating effects on pregnant women, their fetuses, and their partners. All pregnant women and their sex partners should be asked about STIs, counseled about the possibility of perinatal infections, and provided access to recommended screening and treatment, if needed.

Recommendations for screening pregnant women for STIs to detect asymptomatic infections are based on disease severity and sequelae, prevalence among the population, costs, medicolegal considerations (e.g., state laws), and other factors. The following screening recommendations for pregnant women summarize clinical guidelines from federal agencies and medical professional organizations.

Screening Recommendations

HIV Infection

All pregnant women in the United States should be tested for HIV at the first prenatal visit, even if they have been previously tested (*138*). Testing pregnant women for HIV and prompt linkage to care of women with HIV infection are vital for women's health and reducing perinatal transmission of HIV through ART and obstetrical interventions. HIV testing should be offered as part of the routine panel of prenatal tests (i.e., opt-out testing). For women who decline HIV testing, providers should address their concerns and, when appropriate, continue to encourage testing. Partners of pregnant patients should be offered HIV testing if their status is unknown (*139*).

Retesting in the third trimester (preferably before 36 weeks' gestation) is recommended for women at high risk for acquiring HIV infection. Examples of women at high risk include those who inject drugs, have STIs during pregnancy, have multiple sex partners during pregnancy, have a new sex partner during pregnancy, or have partners with HIV infection; those who are receiving care in health care facilities in settings with HIV incidence ≥1 per 1,000 women per year; those who are incarcerated; those who live in areas with high rates of HIV infection; or those who have signs or symptoms of acute HIV infection (e.g., fever, lymphadenopathy, skin rash, myalgia, arthralgia, headache, oral ulcers, leukopenia, thrombocytopenia, or transaminase elevation) (*140*).

Rapid HIV testing should be performed for any woman in labor who has not been tested for HIV during pregnancy or whose HIV status is unknown, unless she declines. If a rapid HIV test result is positive, ART should be administered without waiting for the results of confirmatory testing (https://clinicalinfo.hiv.gov/sites/default/files/inline-files/PerinatalGL.pdf).

Syphilis

During 2012–2019, congenital syphilis rates in the United States increased from 8.4 to 48.5 cases per 100,000 births, a 477.4% increase (*141*). At least 45 states have a prenatal syphilis testing requirement, with high variability among those requirements (*142*). In the United States, all pregnant women should be screened for syphilis at the first prenatal visit, even if they have been tested previously (*143*). Prenatal screening for syphilis has been reported to be suboptimal in the United States (*144*,*145*). Testing in the third trimester and at delivery can prevent congenital syphilis cases (*146*,*147*). Partners of pregnant women with syphilis should be evaluated, tested, and treated.

When access to prenatal care is not optimal, a stat rapid plasma reagin (RPR) card test and treatment, if that test is reactive, should be administered at the time that a pregnancy is confirmed or when the pregnancy test is performed, if follow-up is uncertain. Pregnant women should be retested for syphilis at 28 weeks' gestation and at delivery if the mother lives in a community with high syphilis rates or is at risk for syphilis acquisition during pregnancy (e.g., misuses drugs or has an STI during pregnancy, having multiple sex partners, having a new sex partner, or having a sex partner with an STI). Neonates should not be discharged from the hospital unless

法规或条例保护。在对STI检测结果阳性者进行随访之前，公共卫生专业人员应尽可能咨询患者的医疗保健提供者，告知其公共卫生访视的目的，核实诊断，确定所接受的治疗，并确定患者随访的最佳方法。

复检治疗后以检测复发性感染

在衣原体、淋病或滴虫感染诊断后3个月进行复检可发现重复感染，并有可能用于加强基于人群的预防(*136*, *137*)。任何衣原体或淋病检测阳性者，以及滴虫检测阳性的女性，应在治疗后3个月重新筛查。任何确诊梅毒者应按照当前建议进行随访血清学梅毒检测及HIV随访检测(见梅毒)。有关复检的更多信息见本报告其他部分(见衣原体感染；淋球菌感染；梅毒；滴虫感染)。

STI检测在特殊人群

孕妇女性

宫内或围产期传播的STI可对孕妇、其胎儿及其伴侣产生衰弱性影响。应询问所有孕妇及其性伴侣关于STI的情况，就围产期感染的可能性进行咨询，并在需要时提供推荐的筛查和治疗机会。

筛查孕妇STI以检测无症状感染的建议基于疾病严重程度和后遗症、人群患病率、成本、法医学考虑(例如州法律)及其他因素。以下孕妇筛查建议总结了联邦机构和医学专业组织的临床指南。

筛查建议

HIV感染

美国所有孕妇应在首次产前检查时接受HIV检测，即使她们之前已接受过检测(138)。对孕妇进行HIV检测并将HIV感染女性及时链接至照护对于女性健康和减少围产期传播至关重要通过ART和产科干预减少HIV围产期传播。HIV检测应作为常规产前检测组合的一部分提供(即选择退出检测)。对于拒绝HIV检测的女性，提供者应解决其顾虑，并在适当时继续鼓励检测。妊娠患者的伴侣如果状态未知，应接受HIV检测(139)。

对于HIV感染高风险女性，建议在妊娠晚期(最好在妊娠36周之前)进行复检。高风险女性的例子包括：注射吸毒者、妊娠期间患有STI者、妊娠期间有多个性伴者、妊娠期间有新性伴者、或性伴有HIV感染者；在HIV年发病率≥1/1000女性的医疗机构接受照护者；被监禁者；居住在HIV感染高发地区者；或有急性HIV感染体征或症状者(如发热、淋巴结肿大、皮疹、肌痛、关节痛、头痛、口腔溃疡、白细胞减少、血小板减少或转氨酶升高)(140)。

对于任何在妊娠期间未接受HIV检测或HIV状态未知的临产女性，应进行快速HIV检测，除非她拒绝。如果快速HIV检测结果呈阳性，应立即给予ART，无需等待确证检测结果(https://clinicalinfo.hiv.gov/sites/ default/files/inline-files/PerinatalGL.pdf)。

梅毒

2012-2019年间，美国先天性梅毒发病率从每100,000例活产8.4例上升至48.5例，增幅达477.4%(141)。至少45个州设有产前梅毒检测要求，但各州要求差异很大(142)。在美国，所有孕妇应在首次产前检查时进行梅毒筛查，即使既往已接受过检测(143)。据报道，美国产前梅毒筛查的实施情况欠佳(*144*, *145*)。在妊娠晚期和分娩时进行检测可预防先天性梅毒病例(*146*, *147*)。梅毒孕妇的性伴应接受评估、检测和治疗。

当产前保健可及性不佳时，若随访不确定，应在确认妊娠时或进行妊娠检测时立即行快速血浆反应素(RPR)卡片试验，并在试验呈反应性时给予治疗。如果孕妇居住在梅毒高发社区或存在妊娠期间感染梅毒的风险(如药物滥用或妊娠期间患有STI、有多个性伴、有新性伴、或性伴有STI)，应在妊娠28周和分娩时重新进行梅毒检测。新生儿不应出院，除非

the syphilis serologic status of the mother has been determined at least once during pregnancy. Any woman who delivers a stillborn infant should be tested for syphilis.

Hepatitis B

All pregnant women should be routinely tested for hepatitis B surface antigen (HBsAg) at the first prenatal visit even if they have been previously vaccinated or tested (*148*). Women who are HBsAg positive should be provided with, or referred for, counseling and medical management. Women who are HBsAg negative but at risk for HBV infection should be vaccinated. Women who were not screened prenatally, those who engage in behaviors that put them at high risk for infection (e.g., having had more than one sex partner during the previous 6 months, having been evaluated or treated for an STI, having had recent or current injection drug use, or having an HBsAg-positive sex partner), and those with clinical hepatitis should be tested at the time of admission to the hospital for delivery. To avoid misinterpreting a transient positive HBsAg result during the 21 days after vaccination, HBsAg testing should be performed before vaccine administration. All laboratories that conduct HBsAg tests should test initially reactive specimens with a licensed neutralizing confirmatory test. When pregnant women are tested for HBsAg at the time of admission for delivery, shortened testing protocols can be used, and initially reactive results should prompt expedited administration of immunoprophylaxis to neonates (*148*). Pregnant women who are HBsAg positive should be reported to the local or state health department to ensure that they are entered into a case-management system and that timely and age-appropriate prophylaxis is provided to their infants. Information concerning the pregnant woman's HBsAg status should be provided to the hospital where delivery is planned and to the health care provider who will care for the newborn. In addition, household and sexual contacts of women who are HBsAg positive should be vaccinated.

Chlamydia

All pregnant women aged <25 years as well as older women at increased risk for chlamydia (e.g., those aged ≥25 years who have a new sex partner, more than one sex partner, a sex partner with concurrent partners, or a sex partner who has an STI) should be routinely screened for *Chlamydia trachomatis* at the first prenatal visit (*149*). Pregnant women who remain at increased risk for chlamydial infection also should be retested during the third trimester to prevent maternal postnatal complications and chlamydial infection in the neonate. Pregnant women identified as having chlamydia should be treated immediately and have a test of cure to document chlamydial eradication by a nucleic acid amplification test (NAAT) 4 weeks after treatment. All persons diagnosed with a chlamydial infection should be rescreened 3 months after treatment.

Gonorrhea

All pregnant women aged <25 years as well as women aged ≥25 years at increased risk for gonorrhea (e.g., those with other STIs during pregnancy or those with a new sex partner, more than one sex partner, a sex partner with concurrent partners, or a sex partner who has an STI or is exchanging sex for money or drugs) should be screened for *Neisseria gonorrhoeae* at the first prenatal visit (*149*). Pregnant women who remain at high risk for gonococcal infection also should be retested during the third trimester to prevent maternal postnatal complications and gonococcal infection in the neonate. Clinicians should consider the communities they serve and might choose to consult local public health authorities for guidance on identifying groups that are more vulnerable to gonorrhea acquisition on the basis of local disease prevalence. Gonococcal infection, in particular, is concentrated among specific geographic locations and communities (https://www.cdc.gov/std/statistics/2019/default.htm). Pregnant women identified as having gonorrhea should be treated immediately. All persons diagnosed with gonorrhea should be rescreened 3 months after treatment.

Hepatitis C Virus

The rate of hepatitis C virus (HCV) infection has increased among pregnant women in recent years (*150–153*). HCV screening should be performed for all pregnant women during each pregnancy, except in settings where the HCV infection (HCV positivity) rate is <0.1% (*154–156*). The most important risk factor for HCV infection is past or current injecting drug use (*157*). Additional risk factors include having had a blood transfusion or organ transplantation before July 1992, having received clotting factor concentrates produced before 1987, having received an unregulated tattoo, having been on long-term hemodialysis, having other percutaneous exposures, or having HIV infection. All women with HCV infection should receive counseling, supportive care, and linkage to care (https://www.hcvguidelines.org). No vaccine is available for preventing HCV transmission.

Cervical Cancer

Pregnant women should undergo cervical cancer screening and at the same frequency as nonpregnant women; however, management differs slightly during pregnancy (*158*). Colposcopy is recommended for the same indications during pregnancy as for nonpregnant women. However, biopsies may be deferred, and endocervical sampling should not be performed. Treatment should not be performed during pregnancy unless cancer is detected.

母亲的梅毒血清学状态已在妊娠期间至少确定一次。任何分娩死胎的女性都应接受梅毒检测。

乙型肝炎

所有孕妇均应在首次产前检查时常规检测乙型肝炎表面抗原(HBsAg)，即使她们既往已接种疫苗或已接受检测(148)。HBsAg阳性妇女应获得或转介至咨询和医疗管理服务。HBsAg阴性但有HBV感染风险的妇女应接种疫苗。未接受产前筛查的妇女、存在高危感染行为者(例如，过去6个月内有多名性伴侣、曾因STI接受评估或治疗、近期或当前注射吸毒，或有HBsAg阳性性伴侣)，以及有临床肝炎的妇女，应在入院分娩时接受检测。为避免将接种疫苗后21天内出现的短暂HBsAg阳性结果误判，HBsAg检测应在接种疫苗前进行。所有开展HBsAg检测的实验室应对初筛反应性标本使用获批的中和确证试验进行检测。当孕妇在入院分娩时接受HBsAg检测时，可使用缩短的检测方案，初筛反应性结果应促使尽快为新生儿提供免疫预防(148)。HBsAg阳性孕妇应报告至当地或州卫生部门，以确保其被纳入病例管理系统，并确保其婴儿及时获得适龄预防。有关孕妇HBsAg状态的信息应提供给计划分娩的医院以及将照护新生儿的医疗保健提供者。此外，HBsAg阳性妇女的家庭和性接触者应接种疫苗。

衣原体

所有年龄<25岁的孕妇以及感染衣原体风险较高的年龄较大妇女(例如,年龄≥25岁且有新性伴侣、有多名性伴侣、性伴侣有其他并发性伴侣,或性伴侣有STI者)应在首次产前检查时常规筛查沙眼衣原体(149)。仍处于衣原体感染风险较高的孕妇还应在妊娠晚期复检，以预防母亲产后并发症和新生儿衣原体感染。被确定患有衣原体的孕妇应立即治疗，并在治疗后4周通过核酸扩增检测(NAAT)进行治愈检测以记录衣原体清除。所有人诊断为衣原体感染者应在治疗后3个月复检。

淋病

所有年龄<25岁的孕妇以及年龄≥25岁且淋病风险较高的妇女(例如,妊娠期间有其他STI者,或有新性伴侣、有多名性伴侣、性伴侣有其他并发性伴侣,或性伴侣有STI或以性换取金钱或毒品者)应在首次产前检查时筛查淋病奈瑟菌(149)。仍处于淋球菌感染高风险的孕妇还应在妊娠晚期复检，以预防母亲产后并发症和新生儿淋球菌感染。临床医生应考虑其所服务的社区，并可能选择咨询当地公共卫生部门，以根据当地疾病流行情况获得关于识别更易感染淋病群体的指导。尤其是淋球菌感染集中在特定地理位置和社区(https://www.cdc.gov/std/statistics/2019/default.htm)。被确定患有淋病的孕妇应立即治疗。所有诊断为淋病者应在治疗后3个月复筛。

丙型肝炎病毒

近年来，孕妇中丙型肝炎病毒(HCV)感染率有所上升(*150 - 153*)。所有孕妇应在每次妊娠期间接受HCV筛查，但HCV感染(HCV阳性)率<0.1%的环境除外(*154 - 156*)。HCV感染最重要的危险因素是既往或当前注射吸毒(157)。其他危险因素包括1992年7月前接受输血或器官移植、接受1987年前生产的凝血因子浓缩物、接受不受监管的纹身、长期血液透析、其他经皮暴露或HIV感染。所有HCV感染妇女应获得咨询、支持性照护并与照护服务衔接(https://www.hcvguidelines.org)。目前尚无预防HCV传播的疫苗。

宫颈癌

孕妇应接受宫颈癌筛查，频率与非孕妇相同；然而，妊娠期间的管理略有不同(158)。妊娠期间阴道镜检查的指征与非孕妇相同。然而，活检可推迟，不应进行宫颈管内取样。除非检测到癌症，否则妊娠期间不应进行治疗。

Bacterial Vaginosis, Trichomoniasis, and Genital Herpes

Evidence does not support routine screening for BV among asymptomatic pregnant women at high risk for preterm delivery (*159*). Symptomatic women should be evaluated and treated (see Bacterial Vaginosis). Evidence does not support routine screening for *Trichomonas vaginalis* among asymptomatic pregnant women. Women who report symptoms should be evaluated and treated (see Trichomoniasis). In addition, evidence does not support routine HSV-2 serologic screening among asymptomatic pregnant women. However, type-specific serologic tests might be useful for identifying pregnant women at risk for HSV-2 infection and for guiding counseling regarding the risk for acquiring genital herpes during pregnancy. Routine serial cultures for HSV are not indicated for women in the third trimester who have a history of recurrent genital herpes.

For more detailed discussions of STI screening and treatment among pregnant women, refer to the following references: *Screening for HIV Infection: U.S. Preventive Services Task Force Recommendation Statement* (*138*); *Recommendations for the Use of Antiretroviral Drugs in Pregnant Women with HIV Infection and Interventions to Reduce Perinatal HIV Transmission in the United States* (https://clinicalinfo.hiv.gov/sites/default/files/inline-files/PerinatalGL.pdf); *Guidelines for Perinatal Care* (*160*); *Prevention of Hepatitis B Virus Infection in the United States: Recommendations of the Advisory Committee on Immunization Practices* (*12*); *Screening for Chlamydia and Gonorrhea: U.S. Preventive Services Task Force Recommendation Statement* (*149*); *Screening for Bacterial Vaginosis in Pregnant Persons to Prevent Preterm Delivery: U.S. Preventive Services Task Force Recommendation Statement* (*159*); *Screening for Syphilis Infection in Pregnant Women: U.S. Preventive Services Task Force Recommendation Statement* (*161*); *Serologic Screening for Genital Herpes Infection: U.S. Preventive Services Task Force Recommendation Statement* (*162*); *Screening for HIV Infection in Pregnant Women: A Systematic Review for the U.S. Preventive Services Task Force* (*163*); *Screening for Hepatitis B in Pregnant Women: Updated Evidence Report and Systematic Review for the U.S. Preventive Services Task Force* (*164*); and *CDC Recommendations for Hepatitis C Screening Among Adults — United States, 2020* (*156*).

Adolescents

In the United States, prevalence rates of certain STIs are highest among adolescents and young adults (*141*). For example, reported rates of chlamydia and gonorrhea are highest among females during their adolescent and young adult years, and many persons acquire HPV infection during that time.

Persons who initiate sex early in adolescence are at higher risk for STIs, as are adolescents living in detention facilities; those receiving services at STD clinics; those who are involved in commercial sex exploitation or survival sex and are exchanging sex for drugs, money, food, or housing; young males who have sex with males (YMSM); transgender youths; and youths with disabilities, substance misuse, or mental health disorders. Factors contributing to increased vulnerability to STIs during adolescence include having multiple sex partners, having sequential sex partnerships of limited duration or concurrent partnerships, failing to use barrier protection consistently and correctly, having lower socioeconomic status, and facing multiple obstacles to accessing health care (*141*,*165*).

All 50 states and the District of Columbia explicitly allow minors to consent for their own STI services. No state requires parental consent for STI care, although the age at which a minor can provide consent for specified health care services (i.e., HPV vaccination and HIV testing and treatment) varies among states. In 2019, a total of 18 states allowed but did not require physicians to notify parents of a minor's receipt of STI services, including states where minors can legally provide their own consent to the service (https://www.cdc.gov/hiv/policies/law/states/minors.html).

Protecting confidentiality for STI care, particularly for adolescents enrolled in private health insurance plans, presents multiple problems. After a claim has been submitted, many states mandate that health plans provide a written statement to the beneficiary indicating the service performed, the charges covered, what the insurer allows, and the amount for which the patient is responsible (i.e., explanation of benefits [EOB]) (*166*–*169*). In addition, federal laws obligate notices to beneficiaries when claims are denied, including alerting beneficiaries who need to pay for care until the allowable deductible is reached. For STI testing and treatment-related care, an EOB or medical bill that is received by a parent might disclose services provided and list STI laboratory tests performed or treatment administered. Some states have instituted mechanisms for protecting adolescents' confidentiality and limiting EOBs. Additional risks to confidentiality breaches can inadvertently occur through electronic health records, although technology continues to evolve to assist with ensuring confidential care. AAP and the Society for Adolescent Health and Medicine (SAHM) have published guidance on strategies to address emerging risks for confidentiality breaches associated with health information technology (*169*).

AAP and the SAHM recommend that providers have time alone with their adolescent patients that includes assessment for sexual behavior. The AAP recommendations are available at https://services.aap.org/en/news-room/campaigns-and-toolkits/adolescent-health-care and the SAHM

细菌性阴道病、滴虫病和生殖器疱疹

证据不支持对早产高风险的无症状孕妇常规筛查BV(159)。有症状妇女应接受评估和治疗(见细菌性阴道病)。证据不支持对无症状孕妇常规筛查阴道毛滴虫。报告有症状的妇女应接受评估和治疗(见滴虫感染)。此外，证据不支持对无症状孕妇常规进行HSV-2血清学筛查。然而，型特异性血清学检测可能有助于识别有HSV-2感染风险的孕妇，并指导有关妊娠期间获得生殖器疱疹风险的咨询。对于有复发性生殖器疱疹史的妊娠晚期妇女，不指示常规连续HSV培养。

关于孕妇性传播感染筛查和治疗的更详细讨论，请参阅以下参考文献：Screening for HIV Infection: U.S. Preventive Services Task Force Recommendation Statement (138)；Recommendations for the Use of Antiretroviral Drugs in Pregnant Women with HIV Infection and Interventions to Reduce Perinatal HIV Transmission in the United States (https://clinicalinfo.hiv.gov/sites/default/ files/inline-files/PerinatalGL.pdf)；Guidelines for Perinatal Care (160)；Prevention of Hepatitis B Virus Infection in the United States: Recommendations of the Advisory Committee on Immunization Practices (12)；Screening for Chlamydia and Gonorrhea: U.S. Preventive Services Task Force Recommendation Statement (149)；Screening for Bacterial Vaginosis in Pregnant Persons to Prevent Preterm Delivery: U.S. Preventive Services Task Force Recommendation Statement (159)；Screening for Syphilis Infection in Pregnant Women: U.S. Preventive Services Task Force Recommendation Statement (161)；Serologic Screening for Genital Herpes Infection: U.S. Preventive Services Task Force Recommendation Statement (162)；Screening for HIV Infection in Pregnant Women: A Systematic Review for the U.S. Preventive Services Task Force (163)；Screening for Hepatitis B in Pregnant Women: Updated Evidence Report and Systematic Review for the U.S. Preventive Services Task Force (164)；以及CDC Recommendations for Hepatitis C Screening Among Adults - United States, 2020 (156)。

青少年

在美国，某些STI的患病率在青少年和年轻成人中最高(141)。例如，报告的衣原体和淋病发病率在女性青少年和年轻成人期间最高，许多人在此期间获得HPV感染。

在青春期早期即开始性行为的人群STI风险较高，生活在拘留设施中的青少年、在STD诊所接受服务者、参与商业性剥削或生存性行为并以性换取毒品、金钱、食物或住所者、与男性发生性行为的年轻男性(YMSM)、跨性别青少年，以及存在残疾、物质滥用或精神健康障碍的青少年同样如此。青春期STI易感性增加的相关因素包括拥有多个性伴侣、连续存在持续时间有限的性伴关系或同时存在多个性伴关系、未能持续且正确使用屏障保护、社会经济地位较低，以及获得医疗保健面临多重障碍(*141*,*165*)。

全部50个州和哥伦比亚特区均明确允许未成年人自行同意接受STI服务。尽管未成年人可就特定医疗保健服务(即HPV疫苗接种及HIV检测和治疗)提供同意的年龄因州而异，但没有任何州要求STI诊疗须获得父母同意。2019年，共有18个州允许但不要求医生在未成年人接受STI服务时通知其父母，其中包括未成年人可合法自行同意接受该服务的州(https://www.cdc.gov/hiv/policies/ law/states/minors.html)。

保护STI诊疗的保密性，尤其是对参加私人医疗保险计划的青少年而言，存在多重问题。理赔申请提交后，许多州要求健康计划向受益人提供书面说明，载明所提供服务、承保费用、保险公司允许的金额以及患者需自行承担的金额(即福利说明[EOB])(*166 - 169*)。此外，联邦法律规定，理赔被拒时须通知受益人，包括提醒需要在达到可扣除限额前自付费用的受益人。对于STI检测和治疗相关诊疗，父母收到的EOB或医疗账单可能披露所提供服务，并列出所进行的STI实验室检测或所实施的治疗。一些州已建立保护青少年保密性并限制EOB的机制。尽管技术不断进步以协助确保保密诊疗，电子健康记录仍可能无意中造成额外的保密性泄露风险。AAP和青少年健康与医学学会(SAHM)已发布关于应对健康信息技术相关新兴保密性泄露风险策略的指导(169)。

AAP和SAHM建议提供者与青少年患者有单独相处的时间，其中包括性行为评估。AAP建议可在https://services.aap.org/en/news-room/ campaigns-and-toolkits/adolescent-health-care 获取，SAHM

recommendations are available at https://www.adolescenthealth.org/My-SAHM/Login-or-Create-an-Account.aspx?returnurl=%2fResources%2fClinical-Care-Resources%2fConfidentiality.aspx. Discussions concerning sexual behavior should be tailored for the patient's developmental level and be aimed at identifying risk behaviors (e.g., multiple partners; oral, anal, or vaginal sex; or drug misuse behaviors). Careful, nonjudgmental, and thorough counseling is particularly vital for adolescents who might not feel comfortable acknowledging their engagement in behaviors that make them more vulnerable to acquiring STIs.

Screening Recommendations

Recommendations for screening adolescents for STIs to detect asymptomatic infections are based on disease severity and sequelae, prevalence among the population, costs, medicolegal considerations (e.g., state laws), and other factors. Routine laboratory screening for common STIs is indicated for all sexually active adolescents. The following screening recommendations summarize published clinical prevention guidelines for sexually active adolescents from federal agencies and medical professional organizations.

Chlamydia

Routine screening for *C. trachomatis* infection on an annual basis is recommended for all sexually active females aged <25 years (*149*). Rectal chlamydial testing can be considered for females on the basis of reported sexual behaviors and exposure, through shared clinical decision-making between the patient and the provider (*170*,*171*). Evidence is insufficient to recommend routine screening for *C. trachomatis* among sexually active young males, on the basis of efficacy and cost-effectiveness. However, screening of sexually active young males should be considered in clinical settings serving populations of young men with a high prevalence of chlamydial infections (e.g., adolescent service clinics, correctional facilities, and STD clinics). Chlamydia screening, including pharyngeal or rectal testing, should be offered to all YMSM at least annually on the basis of sexual behavior and anatomic site of exposure (see Men Who Have Sex with Men).

Gonorrhea

Routine screening for *N. gonorrhoeae* on an annual basis is recommended for all sexually active females aged <25 years (*149*). Extragenital gonorrhea screening (pharyngeal or rectal) can be considered for females on the basis of reported sexual behaviors and exposure, through shared clinical-decision between the patient and the provider (*170*,*171*). Gonococcal infection is more prevalent among certain geographic locations and communities (*141*). Clinicians should consider the communities they serve and consult local public health authorities for guidance regarding identifying groups that are more vulnerable to gonorrhea acquisition on the basis of local disease prevalence. Evidence is insufficient to recommend routine screening, on the basis of efficacy and cost-effectiveness, for *N. gonorrhoeae* among asymptomatic sexually active young males who have sex with females only. Screening for gonorrhea, including pharyngeal or rectal testing, should be offered to YMSM at least annually (see Men Who Have Sex with Men).

Providers might consider opt-out chlamydia and gonorrhea screening (i.e., the patient is notified that testing will be performed unless the patient declines, regardless of reported sexual activity) for adolescent and young adult females during clinical encounters. Cost-effectiveness analyses indicate that opt-out chlamydia screening among adolescent and young adult females might substantially increase screening, be cost-saving (*172*), and identify infections among patients who do not disclose sexual behavior (*173*).

HIV Infection

HIV screening should be discussed and offered to all adolescents. Frequency of repeat screenings should be based on the patient's sexual behaviors and the local disease prevalence (*138*). Persons with HIV infection should receive prevention counseling and linkage to care before leaving the testing site.

Cervical Cancer

Guidelines from USPSTF and ACOG recommend that cervical cancer screening begin at age 21 years (*174*,*175*). This recommendation is based on the low incidence of cervical cancer and limited usefulness of screening for cervical cancer among adolescents (*176*). In contrast, the 2020 ACS guidelines recommend that cervical cancer screening begin at age 25 years with HPV testing. This change is recommended because the incidence of invasive cervical cancer in women aged <25 years is decreasing because of vaccination (*177*). Adolescents with HIV infection who have initiated sexual intercourse should have cervical screening cytology in accordance with HIV/AIDS guidelines (https://clinicalinfo.hiv.gov/en/guidelines/adult-and-adolescent-opportunistic-infection/human-papillomavirus-disease?view=full).

Other Sexually Transmitted Infections

YMSM and pregnant females should be routinely screened for syphilis (see Pregnant Women; Men Who Have Sex with Men). Local disease prevalence can help guide decision-making regarding screening for *T. vaginalis*, especially among adolescent females in certain areas. Routine screening of adolescents and young adults who are asymptomatic for certain STIs (e.g., syphilis, trichomoniasis, BV, HSV, HAV, and HBV) is not typically recommended.

建议可在https://www.adolescenthealth.org/My-SAHM/Login-or-Create-an-Account.aspxreturnurl= %2fResources%2fClinical-Care-Resources%2fConfidentiality.aspx获取。关于性行为的讨论应针对患者的发展水平进行调整，并旨在识别危险行为(例如，多个性伴侣；口交、肛交或阴道性交；或药物滥用行为)。对于可能不愿承认自己参与使其更易感染性传播感染的行为的青少年来说，细致、不带评判且全面的咨询尤为重要。

筛查建议

对青少年进行STI筛查以发现无症状感染的建议，是基于疾病严重程度和后遗症、人群中的患病率、成本、法医学考量(如州法律)以及其他因素。所有有性行为的青少年均适宜进行常见STI的常规实验室筛查。以下筛查建议总结了联邦机构和医学专业组织针对有性行为青少年发布的临床预防指南。

衣原体

建议对所有年龄<25岁且有性行为的女性每年进行*C.trachomatis*感染的常规筛查(149)。可根据报告的性行为和暴露情况，通过患者与提供者共同进行临床决策，考虑对女性进行直肠衣原体检测(*170*,*171*)。基于有效性和成本效益，证据不足以建议对有性行为的年轻男性进行*C.trachomatis*常规筛查。然而，在服务于衣原体感染患病率较高的年轻男性人群的临床环境中(如青少年服务诊所、惩教机构和STD诊所)，应考虑对有性行为的年轻男性进行筛查。应根据性行为和解剖暴露部位，至少每年向所有YMSM提供衣原体筛查，包括咽部或直肠检测(见男男性行为人群)。

淋病

建议对所有年龄<25岁且有性行为的女性每年进行*N.gonorrhoeae*常规筛查(149)。可根据报告的性行为和暴露情况，通过患者与提供者共同进行临床决策，考虑对女性进行生殖器外淋病筛查(咽部或直肠)(*170*,*171*)。淋球菌感染在某些地理位置和社区中更为流行(141)。临床医生应考虑其所服务的社区，并咨询当地公共卫生机构，以获取关于根据当地疾病患病率识别更易感染淋病群体的指导。基于有效性和成本效益，证据不足以建议对仅与女性发生性行为的无症状有性行为年轻男性进行*N.gonorrhoeae*常规筛查。应至少每年向YMSM提供淋病筛查，包括咽部或直肠检测(见男男性行为人群)。

提供者可在临床就诊期间考虑对青少年和年轻成年女性采用选择退出式衣原体和淋病筛查(即，无论报告的性活动如何，均告知患者将进行检测，除非患者拒绝)。成本效益分析表明，对青少年和年轻成年女性采用选择退出式衣原体筛查可能大幅提高筛查率、节省成本(172)，并识别出不披露性行为患者中的感染(173)。

HIV感染

应与所有青少年讨论并提供HIV筛查。重复筛查的频率应基于患者的性行为和当地疾病患病率(138)。HIV感染者应在离开检测点之前接受预防咨询并链接至照护。

宫颈癌

USPSTF和ACOG的指南建议宫颈癌筛查从21岁开始(*174*, *175*)。该建议基于青少年中宫颈癌发病率低以及筛查对青少年的有限实用性(176)。相比之下，2020年ACS指南建议宫颈癌筛查从25岁开始，采用HPV检测。推荐这一变化是因为由于疫苗接种，25岁以下女性浸润性宫颈癌的发病率正在下降(177)。已开始性行为的HIV感染青少年应根据HIV/AIDS指南进行宫颈筛查细胞学检查(https://clinicalinfo.hiv.gov/en/Guidelines/adult-and-adolescent-opportunistic-infection/human-papillomavirus-diseaseview=full)。

其他性传播感染

YMSM和妊娠女性应常规进行梅毒筛查(见妊娠女性；男男性行为人群)。当地疾病流行率有助于指导关于阴道毛滴虫筛查的决策，尤其是在某些地区的青少年女性中。通常不建议对无症状的青少年和年轻成人进行某些STI(如梅毒、滴虫感染、BV、HSV、HAV和HBV)的常规筛查。

Primary Prevention Recommendations

Primary prevention and anticipatory guidance for recognizing symptoms and behaviors associated with STIs are strategies that should be incorporated into all types of health care visits for adolescents and young adults. The following recommendations for primary prevention of STIs (i.e., vaccination and counseling) are based on published clinical guidelines for sexually active adolescents and young adults from federal agencies and medical professional organizations.

- HPV vaccination is recommended through age 26 years for those not vaccinated previously at the routine age of 11 or 12 years (https://www.cdc.gov/vaccines/hcp/acip-recs/vacc-specific/hpv.html).
- The HBV vaccination series is recommended for all adolescents and young adults who have not previously received the universal HBV vaccine series during childhood (*12*).
- The HAV vaccination series should be offered to adolescents and young adults as well as those who have not previously received the universal HAV vaccine series during childhood (https://www.cdc.gov/vaccines/schedules/hcp/imz/child-indications.html#note-hepa).
- Information regarding HIV transmission, prevention, testing, and implications of infection should be regarded as an essential component of the anticipatory guidance provided to all adolescents and young adults as part of routine health care.
- CDC and USPSTF recommend offering HIV PrEP to adolescents weighing ≥35 kg and adults who are HIV negative and at substantial risk for HIV infection (*80*,*178*). YMSM should be offered PrEP in youth-friendly settings with tailored adherence support (e.g., text messaging and visits per existing guidelines). Indications for PrEP, initial and follow-up prescribing guidance, and laboratory testing recommendations are the same for adolescents and adults (https://www.cdc.gov/hiv/risk/prep).
- Medical providers who care for adolescents and young adults should integrate sexuality education into clinical practice. Health care providers should counsel adolescents about the sexual behaviors that are associated with risk for acquiring STIs and should educate patients regarding evidence-based prevention strategies, which includes a discussion about abstinence and other risk-reduction behaviors (e.g., consistent and correct condom use and reduction in the number of sex partners including concurrent partners). Interactive counseling approaches (e.g., patient-centered counseling and motivational interviewing) are effective STI and HIV prevention strategies and are recommended by USPSTF. Educational materials (e.g., handouts, pamphlets, and videos) can reinforce office-based educational efforts.

Children

Management of children who have STIs requires close cooperation among clinicians, laboratorians, and child-protection authorities. Official investigations, when indicated, should be initiated promptly. Certain diseases (e.g., gonorrhea, syphilis, HIV, chlamydia, and trichomoniasis), if acquired after the neonatal period, strongly indicate sexual contact. For other diseases (e.g., HSV, HPV and anogenital warts, and vaginitis), the association with sexual contact is not as clear (see Sexual Assault and Abuse and STIs).

Men Who Have Sex with Men

MSM comprise a diverse group in terms of behaviors, identities, and health care needs (*179*). The term "MSM" often is used clinically to refer to sexual behavior alone, regardless of sexual orientation (e.g., a person might identify as heterosexual but still be classified as MSM). Sexual orientation is independent of gender identity. Classification of MSM can vary in the inclusion of transgender men and women on the basis of whether men are defined by sex at birth (i.e., transgender women included) or current gender identity (i.e., transgender men included). Therefore, sexual orientation as well as gender identity of individual persons and their sex partners should be obtained during health care visits. MSM might be at increased risk for HIV and other STIs because of their sexual network or behavioral or biologic factors, including number of concurrent partners, condomless sex, anal sex, or substance use (*180*–*182*). These factors, along with sexual network or higher community disease prevalence, can increase the risk for STIs among MSM compared with other groups (*183*,*184*).

Performing a detailed and comprehensive sexual history is the first step in identifying vulnerability and providing tailored counseling and care (*3*). Factors associated with increased vulnerability to STI acquisition among MSM include having multiple partners, anonymous partners, and concurrent partners (*185*,*186*). Repeat syphilis infections are common and might be associated with HIV infection, substance use (e.g., methamphetamines), Black race, and multiple sex partners (*187*). Similarly, gonorrhea incidence has increased among MSM and might be more likely to display antimicrobial resistance compared with other groups (*188*,*189*). Gonococcal infection among MSM has been associated with similar risk factors to syphilis, including having multiple anonymous partners and substance use, especially methamphetamines (*190*). Disparities in gonococcal infection are also more pronounced among certain racial and ethnic groups of MSM (*141*).

一级预防建议

识别与STI相关症状和行为的初级预防及预期指导策略，应纳入青少年和年轻成人的所有类型医疗就诊中。以下关于STI初级预防(即疫苗接种和咨询)的建议，基于联邦机构和医学专业组织针对有性行为的青少年和年轻成人已发表的临床指南。

- 建议通过 26 岁接种 HPV 疫苗
  对于既往未在11或12岁常规年龄接种者(https://www.cdc.gov/vaccines/hcp/acip- recs/vacc-specific/hpv.html)。
- 建议所有青少年接种HBV疫苗系列
  以及既往未在儿童期接受过普遍HBV疫苗系列的年轻成人(12)。
- 应向以下人群提供HAV疫苗接种系列：
  青少年和年轻成人，以及既往未在儿童期接受过普遍HAV疫苗系列者(https://www.cdc.gov/vaccines/ schedules/hcp/imz/child-indications.html#note-hepa)。
- 关于HIV传播、预防、检测的信息，
  感染的后果应被视为向所有青少年和年轻成人提供的预期指导的重要组成部分，作为常规医疗保健的一部分。
- CDC 和 USPSTF 建议向以下人群提供 HIV PrEP:
  体重≥35 kg的青少年和HIV阴性且HIV感染风险较高的成人(*80*, *178*)。应向YMSM在青年友好环境中提供PrEP，并提供量身定制的依从性支持(例如，根据现有指南进行短信提醒和就诊)。PrEP的适应证、初始和随访处方指导以及实验室检测建议对青少年和成人相同(https://www.cdc.gov/hiv/risk/prep)。
- 照护青少年及年轻
  成人应将性教育纳入临床实践。医疗保健提供者应就与获得STI风险相关的性行为向青少年提供咨询，并应就循证预防策略对患者进行教育，其中包括讨论禁欲和其他降低风险的行为(如持续正确使用安全套以及减少性伴侣数量，包括同时存在的伴侣)。互动式咨询方法(如以患者为中心的咨询和动机性访谈)是有效的STI和HIV预防策略，并受到USPSTF推荐。教育材料(如讲义、小册子和视频)可以强化诊室内的教育工作。

儿童

管理患有STI的儿童需要临床医生、实验室人员和儿童保护机构之间的密切合作。有指征时，应及时启动官方调查。某些疾病(如淋病、梅毒、HIV、衣原体和滴虫感染)，如果在新生儿期后获得，强烈提示性接触。对于其他疾病(如HSV、HPV和肛门生殖器疣以及阴道炎)，与性接触的关联尚不明确(见性侵犯和虐待与STI)。

男性 who have sex with men

MSM在行为、身份和医疗保健需求方面构成一个多样化的群体(179)。"MSM "一词在临床上通常仅指性行为，而不论性取向(例如，一个人可能认同为异性恋，但仍被归类为MSM)。性取向独立于性别认同。MSM的分类可能因男性是按出生时性别定义(即包括跨性别女性)还是按当前性别认同定义(即包括跨性别男性)而在是否纳入跨性别男性和女性方面有所不同。因此，在就诊时应获取个体及其性伴侣的性取向以及性别认同。MSM可能因其性网络或行为或生物学因素而面临更高的HIV和其他STI风险，包括同时拥有的伴侣数量、无安全套性行为、肛交或物质使用(*180 - 182*)。这些因素，连同性网络或更高的社区疾病流行率，可能使MSM相比其他群体具有更高的STI风险(*183*,*184*)。

进行详细而全面的性史是识别脆弱性并提供量身定制的咨询和护理的第一步(3)。与MSM中STI获得脆弱性增加相关的因素包括拥有多个伴侣、匿名伴侣和同时存在的伴侣(*185*,*186*)。复发性梅毒感染很常见，并可能与HIV感染、物质使用(如甲基苯丙胺)、黑人种族和多个性伴侣相关(187)。同样，淋病发病率在MSM中有所增加，并且与其他群体相比可能更易表现出抗菌药物耐药(*188*,*189*)。MSM中的淋球菌感染与梅毒相似的危险因素相关，包括拥有多个匿名伴侣和物质使用，尤其是甲基苯丙胺(190)。淋球菌感染的差异在某些种族和族裔MSM群体中也更为明显(141)。

HIV Risk Among Men Who Have Sex with Men

MSM are disproportionately at risk for HIV infection. In the United States, the estimated lifetime risk for HIV infection among MSM is one in six, compared with heterosexual men at one in 524 and heterosexual women at one in 253 (*191*). These disparities are further exacerbated by race and ethnicity, with African American/Black and Hispanic/Latino MSM having a one in two and a one in four lifetime risk for HIV infection, respectively. For HIV, transmission occurs much more readily through receptive anal sex, compared with penile-vaginal sex (*192*). Similar to other STIs, multiple partners, anonymous partners, condomless sex, and substance use are all associated with HIV infection (*193–196*). Importantly, other STIs also might significantly increase the risk for HIV infection (*197–199*). An estimated 10% of new HIV infections were attributable to chlamydial or gonococcal infection (*81*). A substantial number of MSM remain unaware of their HIV diagnosis (*200*). Clinical care involving MSM, including those who have HIV infection, should involve asking about STI-related risk factors and routine STI testing. Clinicians should routinely ask MSM about their sexual behaviors and symptoms consistent with common STIs, including urethral discharge, dysuria, ulcers, rash, lymphadenopathy, and anorectal symptoms that might be consistent with proctitis (e.g., discharge, rectal bleeding, pain on defecation, or pain during anal sex). However, certain STIs are asymptomatic, especially at rectal and pharyngeal sites, and routine testing is recommended. In addition, clinicians should provide education and counseling regarding evidence-based safer-sex approaches that have demonstrated effectiveness in reducing STI incidence (see HIV Infection, Detection, Counseling, and Referral).

Pre-Exposure Prophylaxis for HIV Prevention

PrEP is the use of medications for preventing an infection before exposure. Studies have demonstrated that a daily oral medication TDF/FTC is effective in preventing HIV acquisition, and specifically among MSM (*74*,*75*,*201*). PrEP guidelines provide information regarding sexually active persons who are at substantial risk for acquiring HIV infection (having had anal or vaginal sex during the previous 6 months with either a partner with HIV infection, a bacterial STI in the past 6 months, or inconsistent or no condom use with a sex partner) or persons who inject drugs (injecting partner with HIV infection or sharing injection equipment) (*80*). Those guidelines provide information regarding daily PrEP use for either TDF/FTC (men or women) or tenofovir alafenamide and emtricitabine for MSM. Screening for bacterial STIs should occur at least every 6 months for all sexually active patients and every 3 months among MSM or among patients with ongoing risk behaviors. MSM taking PrEP might compensate for decreased HIV acquisition risk by using condoms less frequently or modifying their behavior in other ways (*202*,*203*), although data regarding this behavior are inconsistent. Studies have reported that MSM taking PrEP have high rates of STIs, and frequent screening is warranted (*204–206*).

Importance of Rectal and Pharyngeal Testing

Rectal and pharyngeal testing by NAAT for gonorrhea and chlamydia is recognized as an important sexual health consideration for MSM. Rectal gonorrhea and chlamydia are associated with HIV infection (*82*,*207*), and men with repeat rectal infections can be at substantially higher risk for HIV acquisition (*208*). Pharyngeal infections with gonorrhea or chlamydia might be a principal source of urethral infections (*209–211*). Studies have demonstrated that among MSM, prevalence of rectal gonorrhea and chlamydia ranges from 0.2% to 24% and 2.1% to 23%, respectively, and prevalence of pharyngeal gonorrhea and chlamydia ranges from 0.5% to 16.5% and 0% to 3.6%, respectively (*171*). Approximately 70% of gonococcal and chlamydial infections might be missed if urogenital-only testing is performed among MSM (*212–216*) because most pharyngeal and rectal infections are asymptomatic. Self-collected swabs have been reported to be an acceptable means of collection for pharyngeal and rectal specimens (*217–219*), which can enhance patient comfort and reduce clinical workloads.

A detailed sexual history should be taken for all MSM to identify anatomic locations exposed to infection for screening. Clinics that provide services for MSM at high risk should consider implementing routine extragenital screening for *N. gonorrhoeae* and *C. trachomatis* infections, and screening is likely to be cost-effective (*220*).

Screening Recommendations

STI screening among MSM has been reported to be suboptimal. In a cross-sectional sample of MSM in the United States, approximately one third reported not having had an STI test during the previous 3 years, and MSM with multiple sex partners reported less frequent screening (*221*). MSM living with HIV infection and engaged in care also experience suboptimal rates of STI testing (*222*,*223*). Limited data exist regarding the optimal frequency of screening for gonorrhea, chlamydia, and syphilis among MSM, with the majority of evidence derived from mathematical modeling. Models from Australia have demonstrated that increasing syphilis screening frequency from two times a year to four times a year resulted in a relative decrease of 84% from peak prevalence (*224*). In a compartmental model applied to different populations in Canada, quarterly syphilis screening averted more than twice

男男性行为者中的HIV风险

MSM面临不成比例的HIV感染风险。在美国，MSM的估计终生HIV感染风险为六分之一，而异性恋男性为524分之一，异性恋女性为253分之一(191)。这些差异因种族和族裔而进一步加剧，非洲裔美国人/黑人和西班牙裔/拉丁裔MSM的终生HIV感染风险分别为二分之一和四分之一。对于HIV，与阴茎-阴道性交相比，接受性肛交更容易传播(192)。与其他STI类似，多个伴侣、匿名伴侣、无安全套性行为和物质使用均与HIV感染相关(*193 - 196*)。重要的是，其他STI也可能显著增加HIV感染风险(*197 - 199*)。估计有10%的新发HIV感染可归因于衣原体或淋球菌感染(81)。相当数量的MSM仍不知道自己的HIV诊断(200)。涉及MSM的临床护理，包括那些感染HIV者，应询问STI相关危险因素并进行常规STI检测。临床医生应常规询问MSM的性行为以及与常见STI一致的症状，包括尿道分泌物、排尿困难、溃疡、皮疹、淋巴结肿大，以及可能与直肠炎一致的肛门直肠症状(如分泌物、直肠出血、排便时疼痛或肛交时疼痛)。然而，某些STI是无症状的，尤其是在直肠和咽部部位，因此建议进行常规检测。此外，临床医生应就已被证明可有效降低STI发病率的循证安全性行为方法提供教育和咨询(见HIV感染、检测、咨询和转诊)。

HIV 预防的暴露前预防

PrEP是在暴露前使用药物以预防感染。研究已证明，每日口服药物TDF/FTC可有效预防HIV感染，尤其是在MSM中(*74*、*75*、*201*)。PrEP指南提供了有关以下性活跃人群的信息：HIV感染风险较高者(过去6个月内与HIV感染者发生肛交或阴道性交、过去6个月内患有细菌性STI，或与性伴侣不一致使用或不使用安全套)，或注射吸毒者(注射伴侣为HIV感染者或共用注射器具)(80)。这些指南提供了关于每日使用PrEP的信息，包括TDF/FTC(男性或女性)或tenofovir alafenamide联合emtricitabine用于MSM。所有性活跃患者应至少每6个月进行一次细菌性STI筛查，MSM中应每3个月筛查一次，或在持续存在风险行为的患者中。服用PrEP的MSM可能通过减少安全套使用频率或以其他方式改变行为来补偿HIV获得风险降低(*202*, *203*)，尽管关于此行为的数据不一致。研究报告服用PrEP的MSM的STI发生率较高，需要频繁筛查(*204 - 206*)。

直肠和咽部检测的重要性

通过NAAT进行直肠和咽部淋病及衣原体检测被认为是MSM性健康的重要考虑因素。直肠淋病和衣原体感染与HIV感染相关(*82*、*207*)，反复发生直肠感染的男性HIV感染风险可能显著更高(208)。咽部淋病或衣原体感染可能是尿道感染的主要来源(*209 - 211*)。研究已证明，在MSM中，直肠淋病和衣原体的患病率分别为0.2%至24%和2.1%至23%，咽部淋病和衣原体的患病率分别为0.5%至16.5%和0%至3.6%(171)。大约

如果在MSM中仅进行泌尿生殖道检测，70%的淋球菌和衣原体感染可能被漏诊(*212 - 216*)，因为大多数咽部和直肠感染无症状。据报道，自采集拭子是咽部和直肠标本可接受的采集方式(*217 - 219*)，可提高患者舒适度并减少临床工作量。

应为所有MSM采集详细的性史，以确定暴露于感染的解剖部位进行筛查。为高风险MSM提供服务的诊所应考虑实施针对*N.gonorrhoeae*和*C.trachomatis*感染的常规生殖器外筛查，且筛查可能具有成本效益(220)。

筛查建议

据报道，MSM中的STI筛查并不理想。在美国MSM的横断面样本中，约三分之一报告在过去3年内未进行过STI检测，而有多个性伴侣的MSM报告的筛查频率更低(221)。感染HIV并接受照护的MSM的STI检测率也不理想(*222*、*223*)。关于MSM中淋病、衣原体和梅毒的最佳筛查频率，现有数据有限，大多数证据来自数学建模。澳大利亚的模型表明，将梅毒筛查频率从每年两次增加到每年四次，可使患病率较峰值相对下降84%(224)。在应用于加拿大不同人群的区室模型中，与每半年筛查相比，每季度梅毒筛查避免了超过两倍

the number of syphilis cases, compared with semiannual screening (*225*). Furthermore, MSM screening coverage needed for eliminating syphilis among a population is substantially reduced from 62% with annual screening to 23% with quarterly screening (*226*,*227*). In an MSM transmission model that explored the impact of HIV PrEP use on STI prevalence, quarterly chlamydia and gonorrhea screening was associated with an 83% reduction in incidence (*205*). The only empiric data available that examined the impact of screening frequency come from an observational cohort of MSM using HIV PrEP in which quarterly screening identified more bacterial STIs, and semiannual screening would have resulted in delayed treatment of 35% of total identified STI infections (*206*). In addition, quarterly screening was reported to have prevented STI exposure in a median of three sex partners per STI infection (*206*). On the basis of available evidence, quarterly screening for gonorrhea, chlamydia, and syphilis for certain sexually active MSM can improve case finding, which can reduce the duration of infection at the population level, reduce ongoing transmission and, ultimately, prevalence among this population (*228*).

Preventive screening for common STIs is indicated for all MSM. The following screening recommendations summarize published federal agency and USPSTF clinical prevention guidelines for MSM and should be performed at least annually.

HIV Infection

HIV serologic testing is indicated if HIV status is unknown or if HIV negative and the patient or their sex partner has had more than one sex partner since the most recent HIV test.

Syphilis

Syphilis serologic testing is indicated to establish whether persons with reactive tests have untreated syphilis, have partially treated syphilis, or are manifesting a slow or inadequate serologic response to recommended previous therapy.

Gonorrhea and Chlamydia

The following testing is recommended for MSM:

- A test for urethral infection* with *N. gonorrhoeae* and *C. trachomatis* among men who have had insertive intercourse during the preceding year (urine NAAT is preferred).
- A test for rectal infection* with *N. gonorrhoeae* and *C. trachomatis* among men who have had receptive anal intercourse during the preceding year (rectal NAAT is preferred).
- A test for pharyngeal infection* with *N. gonorrhoeae* among men who have had receptive oral intercourse during the preceding year (pharyngeal NAAT is preferred).
- Testing for *C. trachomatis* pharyngeal infection is not recommended.

Basing screening practices solely on history might be suboptimal because providers might feel uncomfortable taking a detailed sexual history (*229*), men might also feel uncomfortable sharing personal sexual information with their provider, and rectal and pharyngeal infections can be identified even in the absence of reported risk behaviors (*171*). Furthermore, the role of saliva, kissing, and rimming (i.e., oral-rectal contact) in the transmission of *N. gonorrhoeae* and *C. trachomatis* has not been well studied (*230–232*).

Rectal and pharyngeal testing (provider-collected or self-collected specimens) should be performed for all MSM who report exposure at these sites. Testing can be offered to MSM who do not report exposure at these sites after a detailed explanation, due to known underreporting of risk behaviors. All MSM with HIV infection entering care should be screened for gonorrhea and chlamydia at appropriate anatomic sites of exposure as well as for syphilis.

More frequent STI screening (i.e., for syphilis, gonorrhea, and chlamydia) at 3- to 6-month intervals is indicated for MSM, including those taking PrEP and those with HIV infection, if risk behaviors persist or if they or their sex partners have multiple partners. In addition, providers can consider the benefits of offering more frequent HIV screening (e.g., every 3–6 months) to MSM at increased risk for acquiring HIV infection.

Hepatitis B Virus

All MSM should be screened with HBsAg, HBV core antibody, and HBV surface antibody testing to detect HBV infection (*233*). Vaccination against both HAV and HBV is recommended for all MSM for whom previous infection or vaccination cannot be documented. Serologic testing can be considered before vaccinating if the patient's vaccination history is unknown; however, vaccination should not be delayed. Vaccinating persons who have had previous infection or vaccination does not increase the risk for vaccine-related adverse events (see Hepatitis A Virus; Hepatitis B Virus).

Hepatitis C Virus

CDC recommends HCV screening at least once for all adults aged ≥18 years, except in settings where the prevalence of HCV infection (HCV RNA positivity) is <0.1% (*156*). The American Association for the Study of Liver Diseases/Infectious Diseases Society of America guidelines recommend all MSM with HIV infection be screened for HCV during the

* Regardless of condom use during exposure.

的梅毒病例数(225)。此外，在人群中消除梅毒所需的MSM筛查覆盖率从每年筛查的62%大幅降至每季度筛查的23%(*226*、*227*)。在一项探讨HIV PrEP使用对STI患病率影响的MSM传播模型中，每季度衣原体和淋病筛查与发病率下降83%相关(205)。唯一可用的、考察筛查频率影响的实证数据来自一项使用HIV PrEP的MSM观察性队列，其中每季度筛查发现了更多细菌性STI，而每半年筛查会导致35%的总确诊STI感染治疗延迟(206)。此外，据报道，每季度筛查在每次STI感染中预防了中位3名性伴侣的STI暴露(206)。基于现有证据，对某些性活跃MSM每季度进行淋病、衣原体和梅毒筛查可改善病例发现，从而可在人群层面缩短感染持续时间、减少持续传播，并最终降低该人群中的患病率(228)。

所有MSM均适用常见STI的预防性筛查。以下筛查建议总结了已发表的联邦机构和USPSTF针对MSM的临床预防指南，应至少每年进行一次。

HIV感染

如果HIV状态未知，或HIV阴性且患者或其性伴侣自最近一次HIV检测以来有超过一名性伴侣，则适用HIV血清学检测。

梅毒

适用梅毒血清学检测以确定反应性检测者是否有未治疗的梅毒、部分治疗的梅毒，或对既往推荐治疗表现出缓慢或不充分的血清学反应。

淋病与衣原体感染

建议对MSM进行以下检测：

- 对过去一年内有插入性交的男性进行尿道感染*检测，检测*N.gonorrhoeae*和*C.trachomatis*(首选尿液NAAT)。
- 采用*N.gonorrhoeae*检测直肠感染*，并*C.trachomatis*，针对过去一年内有接受性肛交的男性(首选直肠NAAT)。
- 对咽部感染*进行*N.gonorrhoeae*检测，在过去一年内有接受性口交的男性(首选咽部NAAT)。
- 咽部沙眼衣原体感染的检测不推荐。

仅根据病史进行筛查实践可能并不理想，因为提供者可能对采集详细性史感到不适(229)，男性也可能对向提供者分享个人性信息感到不适，而且即使没有报告危险行为，也可发现直肠和咽部感染(171)。此外，唾液、接吻和舔肛(即口-直肠接触)在*N.gonorrhoeae*和*C.trachomatis*传播中的作用尚未得到充分研究(*230 - 232*)。

对于所有报告在这些部位暴露的MSM，应进行直肠和咽部检测(提供者采集或自采集标本)。由于已知风险行为报告不足，可在详细解释后向未报告在这些部位暴露的MSM提供检测。所有进入照护的HIV感染MSM应在适当的暴露解剖部位筛查淋病和衣原体以及梅毒。

对于MSM，包括服用PrEP者和HIV感染者，如果风险行为持续存在或他们或其性伴侣有多个伴侣，则适用更频繁的STI筛查(即梅毒、淋病和衣原体)，间隔3至6个月。此外，提供者可考虑向HIV感染风险增加的MSM提供更频繁HIV筛查(例如，每3-6个月)的益处。

乙型肝炎病毒

所有MSM均应接受HBsAg、HBV核心抗体和HBV表面抗体检测以发现HBV感染(233)。建议所有无法记录既往感染或接种史的MSM接种HAV和HBV疫苗。若患者疫苗接种史不详，可考虑在接种前进行血清学检测；但不应延迟接种。对既往感染或已接种者进行接种不会增加疫苗相关不良事件的风险(见甲型肝炎病毒；乙型肝炎病毒)。

丙型肝炎病毒

CDC建议所有≥18岁成人至少进行一次HCV筛查，但HCV感染患病率(HCV RNA阳性)<0.1%的环境除外(156)。美国肝病研究协会/美国感染病学会指南建议所有HIV感染MSM在

* 无论暴露期间是否使用安全套。

initial HIV evaluation and at least annually thereafter (https://www.hcvguidelines.org). More frequent screening depends on ongoing risk behaviors, high-risk sexual behavior, and concomitant ulcerative STIs or STI-related proctitis. Sexual transmission of HCV can occur and is most common among MSM with HIV infection (*234–237*). Screening for HCV in this setting is cost-effective (*238*,*239*). Screening should be performed by using HCV antibody assays followed by HCV RNA testing for those with a positive antibody test. Suspicion for acute HCV infection (e.g., clinical evidence of hepatitis and risk behaviors) should prompt consideration for HCV RNA testing, despite a negative antibody test.

Human Papillomavirus

HPV infection and associated conditions (e.g., anogenital warts and anal squamous intraepithelial lesions) are highly prevalent among MSM. The HPV vaccination is recommended for all men, including MSM and transgender persons or immunocompromised males, including those with HIV infection, through age 26 years (*11*). More information is available at https://www.cdc.gov/hpv/downloads/9vhpv-guidance.pdf.

A digital anorectal examination (DARE) should be performed to detect early anal cancer among persons with HIV and MSM without HIV but who have a history of receptive anal intercourse. Data are insufficient to recommend routine anal cancer screening with anal cytology in populations at risk for anal cancer (see Anal Cancer). Health centers that initiate a cytology-based screening program should only do so if referrals to high-resolution anoscopy (HRA) and biopsy are available.

Herpes Simplex Virus-2

Evaluation for HSV-2 infection with type-specific serologic tests also can be considered if infection status is unknown among persons with previously undiagnosed genital tract infection (see Genital Herpes).

Postexposure Prophylaxis and Pre-Exposure Prophylaxis for STI Prevention

Studies have reported that a benefit might be derived from STI PEP and PrEP for STI prevention. One study demonstrated that monthly oral administration of a 1-g dose of azithromycin reduced infection with *N. gonorrhoeae* and *C. trachomatis* but did not decrease the incidence of HIV transmission (*240*). Among MSM, doxycycline taken as PEP in a single oral dose ≤24 hours after sex decreased infection with *Treponema pallidum* and *C. trachomatis;* however, no substantial effect was observed for infection with *N. gonorrhoeae* (*93*). Doxycycline taken as STI PrEP as 100 mg orally once daily also demonstrated a substantial reduction in gonorrhea, chlamydia, and syphilis among MSM (*90*). However, these studies had limitations because of small sample size, short duration of therapy, and concerns about antibiotic resistance, specifically regarding *N. gonorrhoeae* (*241*). Further study is needed to determine the effectiveness of using antimicrobials for STI PrEP or PEP.

Counseling and Education Approaches

Different counseling and STI prevention strategies are needed to effectively engage different groups of MSM. Outreach efforts should be guided by local surveillance efforts and community input. Engaging MSM at risk through social media, specifically online hookup sites, is an important outreach effort to consider. Hookup sites are Internet sites and mobile telephone applications that men might use for meeting other men for sex. Internet use might facilitate sexual encounters and STI transmission among MSM, and many men report using hookup sites to meet partners (*242–245*). The ease and accessibility of meeting partners online might reduce stigma and barriers of meeting partners through other settings. Moreover, these sites offer an opportunity for effective STI prevention messaging (*246*), although the cost might be limiting (*247*). Different groups of MSM might use different hookup sites, and efforts should be guided by local community input. Studies have demonstrated the acceptability and feasibility of reaching MSM through these hookup sites to promote STI prevention efforts (*248*,*249*).

Enteric Infections Among Men Who Have Sex with Men

The importance of sexual transmission of enteric pathogens among MSM has been recognized since the 1970s, after the first report of MSM-associated shigellosis was reported in San Francisco (*250*,*251*). Global increases in the incidence of shigellosis among adult MSM have been more recently observed (*252–256*). Sporadic outbreaks of *Shigella sonnei* and *Shigella flexneri* have been reported among MSM (*257–262*). Transmission occurs through oral-anal contact or sexual contact, and transmission efficiency is enhanced by both biologic or host and behavioral factors. HIV without viral suppression can be an independent risk factor that can contribute to transmission by increasing shedding of the enteric pathogen, increasing susceptibility of the host, or both (*255*,*263*). Surveillance data in England during 2004–2015 demonstrated that 21% of nontravel-associated *Shigella* diagnoses among MSM were among persons with HIV infection (*255*).

Other enteric organisms might also cause disease among MSM through sexual activities leading to oral-anal contact, including bacteria such as *Escherichia coli* (*264*) and

初始HIV评估，此后至少每年一次(https://www.hcvguidelines.org)。更频繁的筛查取决于持续的风险行为、高危性行为以及合并溃疡性STI或STI相关直肠炎。HCV可经性传播，在合并HIV感染的MSM中最为常见(*234-237*)。在此情况下进行HCV筛查具有成本效益(*238*,*239*)。筛查应使用HCV抗体检测，抗体阳性者随后进行HCV RNA检测。怀疑急性HCV感染(如肝炎的临床证据及风险行为)时，即使抗体检测阴性，也应考虑进行HCV RNA检测。

人乳头瘤病毒

HPV感染及相关疾病(例如，肛门生殖器疣和肛门鳞状上皮内病变)在MSM中高度流行。建议所有男性，包括MSM和跨性别者或免疫功能低下男性，包括HIV感染者，至26岁接种HPV疫苗(11)。更多信息见https://www.cdc.gov/hpv/downloads/9vhpv- guidance.pdf。

应进行数字肛门直肠检查(DARE)以检测HIV感染者和无HIV但有接受性肛交史的MSM中的早期肛门癌。数据不足以建议在肛门癌风险人群中使用肛门细胞学进行常规肛门癌筛查(见肛门癌)。启动基于细胞学筛查项目的健康中心应仅在可获得高分辨率肛门镜检查(HRA)和活检转诊时进行。

单纯疱疹病毒-2型

如果既往未诊断生殖道感染者感染状态未知，也可考虑使用型特异性血清学检测评估HSV-2感染(见生殖器疱疹)。

STI预防的暴露后预防和暴露前预防

研究报道，STI PEP和PrEP可能对STI预防有益。一项研究表明，每月口服1 g剂量阿奇霉素可减少*N.gonorrhoeae*和*C.trachomatis*感染，但未降低HIV传播发生率(240)。在MSM中，性行为后≤24小时内单次口服多西环素作为PEP可减少梅毒螺旋体和*C.trachomatis*感染；然而，对*N.gonorrhoeae*感染未观察到实质性效果(93)。多西环素100 mg每日口服一次作为STI PrEP也显示可大幅减少淋病，

咨询与教育方法

需要不同的咨询和STI预防策略才能有效覆盖不同MSM群体。外展工作应以当地监测工作和社区意见为指导。通过社交媒体，特别是在线约炮网站，接触高危MSM是值得考虑的重要外展工作。约炮网站是男性可能用于与其他男性见面发生性行为的互联网网站和手机应用程序。互联网使用可能促进MSM中的性接触和STI传播，许多男性报告使用约炮网站结识性伴(*242-245*)。在线结识性伴的便利性和可及性可能减少污名化和通过其他场所结识性伴的障碍。此外，这些网站为有效的STI预防信息传递提供了机会(246)，尽管成本可能构成限制(247)。不同MSM群体可能使用不同的约炮网站，相关工作应以当地社区意见为指导。研究已证明通过这些约炮网站接触MSM以促进STI预防工作的可接受性和可行性(*248*,*249*)。

男男性行为者中的肠道感染

自20世纪70年代旧金山首次报告MSM相关志贺菌病以来，肠道病原体在MSM中的性传播重要性已被认识(*250*,*251*)。近期观察到全球成年MSM中志贺菌病发病率上升(*252-256*)。MSM中已报告*Shigella sonnei*和Shigella flexneri的散发性暴发(*257-262*)。传播通过口-肛接触或性接触发生，生物学或宿主因素及行为因素均可增强传播效率。未抑制病毒的HIV感染可为独立危险因素，通过增加肠道病原体排出、增加宿主易感性或两者兼有而促进传播(*255*,*263*)。英格兰2004-2015年监测数据显示，MSM中非旅行相关志贺菌诊断的21%为HIV感染者(255)。

其他肠道微生物也可能通过导致口-肛接触的性活动在MSM中引起疾病，包括*Escherichia coli*(264)等细菌和

Campylobacter jejuni or *Campylobacter coli* (*265*,*266*); viruses such as HAV (*267*); and parasites such as *Giardia lamblia* or *Entamoeba histolytic*a (*268*,*269*). Behavioral characteristics associated with the sexual transmission of enteric infections are broadly similar to those associated with other STIs (e.g., gonorrhea, syphilis, and lymphogranuloma venereum [LGV]). This includes multiple sex partners and online hookup sites that increase opportunities for sexual mixing, which might create dense sexual networks that facilitate STI transmission among MSM (*270*). Specific behaviors associated with sexually transmitted enteric infections among MSM involve attendance at sex parties and recreational drug use including chem sex (i.e., using crystal methamphetamine, gamma-butyrolactone, or mephedrone before or during sex), which might facilitate condomless sex, group sex, fisting, use of sex toys, and scat play (*253*,*271*). The growing number of sexually transmitted enteric infections might be attributable in part to the emergence of antimicrobial resistance. This is well reported regarding *Shigella* species, for which rapid intercontinental dissemination of a *S. flexneri* 3a lineage with high-level resistance to azithromycin through sexual transmission among MSM (*272*) and clusters of multidrug resistant shigella cases among MSM have recently been reported (*273*). Multidrug-resistant *Campylobacter* species have also been documented (*266*,*274*). For MSM patients with diarrhea, clinicians should request laboratory examinations, including stool culture; provide counseling about the risk for infection with enteric pathogens during sexual activity (oral-anal, oral-genital, anal-genital, and digital-anal contact) that could expose them to enteric pathogens; and choose treatment, when needed, according to antimicrobial drug susceptibility.

Women Who Have Sex with Women and Women Who Have Sex with Women and Men

WSW and WSWM comprise diverse groups with variations in sexual identity, practices, and risk behaviors. Studies indicate that certain WSW, particularly adolescents, young women, and WSWM, might be at increased risk for STIs and HIV on the basis of reported risk behaviors (*275*–*280*). Studies have highlighted the diversity of sexual practices and examined use of protective or risk-reduction strategies among WSW populations (*281*–*283*). Use of barrier protection with female partners (e.g., gloves during digital-genital sex, external condoms with sex toys, and latex or plastic barriers [also known as dental dams for oral-genital sex]) was infrequent in all studies. Although health organizations have online materials directed to patients, few comprehensive and reliable resources of sexual health information for WSW are available (*284*).

Recent studies regarding STI rates among WSW and WSWM indicate that WSWM experience higher rates of STIs than WSW, with rates comparable with women who have sex with men (WSM) in all studies reviewed (*279*,*285*,*286*). These studies indicate that WSW might experience STIs at lower rates than WSWM and WSM, although still at significant rates (*287*). One study reported higher sexual-risk behaviors among adolescent WSWM and WSW than among adolescent WSM (*280*). WSW report reduced knowledge of STI risks (*288*), and both WSW and WSWM experience barriers to care, especially Black WSW and WSWM (*289*,*290*). In addition, a continuum of sexual behaviors reported by WSW and WSWM indicates the need for providers to not assume lower risk for WSW, highlighting the importance of an open discussion about sexual health.

Few data are available regarding the risk for STIs conferred by sex between women; however, transmission risk probably varies by the specific STI and sexual practice (e.g., oral-genital sex; vaginal or anal sex using hands, fingers, or penetrative sex items; and oral-anal sex) (*291*,*292*). Practices involving digital-vaginal or digital-anal contact, particularly with shared penetrative sex items, present a possible means for transmission of infected cervicovaginal or anal secretions. This possibility is most directly supported by reports of shared trichomonas infections (*293*,*294*) and by concordant drug-resistance genotype testing and phylogenetic linkage analysis identifying HIV transmitted sexually between women (*295*,*296*). The majority of WSW (53%–97%) have had sex with men in the past and continue to do so, with 5%–28% of WSW reporting male partners during the previous year (*292*,*297*–*300*).

HPV can be transmitted through skin-to-skin contact, and sexual transmission of HPV likely occurs between WSW (*301*–*303*). HPV DNA has been detected through polymerase chain reaction (PCR)–based methods from the cervix, vagina, and vulva among 13%–30% of WSW (*301*,*302*) and can persist on fomites, including sex toys (*304*). Among WSW who report no lifetime history of sex with men, 26% had antibodies to HPV-16, and 42% had antibodies to HPV-6 (*301*). High-grade squamous intraepithelial lesions (HSIL) and low-grade squamous intraepithelial lesions (LSIL) have been detected on Papanicolaou smears (Pap tests) among WSW who reported no previous sex with men (*301*,*302*). WSWM are at risk for acquiring HPV from both their female partners and male partners and thus are at risk for cervical cancer. Therefore, routine cervical cancer screening should be offered to all women, regardless of sexual orientation or practices, and young adult WSW and WSWM should be offered HPV vaccination in accordance with recommendations (*11*) (https://www.cdc.gov/vaccines/hcp/acip-recs/vacc-specific/hpv.html).

空肠弯曲菌或结肠弯曲菌(*265*,*266*)；病毒如HAV(267)；以及寄生虫如蓝氏贾第鞭毛虫或溶组织内阿米巴(*268*,*269*)。与肠道感染性传播相关的行为特征与与其他STI(如淋病、梅毒和性病性淋巴肉芽肿[LGV])相关的行为特征大体相似。这包括多个性伴侣和在线约炮网站，这些增加了性混合的机会，可能形成密集的性网络，促进MSM之间的STI传播(270)。MSM中与性传播肠道感染相关的具体行为涉及参加性派对和娱乐性药物使用，包括chem sex(即在性行为前或期间使用甲基苯丙胺晶体、γ-丁内酯或甲氧麻黄酮)，这可能促进无套性行为、群交、拳交、性玩具使用和粪便游戏(*253*,*271*)。性传播肠道感染数量的增长可能部分归因于抗菌药物耐药的出现。这在志贺菌属中有充分报道，其中一株对阿奇霉素高水平耐药的*S.flexneri* 3a谱系通过MSM之间的性传播快速跨洲传播(272)，并且最近报道了MSM中多重耐药志贺菌病例的聚集(273)。多重耐药弯曲菌属也已被记录(*266*,*274*)。对于有腹泻的MSM患者，临床医生应要求实验室检查，包括粪便培养；提供关于性活动(口-肛、口-生殖器、肛-生殖器和指-肛接触)期间感染肠道病原体风险的咨询，这些接触可能使他们暴露于肠道病原体；并根据抗菌药物敏感性选择治疗(当需要时)。

女性 who have sex with women and 女性 who have sex with 女性与男性

WSW和WSWM构成多样化的群体，在性身份、实践和风险行为方面存在差异。研究表明，某些WSW，特别是青少年、年轻女性和WSWM，根据报告的风险行为可能处于增加的STI和HIV风险中(*275 - 280*)。研究强调了性实践的多样性，并考察了WSW人群中保护性或风险降低策略的使用(*281 - 283*)。在所有研究中，与女性伴侣使用屏障保护(例如，指-生殖器性行为时戴手套、性玩具使用外部避孕套，以及口-生殖器性行为时使用乳胶或塑料屏障[也称为口交膜])都不常见。尽管卫生组织有针对患者的在线材料，但针对WSW的全面可靠的性健康信息资源很少(284)。

关于WSW和WSWM中STI发生率的最新研究表明，WSWM的STI发生率高于WSW，在所有审查的研究中与男男性行为女性(WSM)的发生率相当(*279*,*285*,*286*)。这些研究表明，WSW的STI发生率可能低于WSWM和WSM，但仍处于显著水平(287)。一项研究报告，青少年WSWM和WSW的性风险行为高于青少年WSM(280)。WSW报告对STI风险的了解减少(288)，并且WSW和WSWM都经历护理障碍，尤其是黑人WSW和WSWM(*289*,*290*)。此外，WSW和WSWM报告的连续性性行为表明，提供者不应假设WSW风险较低，这强调了公开讨论性健康的重要性。

关于女性之间性行为带来的STI风险的数据很少；然而，传播风险可能因特定STI和性实践(例如，口-生殖器性行为；使用手、手指或插入性性器具的阴道或肛交；以及口-肛性行为)而异(*291*,*292*)。涉及指-阴道或指-肛接触的实践，特别是共用插入性性器具，提供了传播受感染的宫颈阴道或肛门分泌物的可能途径。这一可能性最直接地得到共享滴虫感染报告的支持(*293*,*294*)，以及一致耐药基因型检测和系统发育连锁分析识别女性之间性传播的HIV的支持(*295*,*296*)。大多数WSW(53%-97%)过去曾与男性发生性行为并继续如此，5%-28%的WSW报告在过去一年中有男性伴侣(*292*,*297 - 300*)。

HPV可通过皮肤接触传播，HPV的性传播可能发生在WSW之间(*301 - 303*)。通过基于聚合酶链反应(PCR)的方法，在13%-30%的WSW的宫颈、阴道和外阴检测到HPV DNA(*301*,*302*)，并且可在污染物上持续存在，包括性玩具(304)。在报告无终生与男性性行为史的WSW中，26%有HPV-16抗体，42%有HPV-6抗体(301)。在报告先前无与男性性行为的WSW中，巴氏涂片(Pap测试)检测到高级别鳞状上皮内病变(HSIL)和低级别鳞状上皮内病变(LSIL)(*301*,*302*)。WSWM有从其女性伴侣和男性伴侣获得HPV的风险，因此有宫颈癌风险。因此，应向所有女性提供常规宫颈癌筛查，无论性取向或实践如何，并且应根据建议(11)(https://www.cdc.gov/vaccines/hcp/acip-recs/vacc-specific/hpv.html)向年轻成人WSW和WSWM提供HPV疫苗接种。

Genital transmission of HSV-2 between female sex partners is inefficient but can occur. A U.S. population-based survey among women aged 18–59 years demonstrated an HSV-2 seroprevalence of 30% among women reporting same-sex partners during the previous year, 36% among women reporting same-sex partners in their lifetime, and 24% among women reporting no lifetime same-sex behavior (*299*). HSV-2 seroprevalence among women self-identifying as homosexual or lesbian was 8%, similar to a previous clinic-based study of WSW (*299*,*305*) but was 26% among Black WSW in one study (*287*). The relatively frequent practice of orogenital sex among WSW and WSWM might place them at higher risk for genital infection with HSV-1, a hypothesis supported by the recognized association between HSV-1 seropositivity and previous number of female partners. Thus, sexual transmission of HSV-1 and HSV-2 can occur between female sex partners. This information should be communicated to women as part of sexual health counseling.

Trichomonas is a relatively common infection among WSW and WSWM, with prevalence rates higher than for chlamydia or gonorrhea (*306*,*307*), and direct transmission of trichomonas between female partners has been demonstrated (*293*,*294*).

Limited information is available regarding transmission of bacterial STIs between female partners. Transmission of syphilis between female sex partners, probably through oral sex, has been reported. Although the rate of transmission of *C. trachomatis* or *N. gonorrhoeae* between women is unknown, infection also might be acquired from past or current male partners. Data indicate that *C. trachomatis* infection among WSW can occur (*275*,*286*,*308*,*309*). Data are limited regarding gonorrhea rates among WSW and WSWM (*170*). Reports of same-sex behavior among women should not deter providers from offering and providing screening for STIs, including chlamydia, according to guidelines.

BV is common among women, and even more so among women with female partners (*310*–*312*). Epidemiologic data strongly demonstrate that BV is sexually transmitted among women with female partners. Evidence continues to support the association of such sexual behaviors as having a new partner, having a partner with BV, having receptive oral sex, and having digital-vaginal and digital-anal sex with incident BV (*313*,*314*). A study including monogamous couples demonstrated that female sex partners frequently share identical genital *Lactobacillus* strains (*315*). Within a community-based cohort of WSW, extravaginal (i.e., oral and rectal) reservoirs of BV-associated bacteria were a risk factor for incident BV (*316*). Studies have examined the impact of specific sexual practices on the vaginal microflora (*306*,*317*–*319*) and on recurrent (*320*) or incident (*321*,*322*) BV among WSW. A BV pathogenesis study in WSW reported that *Prevotella bivia,* *Gardnerella vaginalis*, and *Atopobium vaginae* might have substantial roles in development of incident BV (*323*). These studies have continued to support, although have not proven, the hypothesis that sexual behaviors, specific BV-associated bacteria, and possibly exchange of vaginal or extravaginal microbiota (e.g., oral bacterial communities) between partners might be involved in the pathogenesis of BV among WSW.

Although BV is common among WSW, routine screening for asymptomatic BV is not recommended. Results of one randomized trial used a behavioral intervention to reduce persistent BV among WSW through reduced sharing of vaginal fluid on hands or sex toys. Women randomly assigned to the intervention were 50% less likely to report receptive digital-vaginal contact without gloves than control subjects, and they reported sharing sex toys infrequently. However, these women had no reduction in persistent BV at 1 month posttreatment and no reduction in incident episodes of recurrent BV (*324*). Trials have not been reported examining the benefits of treating female partners of women with BV. Recurrent BV among WSW is associated with having a same-sex partner and a lack of condom use (*325*). Increasing awareness of signs and symptoms of BV among women and encouraging healthy sexual practices (e.g., avoiding shared sex toys, cleaning shared sex toys, and using barriers) might benefit women and their partners.

Sexually active women are at risk for acquiring bacterial, viral, and protozoal STIs from current and previous partners, both male and female. WSW should not be presumed to be at low or no risk for STIs on the basis of their sexual orientation. Report of same-sex behavior among women should not deter providers from considering and performing screening for STIs and cervical cancer according to guidelines. Effective screening requires that care providers and their female patients engage in a comprehensive and open discussion of sexual and behavioral risks that extends beyond sexual identity.

Transgender and Gender Diverse Persons

Transgender persons often experience high rates of stigma and socioeconomic and structural barriers to care that negatively affect health care usage and increase susceptibility to HIV and STIs (*326*–*332*). Persons who are transgender have a gender identity that differs from the sex that they were assigned at birth (*333*,*334*). Transgender women (also known as trans women, transfeminine persons, or women of transgender experience) are women who were assigned male sex at birth (born with male anatomy). Transgender men (also known as trans men, transmasculine persons, or men of transgender experience) are men who were assigned female sex at birth (i.e., born with female anatomy). In addition, certain persons might identify outside the gender binary of male or female or move back and

HSV-2在女性性伴侣之间的生殖器传播效率较低，但可能发生。一项基于美国人群的18-59岁女性调查显示，报告在过去一年中有同性伴侣的女性中HSV-2血清流行率为30%，报告一生中有同性伴侣的女性中为36%，报告一生中无同性性行为的女性中为24%(299)。自我认同为同性恋或女同性恋的女性中HSV-2血清流行率为8%，与先前一项基于诊所的WSW研究相似(*299*, *305*)，但在一项研究中黑人WSW中为26%(287)。WSW和WSWM中相对频繁的口交行为可能使其面临更高的HSV-1生殖器感染风险，这一假说得到了HSV-1血清阳性与既往女性伴侣数量之间已知关联的支持。因此，HSV-1和HSV-2的性传播可在女性性伴侣之间发生。此信息应作为性健康咨询的一部分传达给女性。

滴虫在WSW和WSWM中是相对常见的感染，患病率高于衣原体或淋病(*306*, *307*)，并且已证明滴虫可在女性伴侣之间直接传播(*293*, *294*)。

关于女性伴侣之间细菌性STI传播的信息有限。已有报道女性性伴侣之间梅毒传播，可能通过口交途径。尽管女性之间*C.trachomatis*或*N.gonorrhoeae*的传播率尚不清楚，但感染也可能从既往或当前男性伴侣处获得。数据表明WSW中可发生*C.trachomatis*感染(*275*, *286*, *308*, *309*)。关于WSW和WSWM中淋病发病率的数据有限(170)。女性同性性行为的报告不应妨碍提供者根据指南提供和进行STI筛查，包括衣原体筛查。

BV在女性中常见，在有女性伴侣的女性中更为常见(*310* - *312*)。流行病学数据强烈表明BV在有女性伴侣的女性中经性传播。证据持续支持新伴侣、伴侣患有BV、接受性口交以及手指-阴道和手指-肛门性交等性行为与新发BV的关联(*313*, *314*)。一项纳入单配偶伴侣的研究表明，女性性伴侣常共享相同的生殖器*Lactobacillus*菌株(315)。在一个基于社区的WSW队列中，BV相关细菌的阴道外(即口腔和直肠)储库是新发BV的危险因素(316)。研究已探讨了特定性行为对阴道微生物群的影响(*306*, *317* - *319*)以及对WSW中复发性(320)或新发(*321*, *322*)BV的影响。一项WSW中BV发病机制研究报告称*Prevotella bivia,*

*Gardnerella vaginalis*和*Atopobium vaginae*可能在 incident BV 的发生中起重要作用(323)。这些研究持续支持但尚未证明以下假设：性行为、特定的BV相关细菌以及伴侣之间可能的阴道或阴道外微生物群(例如，口腔细菌群落)交换可能参与WSW中BV的发病机制。

尽管BV在WSW中常见，但不推荐对无症状BV进行常规筛查。一项随机试验通过减少手上或性玩具上阴道液的共享，采用行为干预以减少WSW中持续性BV。随机分配到干预组的女性报告未戴手套接受手指-阴道接触的可能性比对照组低50%，且她们报告很少共享性玩具。然而，这些女性在治疗后1个月持续性BV无减少，复发性BV新发发作也无减少(324)。尚未有试验报告检查治疗BV女性女性伴侣的益处。WSW中复发性BV与有同性伴侣和缺乏安全套使用相关(325)。提高女性对BV体征和症状的认识并鼓励健康的性行为(例如，避免共享性玩具、清洁共享性玩具和使用屏障)可能有益于女性及其伴侣。

性活跃女性面临从当前和既往伴侣(包括男性和女性)获得细菌性、病毒性和原虫性STI的风险。不应根据性取向推定WSW处于STI低风险或无风险。女性同性性行为的报告不应妨碍提供者根据指南考虑和进行STI及宫颈癌筛查。有效的筛查要求照护提供者及其女性患者就性行为和行为风险进行全面开放的讨论，且讨论范围应超越性身份。

跨性别与性别多元人群

跨性别者往往面临高比例的污名以及社会经济和结构性照护障碍，这些因素对医疗服务使用产生负面影响，并增加其对HIV和STI的易感性(*326* - *332*)。跨性别者的性别认同与其出生时被指定的性别不同(*333*, *334*)。跨性别女性(又称跨性别女性、跨女性化者或有跨性别经历的女性)是出生时被指定为男性性别(出生时具有男性解剖结构)的女性。跨性别男性(又称跨性别男性、跨男性化者或有跨性别经历的男性)是出生时被指定为女性性别(即出生时具有女性解剖结构)的男性。此外，某些人可能认同自己不属于男性或女性的性别二元范畴，或在其间流动，并且

forth between different gender identities and use such terms as "gender nonbinary," "genderqueer," or "gender fluid" to describe themselves. Persons who use terms such as "agender" or "null gender" do not identify with having any gender. The term "cisgender" is used to describe persons who identify with their assigned sex at birth. Prevalence studies of transgender persons among the overall population have been limited and often are based on small convenience samples.

Gender identity is independent of sexual orientation. Sexual orientation identities among transgender persons are diverse. Persons who are transgender or gender diverse might have sex with cisgender men, cisgender women, or other transgender or gender nonbinary persons.

Clinical Environment Assessment

Providers should create welcoming environments that facilitate disclosure of gender identity and sexual orientation. Clinics should document gender identity and sex assigned at birth for all patients to improve sexual health care for transgender and gender nonbinary persons. Assessment of gender identity and sex assigned at birth has been validated among diverse populations, has been reported to be acceptable (*335*,*336*), and might result in increased patients identifying as transgender (*337*).

Lack of medical provider knowledge and other barriers to care (e.g., discrimination in health care settings or denial of services) often result in transgender and gender nonbinary persons avoiding or delaying preventive care services (*338*–*340*) and incurring missed opportunities for HIV and STI prevention services. Gender-inclusive and trauma-guided health care might increase the number of transgender patients who seek sexual health services, including STI testing (*341*), because transgender persons are at high risk for sexual violence (*342*).

Primary care providers should take a comprehensive sexual history, including a discussion of STI screening, HIV PrEP and PEP, behavioral health, and social determinants of sexual health. Clinicians can improve the experience of sexual health screening and counseling for transgender persons by asking for their choice of terminology or modifying language (e.g., asking patients their gender pronouns) to be used during clinic visits and history taking and examination (*343*). Options for fertility preservation, pregnancy potential, and contraception options should also be discussed, if indicated. For transgender persons who retain a uterus and ovaries, ovulation might continue in the presence of testosterone therapy, and pregnancy potential exists (https://transcare.ucsf.edu).

Transgender Women

A systematic review and meta-analysis of HIV infection among transgender women estimated that HIV prevalence in the United States is 14% among transgender women, with the highest prevalence among Black (44%) and Hispanic (26%) transgender women (*344*). Data also demonstrate high rates of HIV infection among transgender women worldwide (*345*). Bacterial STI prevalence varies among transgender women and is based largely on convenience samples. Despite limited data, international and U.S. studies have indicated elevated incidence and prevalence of gonorrhea and chlamydia among transgender women similar to rates among cisgender MSM (*346*–*348*). A recent study using data from the STD Surveillance Network revealed that the proportions of transgender women with extragenital chlamydial or gonococcal infections were similar to those of cisgender MSM (*349*).

Providers caring for transgender women should have knowledge of their patients' current anatomy and patterns of sexual behavior before counseling them about STI and HIV prevention. The majority of transgender women have not undergone genital-affirmation surgery and therefore might retain a functional penis; in these instances, they might engage in insertive oral, vaginal, or anal sex as well as receptive oral or anal sex. In the U.S. Transgender Survey, 12% of transgender women had undergone vaginoplasty surgery, and approximately 50% more were considering surgical intervention (*350*). Providers should have knowledge about the type of tissue used to construct the neovagina, which can affect future STI and HIV preventive care and screening recommendations. The majority of vaginoplasty surgeries conducted in the United States use penile and scrotal tissue to create the neovagina (*351*). Other surgical techniques use intestinal tissue (e.g., sigmoid colon graft) or split-skin grafts (*352*). Although these surgeries involve penectomy and orchiectomy, the prostate remains intact. Transgender women who have had a vaginoplasty might engage in receptive vaginal, oral, or anal sex.

Neovaginal STIs have infrequently been reported in the literature and include HSV and HPV/genital warts in penile-inversion vaginoplasty, *C. trachomatis* in procedures that involved penile skin and grafts with urethra mucosa or abdominal peritoneal lining (*353*), and *N. gonorrhoeae* in both penile-inversion and colovaginoplasty (*354*–*359*). If the vaginoplasty used an intestinal graft, a risk also exists for bowel-related disease (e.g., adenocarcinoma, inflammatory bowel disease, diversion colitis, and polyps) (*360*–*362*).

Transgender Men

The few studies of HIV prevalence among transgender men indicated that they have a lower prevalence of HIV infection than transgender women. A recent estimate of HIV prevalence among transgender men was 2% (*344*). However, transgender men who have sex with cisgender men might be at elevated

在不同性别认同之间流动，并使用"性别非二元"、"性别酷儿"或"性别流动"等术语来描述自己。使用"无性别"或"零性别"等术语的人不认同自己具有任何性别。"顺性别"一词用于描述认同其出生时指定性别的人。关于跨性别人群在总体人群中患病率的研究有限，且通常基于小型便利样本。

性别认同与性取向无关。跨性别者的性取向认同多种多样。跨性别或性别多元者可能与顺性别男性、顺性别女性或其他跨性别或性别非二元者发生性行为。

临床环境评估

医疗服务提供者应营造欢迎的环境，促进性别认同和性取向的披露。诊所应为所有患者记录性别认同和出生时指定性别，以改善跨性别和性别非二元人群的性健康照护。性别认同和出生时指定性别的评估已在多样化人群中得到验证，据报道是可接受的(*335*, *336*)，并可能导致更多患者认同为跨性别者(337)。

医疗提供者知识缺乏和其他照护障碍(例如，医疗环境中的歧视或拒绝服务)往往导致跨性别和性别非二元人群避免或延迟预防性照护服务(*338* - *340*)，并错失HIV和STI预防服务的机会。性别包容和创伤引导的医疗照护可能增加寻求性健康服务(包括STI检测)的跨性别患者数量(341)，因为跨性别者面临性暴力的高风险(342)。

初级照护提供者应采集全面的性史，包括讨论STI筛查、HIV PrEP和PEP、行为健康以及性健康的社会决定因素。临床医生可以通过询问跨性别者选择使用的术语或修改语言(例如，询问患者的性别代词)来改善性健康筛查和咨询的体验，以用于诊所就诊、病史采集和检查(343)。如有指征，还应讨论生育力保存、妊娠可能性和避孕选择。对于保留子宫和卵巢的跨性别者，在睾酮治疗期间排卵可能继续，妊娠可能性存在(https://transcare.ucsf.edu)。

跨性别女性

一项关于跨性别女性HIV感染的系统综述和荟萃分析估计，HIV患病率在美国，跨性别女性中为14%，其中黑人(44%)和西班牙裔(26%)跨性别女性的患病率最高(344)。数据还表明，全球跨性别女性中HIV感染率高(345)。细菌性STI患病率在跨性别女性中各不相同，主要基于便利样本。尽管数据有限，国际和美国研究表明，跨性别女性中淋病和衣原体的发病率和患病率升高，与顺性别MSM中的比率相似(*346* - *348*)。最近一项使用STD监测网络数据的研究显示，跨性别女性中生殖器外衣原体或淋球菌感染的比例与顺性别MSM相似(349)。

为跨性别女性提供医疗服务的医务人员在就STI和HIV预防进行咨询之前，应了解患者当前的解剖结构和性行为模式。大多数跨性别女性未接受生殖器确认手术，因此可能保留有功能的阴茎；在这些情况下，她们可能进行插入性口交、阴道交或肛交，以及接受性口交或肛交。在美国跨性别调查中，12%的跨性别女性接受过阴道成形术，另有约50%正在考虑手术干预(350)。医务人员应了解用于构建新阴道组织的类型，这可能影响未来的STI和HIV预防保健及筛查建议。美国大多数阴道成形术使用阴茎和阴囊组织构建新阴道(351)。其他手术技术使用肠道组织(如乙状结肠移植)或刃厚皮片移植(352)。尽管这些手术涉及阴茎切除术和睾丸切除术，前列腺仍保持完整。接受过阴道成形术的跨性别女性可能进行接受性阴道交、口交或肛交。

文献中罕有新阴道STI的报道，包括阴茎翻转阴道成形术后的HSV和HPV/生殖器疣、涉及阴茎皮肤及尿道黏膜或腹膜衬里移植手术中的*C.trachomatis*(353)，以及阴茎翻转阴道成形术和结肠阴道成形术中的*N.gonorrhoeae*(*354* - *359*)。如果阴道成形术使用了肠道移植，还存在肠道相关疾病的风险(如腺癌、炎症性肠病、转流性结肠炎和息肉)(*360* - *362*)。

跨性别男性

少数关于跨性别男性HIV患病率的研究表明，其HIV感染患病率低于跨性别女性。近期对跨性别男性HIV患病率的估计为2%(344)。然而，与顺性别男性发生性行为的跨性别男性可能面临更高的

risk for HIV infection (*332*,*363*,*364*). Data are limited regarding STI prevalence among transgender men, and the majority of studies have used clinic-based data or convenience sampling. Recent data from the STD Surveillance Network demonstrated higher prevalence of gonorrhea and chlamydia among transgender men, similar to rates reported among cisgender MSM (*365*).

The U.S. Transgender Survey indicated that the proportion of transgender men and gender diverse persons assigned female sex at birth who have undergone gender-affirmation genital surgery is low. Providers should consider the anatomic diversity among transgender men because a person can undergo a metoidioplasty (a procedure to increase the length of the clitoris), with or without urethral lengthening, and might not have a hysterectomy and oophorectomy and therefore be at risk for bacterial STIs, HPV, HSV, HIV, and cervical cancer (*366*). For transgender men using gender-affirming hormone therapy, the decrease in estradiol levels caused by exogenous testosterone can lead to vaginal atrophy (*367*,*368*) and is associated with a high prevalence of unsatisfactory sample acquisition (*369*). The impact of these hormonal changes on mucosal susceptibility to HIV and STIs is unknown.

Transgender men who have not chosen to undergo hysterectomy with removal of the cervix remain at risk for cervical cancer. These persons often avoid cervical cancer screening because of multiple factors, including discomfort with medical examinations and fear of discrimination (*338*,*370*). Providers should be aware that conducting a speculum examination can be technically difficult after metoidioplasty surgery because of narrowing of the introitus. In these situations, high-risk HPV testing using a swab can be considered; self-collected swabs for high-risk HPV testing has been reported to be an acceptable option for transgender men (*371*).

Screening Recommendations

The following are screening recommendations for transgender and gender diverse persons:

- Because of the diversity of transgender persons regarding surgical gender-affirming procedures, hormone use, and their patterns of sexual behavior, providers should remain aware of symptoms consistent with common STIs and screen for asymptomatic infections on the basis of the patient's sexual practices and anatomy.
- Gender-based screening recommendations should be adapted on the basis of anatomy (e.g., routine screening for *C. trachomatis* and *N. gonorrhoeae)* as recommended for all sexually active females aged <25 years on an annual basis and should be extended to transgender men and nonbinary persons with a cervix among this age group.
- HIV screening should be discussed and offered to all transgender persons. Frequency of repeat screenings should be based on level of risk.
- For transgender persons with HIV infection who have sex with cisgender men and transgender women, STI screening should be conducted at least annually, including syphilis serology, HCV testing, and urogenital and extragenital NAAT for gonorrhea and chlamydia.
- Transgender women who have had vaginoplasty surgery should undergo routine STI screening for all exposed sites (e.g., oral, anal, or vaginal). No data are available regarding the optimal screening method (urine or vaginal swab) for bacterial STIs of the neovagina. The usual techniques for creating a neovagina do not result in a cervix; therefore, no rationale exists for cervical cancer screening (*368*).
- If transgender men have undergone metoidioplasty surgery with urethral lengthening and have not had a vaginectomy, assessment of genital bacterial STIs should include a cervical swab because a urine specimen will be inadequate for detecting cervical infections.
- Cervical cancer screening for transgender men and nonbinary persons with a cervix should follow current screening guidelines (see Human Papillomavirus Infections).

Persons in Correctional Facilities

Multiple studies have demonstrated that persons entering correctional facilities have a high prevalence of STIs, HIV, and viral hepatitis, especially those aged ≤35 years (*141*,*372*,*373*). Risk behaviors for acquiring STIs (e.g., having condomless sex, having multiple sex partners, substance misuse, and engaging in commercial, survival, or coerced sex) are common among incarcerated populations. Before their incarceration, many persons have had limited access to medical care. Other social determinants of health (e.g., insufficient social and economic support or living in communities with high local STI prevalence) are common. Addressing STIs in correctional settings is vital for addressing the overall STI impact among affected populations.

Growing evidence demonstrates the usefulness of expanded STI screening and treatment services in correctional settings, including short-term facilities (jails), long-term institutions (prisons), and juvenile detention centers. For example, in jurisdictions with comprehensive, targeted jail screening, more chlamydial infections among females (and males if screened) are detected and subsequently treated in the correctional setting than in any other single reporting source (*141*,*374*) and might represent the majority of reported cases in certain jurisdictions (*375*). Screening in the jail setting has the potential to reach

HIV感染风险(*332*、*363*、*364*)。关于跨性别男性中性传播感染患病率的数据有限，且大多数研究使用的是诊所数据或便利抽样。来自STD Surveillance Network的最新数据显示，跨性别男性中淋病和衣原体的患病率较高，与报告的顺性别MSM中的发生率相似(365)。

美国跨性别调查表明，出生时被指定为女性且接受过性别确认生殖器手术的跨性别男性和性别多元人群比例较低。医务人员应考虑跨性别男性之间的解剖多样性，因为个体可能接受过阴茎成形术(增加阴蒂长度的手术)，伴或不伴尿道延长，且可能未行子宫切除术和卵巢切除术，因此面临细菌性STI、HPV、HSV、HIV和宫颈癌的风险(366)。对于使用性别确认激素治疗的跨性别男性，外源性睾酮引起的雌二醇水平下降可导致阴道萎缩(*367*, *368*)，并与标本采集不满意的高发生率相关(369)。这些激素变化对黏膜HIV和STI易感性的影响尚不清楚。

未选择接受子宫切除术及宫颈切除的跨性别男性仍面临宫颈癌风险。这些人常因多种因素而避免宫颈癌筛查，包括对医学检查的不适和对歧视的恐惧(*338*, *370*)。医务人员应意识到，阴茎成形术后因阴道口狭窄，进行窥器检查在技术上可能困难。在这些情况下，可考虑使用拭子进行高危HPV检测；自我采集拭子进行高危HPV检测已被报道为跨性别男性可接受的选择(371)。

筛查建议

以下是针对跨性别和性别多元者的筛查建议：

- 由于跨性别者在以下方面的多样性
  性别肯定手术、激素使用及其性行为模式，提供者应保持对常见STI相关症状的警觉，并根据患者的性行为和解剖结构筛查无症状感染。

- 基于性别的筛查建议应当
  根据解剖结构进行调整(例如，对沙眼衣原体和淋病奈瑟菌进行常规筛查)，正如建议所有25岁以下性活跃女性每年进行一次筛查，并且该建议应扩展至该年龄组中有宫颈的跨性别男性和非二元性别者。

- 应与所有人讨论并提供HIV筛查
  跨性别者。重复筛查的频率应基于风险水平。

- 对于感染 HIV 的跨性别者，若有性行为
  与顺性别男性和跨性别女性发生性行为者，应至少每年进行一次STI筛查，包括梅毒血清学、HCV检测以及针对淋病和衣原体的泌尿生殖道和生殖器外NAAT。

- 接受过阴道成形术的跨性别女性
  应对所有暴露部位(如口腔、肛门或阴道)进行常规STI筛查。关于新阴道细菌性STI的最佳筛查方法(尿液或阴道拭子)尚无数据。创建新阴道的常规技术不会产生宫颈；因此，没有理由进行宫颈癌筛查(368)。• 如果跨性别男性接受了尿道延长的阴茎头成形术

  且未进行阴道切除术，生殖器细菌性STI的评估应包括宫颈拭子，因为尿液标本不足以检测宫颈感染。

- 跨性别男性及
  有宫颈的非二元者应遵循当前筛查指南(见人乳头瘤病毒感染)。

人员在惩教设施

多项研究表明，进入惩教机构的人员STI、HIV和病毒性肝炎患病率高，尤其是年龄≤35岁者(*141*, *372*, *373*)。获得STI的风险行为(如无安全套性行为、多性伴、物质滥用以及从事商业性、生存性或被迫性行为)在监禁人群中常见。在入狱前，许多人获得医疗服务的机会有限。其他健康社会决定因素(如社会和经济支持不足或居住在STI局部流行率高的社区)也很常见。解决惩教环境中的STI问题对于应对受影响人群的整体STI影响至关重要。

越来越多的证据表明，在惩教场所(包括短期设施(看守所)、长期机构(监狱)和少年拘留中心)扩大STI筛查和治疗服务是有用的。例如，在具有全面、针对性看守所筛查的司法管辖区，女性(以及男性如果接受筛查)中检测到并随后在惩教场所治疗的衣原体感染比任何其他单一报告来源都多(*141*, *374*)，并且可能代表某些司法管辖区报告的大多数病例(375)。看守所环境中的筛查有可能覆盖

substantially more persons at risk than screening among the prison population alone.

Both males and females aged ≤35 years in juvenile and adult detention facilities have been reported to have higher rates of chlamydia and gonorrhea than nonincarcerated persons in the community (*141*,*374*,*376*). Syphilis seroprevalence rates, which can indicate previously treated or current infection, are considerably higher among incarcerated adult men and women than among adolescents, which is consistent with the overall national syphilis trends (*141*,*374*). Detection and treatment of early syphilis in correctional facilities might affect rates of transmission among adults and prevention of congenital syphilis (*377*).

In jails, approximately half of entrants are released back into the community within 48 hours. As a result, treatment completion rates for those screened for STIs and who receive STI diagnoses in short-term facilities might not be optimal. However, because of the mobility of incarcerated populations in and out of the community, the impact of screening in correctional facilities on the prevalence of infections among detainees and subsequent transmission in the community after release might be considerable (*378*). Moreover, treatment completion rates of ≥95% in short-term facilities can be achieved by offering screening at or shortly after intake, thus facilitating earlier receipt of test results and, if needed, follow-up of untreated persons can be conducted through public health outreach.

Universal, opt-out screening for chlamydia and gonorrhea among females aged ≤35 years entering juvenile and adult correctional facilities is recommended (*379*). Males aged <30 years entering juvenile and adult correctional facilities should also be screened for chlamydia and gonorrhea (*380*). Opt-out screening has the potential to substantially increase the number tested and the number of chlamydia and gonorrhea infections detected (*381*–*385*). Point-of-care (POC) NAAT might also be considered if the tests have demonstrated sufficient sensitivity and specificity. Studies have demonstrated high prevalence of trichomoniasis among incarcerated females (*386*–*392*).

Screening Recommendations

Chlamydia and Gonorrhea

Females aged ≤35 years and males aged <30 years housed in correctional facilities should be screened for chlamydia and gonorrhea. This screening should be conducted at intake and offered as opt-out screening.

Trichomonas

Females aged ≤35 years housed in correctional facilities should be screened for trichomonas. This screening should be conducted at intake and offered as opt-out screening.

Syphilis

Opt-out screening for incarcerated persons should be conducted on the basis of the local area and institutional prevalence of early (primary, secondary, or early latent) infectious syphilis. Correctional facilities should stay apprised of local syphilis prevalence. In short-term facilities, screening at entry might be indicated.

Viral Hepatitis

All persons housed in juvenile and adult correctional facilities should be screened at entry for viral hepatitis, including HAV, HBV, and HCV, depending on local prevalence and the person's vaccination status. Vaccination for HAV and HBV should be offered if the person is susceptible.

Cervical Cancer

Women and transgender men who are housed in correctional facilities should be screened for cervical cancer as for women who are not incarcerated (*393*,*394*) (see Cervical Cancer).

HIV Infection

All persons being housed in juvenile and adult correctional facilities should be screened at entry for HIV infection; screening should be offered as opt-out screening. For those identified as being at risk for HIV infection (e.g., with diagnosed gonorrhea or syphilis or persons who inject drugs) and being released into the community, starting HIV PrEP (or providing linkage to a community clinic for HIV PrEP) for HIV prevention should be considered (*395*,*396*). Persons are likely to engage in high-risk activities immediately after release from incarceration (*397*). For those identified with HIV infection, treatment should be initiated. Those persons receiving PrEP or HIV treatment should have linkage to care established before release. Correctional settings should consider implementing other STI prevention approaches, both during incarceration and upon release, which might include educational and behavioral counseling interventions (*398*–*401*), vaccination (e.g., for HPV) (*402*,*403*), condom distribution (*404*,*405*), EPT (*125*), and PrEP to prevent HIV infection (see Primary Prevention Methods).

风险人群远多于仅对监狱人群进行筛查。

据报道，少年和成人拘留设施中年龄≤35岁的男性和女性衣原体和淋病感染率均高于社区中非监禁人员(*141*, *374*, *376*)。梅毒血清阳性率(可指示既往治疗或当前感染)在监禁的成年男性和女性中显著高于青少年，这与全国梅毒总体趋势一致(*141*, *374*)。在惩教设施中检测和治疗早期梅毒可能影响成人间的传播率并预防先天性梅毒(377)。

在看守所中，约半数入所者在48小时内被释放回社区。因此，在短期设施中接受STI筛查并获得STI诊断者的治疗完成率可能不理想。然而，由于监禁人群进出社区的流动性，惩教设施筛查对 detainees 感染患病率及释放后社区后续传播的影响可能相当大(378)。此外，通过在入所时或入所后不久提供筛查，短期设施可实现≥95%的治疗完成率，从而促进更早获得检测结果，必要时可通过公共卫生外展对未治疗者进行随访。

建议对进入少年和成人惩教设施的年龄≤35岁女性进行普遍、选择退出式衣原体和淋病筛查(379)。进入少年和成人惩教设施的年龄<30岁男性也应接受衣原体和淋病筛查(380)。选择退出式筛查有可能大幅增加检测人数和检测到的衣原体和淋病感染数(*381 - 385*)。如果检测已证明具有足够的敏感性和特异性，也可考虑即时(POC)NAAT。研究表明监禁女性中滴虫感染患病率高(*386 - 392*)。

筛查建议

衣原体感染与淋病

收容在惩教设施中的≤35岁女性和<30岁男性应进行衣原体和淋病筛查。该筛查应在入所时进行,并作为选择退出筛查提供。

滴虫

收容在惩教设施中的≤35岁女性应进行滴虫筛查。该筛查应在入所时进行，并作为选择退出筛查提供。

梅毒

对被监禁者的选择退出筛查应根据当地和机构内早期(一期、二期或早期潜伏)传染性梅毒的患病率进行。惩教设施应随时了解当地梅毒患病率。在短期设施中，可能指示在入所时进行筛查。

病毒性肝炎

所有收容在少年和成人惩教设施中的人员应在入所时进行病毒性肝炎筛查，包括HAV、HBV和HCV，具体取决于当地患病率和该人员的疫苗接种状态。如果该人员易感，应提供HAV和HBV疫苗接种。

宫颈癌

被关押在惩教机构中的女性和跨性别男性应与非监禁女性一样接受宫颈癌筛查(*393*,*394*)(见宫颈癌)。

HIV感染

所有被安置在少年和成人惩教设施中的人员应在入所时接受HIV感染筛查；筛查应作为选择退出式筛查提供。对于被识别为有HIV感染风险者(例如，确诊淋病或梅毒者或注射吸毒者)并将释放回社区者，应考虑开始HIV PrEP(或提供与社区诊所的联系以获取HIV PrEP)以预防HIV(*395*, *396*)。人员在释放后可能立即从事高风险活动(397)。对于被识别为HIV感染者，应开始治疗。接受PrEP或HIV治疗者应在释放前建立与照护的联系。惩教场所应考虑实施其他STI预防方法，包括监禁期间和释放时，可能包括教育和行为咨询干预(*398 - 401*)、疫苗接种(例如，针对HPV)(*402*, *403*)、安全套分发(*404*, *405*)、EPT(125)以及PrEP以预防HIV感染(见Primary prevention Methods)。

HIV Infection

Detection, Counseling, and Referral

Infection with HIV causes an acute but brief and nonspecific influenza-like retroviral syndrome that can include fever, malaise, lymphadenopathy, pharyngitis, arthritis, or skin rash. Most persons experience at least one symptom; however, some might be asymptomatic or have no recognition of illness (*406*–*409*). Acute infection transitions to a multiyear, chronic illness that progressively depletes CD4$^+$ T lymphocytes crucial for maintenance of effective immune function. Ultimately, persons with untreated HIV infection experience symptomatic, life-threatening immunodeficiency (i.e., AIDS).

Effective ART that suppresses HIV replication to undetectable levels reduces morbidity, provides a near-normal lifespan, and prevents sexual transmission of HIV to others (*95*–*97*,*410*–*412*). Early diagnosis of HIV and rapid linkage to care are essential for achieving these goals. Guidelines from both the U.S. Department of Health and Human Services and the International AIDS Society–USA Panel recommend that all persons with HIV infection be offered effective ART as soon as possible, both to reduce morbidity and mortality and to prevent HIV transmission (*413*).

STD specialty or sexual health clinics are a vital partner in reducing HIV infections in the United States. These clinics provide safety net services to vulnerable populations in need of HIV prevention services who are not served by the health care system and HIV partner service organizations. Diagnosis of an STI is a biomarker for HIV acquisition, especially among persons with primary or secondary syphilis or, among MSM, rectal gonorrhea or chlamydia (*197*). STD clinics perform only approximately 20% of all federally funded HIV tests nationally but identify approximately 30% of all new infections (*414*). Among testing venues, STD clinics are high performing in terms of linkage to HIV care within 90 days of diagnosis; during 2013–2017, the percentage of persons with a new diagnosis in an STD clinic and linked to care within 90 days increased from 55% to >90% (*415*,*415*).

Screening Recommendations

The following recommendations apply to testing for HIV:

- HIV testing is recommended for all persons seeking STI evaluation who are not already known to have HIV infection. Testing should be routine at the time of the STI evaluation, regardless of whether the patient reports any specific behavioral risks for HIV. Testing for HIV should be performed at the time of STI diagnosis and treatment if not performed at the initial STI evaluation and screening (*82*,*195*,*416*).
- CDC and USPSTF recommend HIV screening at least once for all persons aged 15–65 years (*417*).
- Persons at higher risk for HIV acquisition, including sexually active gay, bisexual, and other MSM, should be screened for HIV at least annually. Providers can consider the benefits of offering more frequent screening (e.g., every 3–6 months) among MSM at increased risk for acquiring HIV (*418*,*419*).
- All pregnant women should be tested for HIV during the first prenatal visit. A second test during the third trimester, preferably at <36 weeks' gestation, should be considered and is recommended for women who are at high risk for acquiring HIV infection, women who receive health care in jurisdictions with high rates of HIV, and women examined in clinical settings in which HIV incidence is ≥1 per 1,000 women screened per year (*138*,*140*).
- HIV screening should be voluntary and free from coercion. Patients should not be tested without their knowledge.
- Opt-out HIV screening (notifying the patient that an HIV test will be performed, unless the patient declines) is recommended in all health care settings. CDC also recommends that consent for HIV screening be incorporated into the general informed consent for medical care in the same manner as other screening or diagnostic tests.
- Requirement of specific signed consent for HIV testing is not recommended. General informed consent for medical care is considered sufficient to encompass informed consent for HIV testing.
- Providers should use a laboratory-based antigen/antibody (Ag/Ab) combination assay as the first test for HIV, unless persons are unlikely to follow up with a provider to receive their HIV test results; in those cases screening with a rapid POC test can be useful.
- Preliminary positive screening tests for HIV should be followed by supplemental testing to establish the diagnosis.
- Providing prevention counseling as part of HIV screening programs or in conjunction with HIV diagnostic testing is not required (*6*). However, persons might be more likely to think about HIV and consider their risk-related behavior when undergoing an HIV test. HIV testing gives providers an opportunity to conduct STI and HIV prevention counseling and communicate risk-reduction messages.
- Acute HIV infection can occur among persons who report recent sexual or needle-sharing behavior or who have had an STI diagnosis.
- Providers should test for HIV RNA if initial testing according to the HIV testing algorithm recommended by CDC is negative or indeterminate when concerned about acute HIV infection (https://stacks.cdc.gov/view/cdc/50872).

HIV感染

检测、咨询、和转诊

HIV感染会导致一种急性但短暂且非特异性的流感样逆转录病毒综合征，可能包括发热、不适、淋巴结病、咽炎、关节炎或皮疹。大多数人至少经历一种症状；然而，有些人可能无症状或未意识到患病(*406 - 409*)。急性感染过渡为多年慢性疾病，逐渐耗竭对维持有效免疫功能至关重要的CD4 $^+$ T淋巴细胞。最终，未经治疗的HIV感染者会出现症状性、危及生命的免疫缺陷(即AIDS)。

有效的ART将HIV复制抑制到检测不到的水平，可降低发病率、提供接近正常的寿命，并防止HIV的性传播(*95 - 97*, *410 - 412*)。HIV的早期诊断和快速衔接照护对于实现这些目标至关重要。美国卫生与公众服务部和国际艾滋病学会-美国专家组的指南均建议，所有HIV感染者应尽快接受有效ART，以降低发病率和死亡率并防止HIV传播(413)。

STD专科门诊或性健康门诊是减少美国HIV感染的重要合作伙伴。这些门诊为医疗系统和HIV伴侣服务机构未覆盖的、需要HIV预防服务的脆弱人群提供安全网服务。STI的诊断是HIV感染的生物标志物，尤其是在一期或二期梅毒患者中，或在MSM中，直肠淋病或衣原体感染者中(197)。STD门诊在全国仅执行约20%的联邦资助HIV检测，但识别约30%的所有新感染(414)。在检测场所中，STD门诊在诊断后90天内衔接HIV照护方面表现优异；2013-2017年期间，在STD门诊新诊断并在90天内衔接照护的人数比例从55%增加到>90%(*415*, *415*)。

筛查建议

以下建议适用于HIV检测：

- 建议所有寻求STI检测的人进行HIV检测
  对尚不知晓已感染HIV的接受评估者。无论患者是否报告任何特定的HIV行为风险，在STI评估时均应常规进行检测。如果在初始STI评估和筛查时未进行HIV检测，则应在STI诊断和治疗时进行HIV检测(*82*,*195*,*416*)。
- CDC 和 USPSTF 建议至少进行 HIV 筛查
  为所有15-65岁人群进行一次检测(417)。
- HIV 感染风险较高的人群，包括
  性活跃的男同性恋者、双性恋者及其他MSM应至少每年接受一次HIV筛查。对于HIV感染风险增加的MSM，提供者可考虑提供更频繁筛查(例如每3-6个月一次)的益处(*418*,*419*)。
- 所有孕妇均应在以下期间接受HIV检测：
  首次产前检查时。应考虑在妊娠晚期(最好在妊娠<36周时)进行第二次检测,并推荐对HIV感染高风险女性、在HIV高流行率辖区接受医疗保健的女性,以及在每年每1,000名接受筛查女性中HIV发病率≥1例的临床环境中接受检查的女性进行该检测(*138*,*140*)。
- HIV 筛查应是自愿的，不受任何胁迫。
  不应在患者不知情的情况下对其进行检测。
- 退出式HIV筛查(告知患者HIV
  检测将进行，除非患者拒绝)建议在所有医疗保健环境中实施。CDC还建议将HIV筛查的同意纳入医疗保健的一般知情同意中，与其他筛查或诊断检测的方式相同。
- 对HIV检测要求特定签署知情同意的规定是
  不推荐。医疗保健的一般知情同意被认为足以涵盖HIV检测的知情同意。
- 医务人员应使用基于实验室的抗原/抗体
  (Ag/Ab)联合检测作为HIV的首选检测，除非人员不太可能随访提供者以获取HIV检测结果；在这些情况下，使用快速POC检测进行筛查可能有用。
- 对HIV的初步阳性筛查试验应
  随后进行补充检测以确立诊断。
- 作为HIV筛查的一部分提供预防咨询
  项目或与HIV诊断检测结合不需要(6)。然而，人员在进行HIV检测时可能更倾向于考虑HIV并思考其风险相关行为。HIV检测为提供者提供了进行STI和HIV预防咨询并传达风险降低信息的机会。
- 报告有急性HIV感染的人中可能出现
  近期性行为或共用针具行为，或已被诊断为STI者。
- 如果初步检测结果根据
  对CDC推荐的HIV检测流程呈阴性或不确定，同时临床怀疑急性HIV感染时(https://stacks.cdc.gov/view/cdc/50872)。

- Providers should not assume that a laboratory report of a negative HIV Ag/Ab or antibody test indicates that the requisite HIV RNA testing for acute HIV infection has been conducted. They should consider explicitly requesting HIV RNA testing when concerned about early acute HIV infection.
- Providers should assess eligibility of all persons seeking STI services for HIV PrEP and PEP. For persons with substantial risk whose results are HIV negative, providers should offer or provide referral for PrEP services, unless the last potential HIV exposure occurred <72 hours, in which case PEP might be indicated.

Diagnostic Considerations

HIV infection can be diagnosed by HIV 1/2 Ag/Ab combination immunoassays. All FDA-cleared HIV tests are highly sensitive and specific. Available serologic tests can detect all known subtypes of HIV-1. The majority also detect HIV-2 and uncommon variants of HIV-1 (e.g., group O and group N).

According to an algorithm for HIV diagnosis, CDC recommends that HIV testing begin with a laboratory-based HIV-1/HIV-2 Ag/Ab combination assay, which, if repeatedly reactive, is followed by a laboratory-based assay with a supplemental HIV-1/HIV-2 antibody differentiation assay (https://stacks.cdc.gov/view/cdc/50872). This algorithm confers an additional advantage because it can detect HIV-2 antibodies after the initial immunoassay. Although HIV-2 is uncommon in the United States, accurate identification is vital because monitoring and therapy for HIV-2 differs from that for HIV-1 (*420*). RNA testing should be performed on all specimens with reactive immunoassay but negative supplemental antibody test results to determine whether the discordance represents acute HIV infection.

Rapid POC HIV tests can enable clinicians to make a preliminary diagnosis of HIV infection in <20 minutes. The majority of rapid antibody assays become reactive later in the course of HIV infection than conventional laboratory-based assays and thus can produce negative results among persons recently infected (e.g., acutely infected persons). Furthermore, HIV home-test kits only detect HIV antibodies and therefore will not detect acute HIV infection. If early or acute infection is suspected and a rapid HIV antibody assay is negative, confirmatory testing with combined laboratory-based assays or RNA testing should be performed. CDC recommends that all persons with reactive rapid tests be assessed with a laboratory-based Ag/Ab assay. Additional details about interpretation of results by using the HIV testing algorithm recommended by CDC are available at https://stacks.cdc.gov/view/cdc/48472.

Acute HIV Infection

Providers serving persons at risk for STIs are in a position to diagnose HIV infection during its acute phase. Diagnosing HIV infection during the acute phase is particularly important because persons with acute HIV have highly infectious disease due to the concentration of virus in plasma and genital secretions, which is extremely elevated during that stage of infection (*421*,*422*) (https://clinicalinfo.hiv.gov/en/guidelines/adult-and-adolescent-arv/acute-and-recent-early-hiv-infection?view=full). ART during acute HIV infection is recommended because it substantially reduces infection transmission to others, improves laboratory markers of disease, might decrease severity of acute disease, lowers viral setpoint, reduces the size of the viral reservoir, decreases the rate of viral mutation by suppressing replication, and preserves immune function (https://clinicalinfo.hiv.gov/en/guidelines/adult-and-adolescent-arv/acute-and-recent-early-hiv-infection?view=full). Persons who receive an acute HIV diagnosis should be referred immediately to an HIV clinical care provider, provided prevention counseling (e.g., advised to reduce the number of partners and to use condoms correctly and consistently), and screened for STIs. Information should be provided regarding availability of PEP for sexual and injecting drug use partners not known to have HIV infection if the most recent contact was <72 hours preceding HIV diagnosis.

When providers test by using the CDC algorithm, specimens collected during acute infection might give indeterminate or negative results because insufficient anti-HIV antibodies and potentially insufficient antigen are present to be reactive on Ag/Ab combination assays and supplemental HIV-1/HIV-2 antibody differentiation assays. Whenever acute HIV infection is suspected (e.g., initial testing according to the CDC algorithm is negative or indeterminate after a possible sexual exposure to HIV within the previous few days to weeks, especially if the person has symptoms or has primary or secondary syphilis, gonorrhea, or chlamydia), additional testing for HIV RNA is recommended. If this additional testing for HIV RNA is also negative, repeat testing in a few weeks is recommended to rule out very early acute infection when HIV RNA might not be detectable. A more detailed discussion of testing in the context of acute HIV infection is available at https://clinicalinfo.hiv.gov/en/guidelines/adult-and-adolescent-arv/initiation-antiretroviral-therapy?view=full.

Treatment

ART should be initiated as soon as possible for all persons with HIV infection regardless of CD4$^+$ T-cell count, both for individual health and to prevent HIV transmission (https://clinicalinfo.hiv.gov/sites/default/files/inline-files/AdultandAdolescentGL.pdf).

- 医务人员不应假定实验室报告的HIV Ag/Ab或抗体检测阴性即表示已进行了急性HIV感染所需的HIV RNA检测。当怀疑早期急性HIV感染时，应考虑明确要求进行HIV RNA检测。
- 提供者应评估所有寻求
  为HIV PrEP和PEP提供STI服务。对于高风险且HIV检测结果为阴性者，医务人员应提供或转介PrEP服务，除非最后一次潜在HIV暴露发生在<72小时前,此时可能提示需要PEP。

诊断考虑

HIV感染可通过HIV 1/2 Ag/Ab联合免疫测定进行诊断。所有经FDA批准的HIV检测均具有高敏感性和特异性。现有的血清学检测可检出所有已知的HIV-1亚型。大多数还可检出HIV-2及不常见的HIV-1变异株(如O组和N组)。

根据HIV诊断算法，CDC建议HIV检测从基于实验室的HIV-1/HIV-2 Ag/Ab联合检测开始，如果反复反应，则随后进行基于实验室的补充HIV-1/HIV-2抗体分化检测(https://stacks.cdc.gov/view/cdc/50872)。该算法具有额外优势，因为它在初始免疫检测后可以检测HIV-2抗体。尽管HIV-2在美国不常见，但准确识别至关重要，因为HIV-2的监测和治疗与HIV-1不同(420)。应对所有免疫检测反应但补充抗体检测结果阴性的标本进行RNA检测，以确定不一致是否代表急性HIV感染。

快速POC HIV检测可使临床医生在<20分钟内对HIV感染作出初步诊断。大多数快速抗体检测在HIV感染病程中较传统实验室检测更晚出现反应性,因此可在近期感染者(例如急性感染者)中产生阴性结果。此外,HIV自检试剂盒仅检测HIV抗体,因此不会检测出急性HIV感染。如果怀疑早期或急性感染且快速HIV抗体检测为阴性,应使用联合实验室检测或RNA检测进行确认性检测。CDC建议所有快速检测呈反应性者均应接受基于实验室的Ag/Ab检测评估。关于使用CDC推荐的HIV检测算法解释结果的更多细节,请参见https://stacks.cdc.gov/view/cdc/48472.

急性HIV感染

为性传播感染(STI)风险人群提供服务的机构有能力在HIV感染的急性期进行诊断。在急性期诊断HIV感染尤为重要，因为急性HIV感染者具有高度传染性，这是由于该感染阶段血浆和生殖道分泌物中的病毒浓度极高(*421*, *422*)(https://clinicalinfo.hiv.gov/en/ guidelines/adult-and-adolescent-arv/acute-and-recent-early- hiv-infectionview=full)。建议在急性HIV感染期间进行ART，因为它能大幅减少向他人传播感染、改善疾病的实验室指标、可能减轻急性疾病的严重程度、降低病毒调定点、缩小病毒储存库的大小、通过抑制复制降低病毒突变率，并保护免疫功能(https://clinicalinfo.hiv.获得急性HIV诊断的人员应立即转介至HIV临床照护提供者，接受预防咨询(例如，建议减少性伴侣数量并正确、持续使用安全套)，并进行STI筛查。应提供有关信息，说明对于未知是否感染HIV的性伴侣和注射吸毒伴侣，如果最近一次接触发生在HIV诊断前<72小时,可使用PEP。

当提供者使用CDC算法进行检测时，急性感染期间采集的标本可能给出不确定或阴性结果，因为存在不足的抗HIV抗体以及可能不足的抗原，无法在Ag/Ab联合检测和补充性HIV-1/HIV-2抗体分化检测中呈反应性。每当怀疑急性HIV感染时(例如，根据CDC算法进行的初始检测在可能于过去几天至几周内发生HIV性暴露后呈阴性或不确定，尤其是如果该人有症状或患有一期或二期梅毒、淋病或衣原体感染)，建议进行额外的HIV RNA检测。如果这一额外的HIV RNA检测也为阴性，建议在几周后重复检测，以排除非常早期的急性感染，此时HIV RNA可能无法被检测到。关于急性HIV感染背景下检测的更详细讨论，可参见https:// clinicalinfo.hiv.gov/en/ guidelines/adult-and-adolescent-arv/ initiation-antiretroviral-therapyview=full。

治疗

无论CD4 $^+$ T细胞计数如何，所有HIV感染者均应尽快启动ART，这既有利于个人健康，也可预防HIV传播(https://clinicalinfo.hiv.gov/sites/default/files/inline-files/AdultandAdolescentGL.pdf)。

Persons with HIV infection who achieve and maintain a viral load suppressed to <200 copies/mL with ART have effectively no risk for sexually transmitting HIV (*95*–*97*,*421*). Early HIV diagnosis and treatment is thus not only vital for individual health but also as a public health intervention to prevent new infections. Knowledge of the prevention benefit of treatment can help reduce stigma and increase the person's commitment to start and remain adherent to ART (*423*). The importance of adherence should be stressed as well as the fact that ART does not protect against other STIs that can be prevented by using condoms. Interventions to assist persons to remain adherent to their prescribed HIV treatment, to otherwise reduce the possibility of transmission to others, and to protect themselves against STIs, have been developed for diverse populations at risk (*424*) (https://clinicalinfo.hiv.gov/sites/default/files/inline-files/AdultandAdolescentGL.pdf).

Comprehensive HIV treatment and care services might not be available in facilities focused primarily on STI treatment. Providers in such settings should be knowledgeable about HIV treatment and care options available in their communities and promptly link persons who have newly diagnosed HIV infection and any persons with HIV infection who are not engaged in ongoing effective care to a health care provider or facility experienced in caring for persons living with HIV (https://clinicalinfo.hiv.gov/sites/default/files/inline-files/AdultandAdolescentGL.pdf).

Other HIV Management Considerations

Behavioral and psychosocial services are integral to caring for persons with HIV infection. Providers should expect persons to be distressed when first informed that they have HIV. They face multiple adaptive challenges, including coping with the reactions of others to a stigmatizing illness, developing and adopting strategies to maintain physical and emotional health, initiating changes in behavior to prevent HIV transmission to others, and reducing the risk for acquiring additional STIs. Many persons will require assistance gaining access to health care and other support services and coping with changes in personal relationships.

Persons with HIV infection might have additional needs (e.g., referral for substance use or mental health disorders). Others require assistance to secure and maintain employment and housing. Persons capable of reproduction might require family planning counseling, information about reproductive health choices, and referral for reproductive health care.

The following recommendations apply to managing persons with diagnosed HIV infection:

- Link persons with HIV infection to care and start them on ART as soon as possible.
- Report cases (in accordance with local requirements) to public health and initiate partner services.
- Provide prevention counseling to persons with diagnosed HIV infection.
- Ensure all persons with HIV infection are informed that if they achieve and maintain a suppressed viral load, they have effectively no risk for transmitting HIV. Stress that a suppressed viral load is not a substitute for condoms and behavioral modifications because ART does not protect persons with HIV against other STIs.
- Provide additional counseling, either on-site or through referral, about the psychosocial and medical implications of having HIV infection.
- Assess the need for immediate medical care and psychosocial support.
- Link persons with diagnosed HIV infection to services provided by health care personnel experienced in managing HIV infection. Additional services that might be needed include substance misuse counseling and treatment, treatment for mental health disorders or emotional distress, reproductive counseling, risk-reduction counseling, and case management. Providers should follow up to ensure that patients have received services for any identified needs.
- Persons with HIV infection should be educated about the importance of ongoing medical care and what to expect from these services.

STI Screening of Persons with HIV Infection in HIV Care Settings

At the initial HIV care visit, providers should screen all sexually active persons for syphilis, gonorrhea, and chlamydia, and perform screening for these infections at least annually during the course of HIV care (*425*). Specific testing includes syphilis serology and NAAT for *N. gonorrhoeae* and *C. trachomatis* at the anatomic site of exposure. Women should also be screened for trichomoniasis at the initial visit and annually thereafter. Women should be screened for cervical cancer precursor lesions per existing guidelines (*98*).

More frequent screening for syphilis, gonorrhea, and chlamydia (e.g., every 3 or 6 months) should be tailored to individual risk and the local prevalence of specific STIs. Certain STIs can be asymptomatic; their diagnosis might prompt referral for partner services, might identify sexual and needle-sharing partners who can benefit from early diagnosis and treatment of HIV, and might prompt reengagement in care or HIV prevention services (e.g., PEP or PrEP) (*8*). More detailed information on screening, testing, and treatment is provided in pathogen-specific sections of this report.

通过ART将病毒载量抑制至<200 copies/mL并维持抑制的HIV感染者,实际上没有经性传播HIV的风险(*95 - 97*,*421*)。因此，早期HIV诊断和治疗不仅对个体健康至关重要，而且作为预防新感染的公共卫生干预措施也至关重要。了解治疗的预防获益有助于减少污名并增强个人开始并保持ART依从性的承诺(423)。应强调依从性的重要性，以及ART不能预防其他可通过使用安全套预防的STI这一事实。已针对不同风险人群开发了干预措施，以帮助个人保持对处方HIV治疗的依从性、以其他方式降低向他人传播的可能性，并保护自身免受STI感染(424)(https://clinicalinfo.hiv.gov/sites/default/ files/inline-files/AdultandAdolescentGL.pdf)。

主要以STI治疗为重点的机构可能无法提供全面的HIV治疗和关怀服务。此类环境中的医务人员应了解其社区可获得的HIV治疗和关怀选择，并及时将新诊断HIV感染者以及任何未接受持续有效关怀的HIV感染者转介至具有照护HIV感染者经验的医疗服务提供者或机构(https://clinicalinfo.hiv.gov/sites/default/files/inline-files/ AdultandAdolescentGL.pdf)。

其他HIV管理考虑事项

行为和心理社会服务是照护HIV感染者不可或缺的组成部分。医务人员应预期个人在首次被告知感染HIV时会感到痛苦。他们面临多重适应性挑战，包括应对他人对一种污名化疾病的反应、制定并采取维持身心健康的策略、启动行为改变以预防向他人传播HIV，以及降低获得其他STI的风险。许多人将需要帮助以获得医疗保健和其他支持服务，并应对个人关系的变化。

HIV感染者可能有额外需求(如转介物质使用或精神健康障碍相关服务)。其他人需要协助以获得并维持就业和住房。有生育能力者可能需要计划生育咨询、生殖健康选择信息以及生殖保健转介。

以下建议适用于已确诊HIV感染者的管理：

- 将HIV感染者与医疗服务相衔接，并启动他们的治疗尽快开始 ART。
- 按照当地要求向以下机构报告病例公共卫生并启动伴侣服务。
- 为已确诊者提供预防咨询HIV感染。
- 确保所有HIV感染者被告知如果他们达到并维持病毒载量抑制，则实际上没有传播HIV的风险。应强调病毒载量抑制不能替代安全套和行为改变，因为ART不能保护HIV感染者免受其他STI的感染。
- 提供额外的咨询，无论是现场还是通过转介，关于感染HIV的心理社会和医学影响。
- 评估是否需要立即医疗护理，并心理社会支持。
- 将确诊HIV感染者转介至相关服务

由具有HIV感染管理经验的医护人员提供。可能需要的额外服务包括物质滥用咨询和治疗、精神健康障碍或情绪困扰的治疗、生殖咨询、风险降低咨询和病例管理。提供者应进行随访，以确保患者已获得针对任何已识别需求的服务。• HIV感染者应接受关于

持续医疗护理的重要性以及可从这些服务中预期的事项。

HIV 护理环境中 HIV 感染者的 STI 筛查

在初始HIV关怀就诊时，医务人员应对所有性活跃者进行梅毒、淋病和衣原体筛查，并在HIV关怀过程中至少每年进行这些感染的筛查(425)。具体检测包括梅毒血清学以及针对暴露解剖部位的*N.gonorrhoeae*和*C.trachomatis*的NAAT。女性还应在初次就诊时及此后每年进行滴虫感染筛查。女性应按照现有指南进行宫颈癌前病变筛查(98)。

更频繁的梅毒、淋病和衣原体筛查(例如每3或6个月)应根据个体风险和特定STI的局部流行情况量身定制。某些STI可以无症状；其诊断可能促使转介伴侣服务，可能识别出可从HIV早期诊断和治疗中获益的性伴侣和共用针具伴侣，并可能促使重新参与关怀或HIV预防服务(例如PEP或PrEP)(8)。关于筛查、检测和治疗的更详细信息见本报告按病原体分列的各章节。

Partner Services and Reporting

Partner notification is a key component in the evaluation of persons with HIV infection. Early diagnosis and treatment of HIV among all potentially exposed sexual and injecting drug sharing partners can improve their health and reduce new infections. For those partners without HIV infection, partner services also provide an opportunity for offering HIV prevention services, including PrEP or PEP (if exposure was <72 hours previous) and STI testing and treatment.

Health care providers should inform persons with diagnosed HIV infection about any legal obligations of providers to report cases of HIV to public health; the local confidential processes for managing partner services, including that a public health department still might be in contact to follow up in their care and partner services; and the benefits and risks of partner notification and services. Health care providers should also encourage persons with a new HIV diagnosis to notify their partners and provide them with referral information for their partners about HIV testing. Partner notification for exposure to HIV should be confidential. Health care providers can assist in the partner notification process, either directly or by referral to health department partner notification programs. Health department staff are trained to use public health investigation strategies for confidentially locating persons who can benefit from HIV treatment, care, or prevention services. Guidance regarding spousal notification varies by jurisdiction. Detailed recommendations for notification, evaluation, and treatment of exposed partners are available in *Recommendations for Partner Services Programs for HIV Infection, Syphilis, Gonorrhea, and Chlamydial Infections* (*111*).

Special Considerations

Pregnancy

All pregnant women should be tested for HIV during the first prenatal visit. A second test during the third trimester, preferably at <36 weeks' gestation, should be considered and is recommended for women who are at high risk for acquiring HIV, women who receive health care in jurisdictions with high rates of HIV infection, and women served in clinical settings in which prenatal screening identifies ≥1 pregnant woman with HIV per 1,000 women screened (*138*). Diagnostic algorithms for HIV for pregnant women do not differ from those for nonpregnant women (see STI Detection Among Special Populations). Pregnant women should be informed that HIV testing will be performed as part of the routine panel of prenatal tests (*138*); for women who decline HIV testing, providers should address concerns that pose obstacles, discuss the benefits of testing (e.g., early HIV detection, treatment, and care for improving health of the mother and reducing perinatal transmission of HIV), and encourage testing at subsequent prenatal visits. Women who decline testing because they have had a previous negative HIV test result should be informed about the importance of retesting during each pregnancy. Women with no prenatal care should be tested for HIV at the time of delivery.

Testing pregnant women is crucial because knowledge of infection status can help maintain the woman's health, and it enables receipt of interventions (i.e., ART or specialized obstetrical care) that can substantially reduce the risk for perinatal transmission of HIV. Pregnant women with diagnosed HIV infection should be educated about the benefits of ART for their own health and for reducing the risk for HIV transmission to their infant. In the absence of ART, a mother's risk for transmitting HIV to her neonate is approximately 30%; however, risk can be reduced to <2% through ART, obstetrical interventions (i.e., elective cesarean delivery at 38 weeks' pregnancy), and breastfeeding avoidance (https://clinicalinfo.hiv.gov/sites/default/files/inline-files/PerinatalGL.pdf). Pregnant women with HIV infection should be linked to an HIV care provider experienced in managing HIV in pregnancy and provided antenatal and postpartum treatment and advice. Detailed and regularly updated recommendations for managing pregnant patients with HIV infection are available at https://clinicalinfo.hiv.gov/sites/default/files/inline-files/PerinatalGL.pdf.

HIV Infection Among Neonates, Infants, and Children

Diagnosis of HIV infection in a pregnant woman indicates the need for evaluating and managing the HIV-exposed neonate and considering whether the woman's other children, if any, might be infected. Detailed recommendations regarding diagnosis and management of HIV infection among neonates and children of mothers with HIV are beyond the scope of these guidelines but are available at https://clinicalinfo.hiv.gov/en/guidelines. Exposed neonates and children with HIV infection should be referred to physicians with expertise in neonatal and pediatric HIV management.

Diseases Characterized by Genital, Anal, or Perianal Ulcers

In the United States, the majority of young, sexually active patients who have genital, anal, or perianal ulcers have either genital herpes or syphilis. The frequency of each condition differs by geographic area and population; however, genital herpes is the most prevalent of these diseases. More than one etiologic agent (e.g., herpes and syphilis) can be present in any genital, anal, or perianal ulcer. Less common infectious

伴侣服务与报告

伴侣通知是HIV感染者评估的关键组成部分。在所有可能暴露的性伴侣和注射吸毒共享伴侣中早期诊断和治疗HIV可以改善他们的健康并减少新发感染。对于未感染HIV的伴侣，伴侣服务还提供了提供HIV预防服务的机会，包括PrEP或PEP(如果暴露发生在<72小时前)以及STI检测和治疗。

医务人员应告知确诊HIV感染者医务人员向公共卫生部门报告HIV病例的任何法律义务；管理伴侣服务的当地保密流程，包括公共卫生部门仍可能联系以随访其关怀和伴侣服务；以及伴侣通知和服务的益处与风险。医务人员还应鼓励新诊断HIV感染者通知其伴侣，并向其提供伴侣HIV检测的转介信息。HIV暴露的伴侣通知应保密。医务人员可以直接协助伴侣通知过程，或转介至卫生部门伴侣通知项目。卫生部门工作人员经过培训，可使用公共卫生调查策略保密地定位可从HIV治疗、关怀或预防服务中获益的人员。关于配偶通知的指导因辖区而异。关于暴露伴侣的通知、评估和治疗的详细建议见*recommendations for Partner Services Programs for HIV Infection, Syphilis, Gonorrhea, and Chlamydial Infections*(111)。

特殊考虑

妊娠

所有孕妇应在首次产前检查时接受HIV检测。应考虑在妊娠晚期(最好在妊娠<36周时)进行第二次检测,并推荐用于HIV感染高风险女性、在HIV感染率高辖区接受医疗保健的女性,以及在产前筛查中每筛查1,000名女性可识别≥1名HIV感染孕妇的临床环境中服务的女性(138)。孕妇的HIV诊断算法与非孕妇相同(见特殊人群中的STI检测)。应告知孕妇HIV检测将作为常规产前检测组合的一部分进行(138);对于拒绝HIV检测的女性,医务人员应解决构成障碍的顾虑,讨论检测的益处(例如早期HIV检测、治疗和关怀以改善母亲健康并降低围产期HIV传播)，并鼓励在后续产前检查中进行检测。因既往HIV检测结果为阴性而拒绝检测的妇女应被告知每次妊娠期间重新检测的重要性。未接受产前保健的妇女应在分娩时进行HIV检测。

检测孕妇至关重要，因为了解感染状态有助于维持女性健康，并使其能够接受可大幅降低HIV围产期传播风险的干预措施(即ART或专门产科护理)。确诊HIV感染的孕妇应接受教育，了解ART对其自身健康以及降低HIV传播给婴儿风险的益处。在无ART的情况下，母亲将HIV传播给新生儿的风险约为30%；然而，通过ART、产科干预(即妊娠38周时选择性剖宫产)和避免母乳喂养，风险可降至<2%(https://clinicalinfo.hiv.gov/sites/default/files/inline-files/PerinatalGL.pdf)。HIV感染孕妇应转介至在妊娠期HIV管理方面有经验的HIV关怀提供者,并获得产前和产后治疗及建议。关于HIV感染孕妇管理的详细且定期更新的建议见https://clinicalinfo.hiv.gov/sites/default/files/inline- files/PerinatalGL.pdf。

新生儿、婴儿和儿童中的HIV感染

孕妇HIV感染的诊断表明需要评估和管理HIV暴露新生儿，并考虑该妇女的其他子女(如有)是否可能感染。关于新生儿和HIV感染母亲所生儿童HIV感染诊断和管理的详细建议超出本指南范围，但可在https://clinicalinfo.hiv.gov/en/guidelines获取。暴露新生儿和HIV感染儿童应转诊至具有新生儿和儿科HIV管理专业知识的医生。

疾病特征为由生殖器、肛门、或肛周溃疡

在美国，大多数有生殖器、肛门或肛周溃疡的年轻性活跃患者患有生殖器疱疹或梅毒。每种疾病的频率因地理区域和人群而异；然而，生殖器疱疹是这些疾病中最普遍的。任何生殖器、肛门或肛周溃疡中可能存在一种以上的病原体(例如疱疹和梅毒)。较少见的感染性

causes of genital, anal, or perianal ulcers include chancroid, LGV, and granuloma inguinale (donovanosis). GUDs (e.g., syphilis, herpes, and LGV) might also present as oral ulcers. Genital herpes, syphilis, chlamydia, gonorrhea, and chancroid have been associated with an increased risk for HIV acquisition and transmission. Genital, anal, or perianal lesions can also be associated with infectious and noninfectious conditions that are not sexually transmitted (e.g., yeast, trauma, carcinoma, aphthae or Behcet's disease, fixed drug eruption, or psoriasis).

A diagnosis based only on medical history and physical examination frequently can be inaccurate. Therefore, all persons who have genital, anal, or perianal ulcers should be evaluated. Specific evaluation of genital, anal, or perianal ulcers includes syphilis serology tests and darkfield examination from lesion exudate or tissue, or NAAT if available; NAAT or culture for genital herpes type 1 or 2; and serologic testing for type-specific HSV antibody. In settings where chancroid is prevalent, a NAAT or culture for *Haemophilus ducreyi* should be performed.

No FDA-cleared NAAT for diagnosing syphilis is available in the United States; however, multiple FDA-cleared NAATs are available for diagnosing HSV-1 and HSV-2 in genital specimens. Certain clinical laboratories have developed their own syphilis and HSV NAATs and have conducted Clinical Laboratory Improvement Amendment (CLIA) verification studies with genital specimens. Type-specific serology for HSV-2 might aid in identifying persons with genital herpes (see Genital Herpes). In addition, biopsy of ulcers with immunohistochemistry can help identify the cause of ulcers that are unusual or that do not respond to initial therapy. HIV testing should be performed on all persons not known to have HIV infection who present with genital, anal, or perianal ulcers (see Diagnostic Considerations in disease-specific sections). NAAT testing at extragenital sites should be considered for cases in which GUDs are suspected (e.g., oral manifestations of syphilis, herpes, or LGV). Commercially available NAATs have not been cleared by FDA for these indications; however, they can be used by laboratories that have met regulatory requirements for an off-label procedure.

Because early syphilis treatment decreases transmission possibility, public health standards require health care providers to presumptively treat any patient with a suspected case of infectious syphilis at the initial visit, even before test results are available. Presumptive treatment of a patient with a suspected first episode of genital herpes also is recommended because HSV treatment benefits depend on prompt therapy initiation. The clinician should choose the presumptive treatment on the basis of the clinical presentation (i.e., HSV lesions begin as vesicles and primary syphilis as a papule) and epidemiologic circumstances (e.g., high incidence of disease among populations and communities and travel history). For example, syphilis is so common among MSM that any male who has sex with men presenting with a genital ulcer should be presumptively treated for syphilis at the initial visit after syphilis and HSV tests are performed. After a complete diagnostic evaluation, >25% of patients who have genital ulcers might not have a laboratory-confirmed diagnosis (*426*).

Chancroid

Chancroid prevalence has declined in the United States (*141*). When infection does occur, it is usually associated with sporadic outbreaks. Worldwide, chancroid appears to have decreased as well, although infection might still occur in certain Africa regions and the Caribbean. Chancroid is a risk factor in HIV transmission and acquisition (*197*).

Diagnostic Considerations

A definitive diagnosis of chancroid requires identifying *H. ducreyi* on special culture media that is not widely available from commercial sources; even when these media are used, sensitivity is <80% (*427*). No FDA-cleared NAAT for *H. ducreyi* is available in the United States; however, such testing can be performed by clinical laboratories that have developed their own NAAT and have conducted CLIA verification studies on genital specimens.

The combination of one or more deep and painful genital ulcers and tender suppurative inguinal adenopathy indicates the chancroid diagnosis; inguinal lymphadenitis typically occurs in <50% of cases (*428*). For both clinical and surveillance purposes, a probable diagnosis of chancroid can be made if all of the following four criteria are met: 1) the patient has one or more painful genital ulcers; 2) the clinical presentation, appearance of genital ulcers and, if present, regional lymphadenopathy are typical for chancroid; 3) the patient has no evidence of *T. pallidum* infection by darkfield examination or NAAT (i.e., ulcer exudate or serous fluid) or by serologic tests for syphilis performed at least 7–14 days after onset of ulcers; and 4) HSV-1 or HSV-2 NAAT or HSV culture performed on the ulcer exudate or fluid are negative.

Treatment

Successful antimicrobial treatment for chancroid cures the infection, resolves the clinical symptoms, and prevents transmission to others. In advanced cases, genital scarring and rectal or urogenital fistulas from suppurative buboes can result despite successful therapy.

生殖器、肛门或肛周溃疡的病因包括软下疳、LGV和腹股沟肉芽肿(donovanosis)。GUD(如梅毒、疱疹和LGV)也可能表现为口腔溃疡。生殖器疱疹、梅毒、衣原体、淋病和软下疳与HIV获得和传播风险增加相关。生殖器、肛门或肛周病变也可能与非性传播的感染性和非感染性状况相关(如酵母菌、创伤、癌、口疮或Behcet病、固定性药疹或银屑病)。

仅基于病史和体格检查的诊断常常可能不准确。因此，所有有生殖器、肛门或肛周溃疡的人都应接受评估。生殖器、肛门或肛周溃疡的具体评估包括梅毒血清学试验和病灶渗出物或组织的暗视野检查，或NAAT(如可用)；生殖器疱疹1型或2型的NAAT或培养；以及型特异性HSV抗体的血清学检测。在软下疳流行地区，应进行*Haemophilus ducreyi*的NAAT或培养。

美国尚无FDA批准的用于诊断梅毒的NAAT；然而，有多种FDA批准的NAAT可用于诊断生殖器标本中的HSV-1和HSV-2。某些临床实验室已开发了自己的梅毒和HSV NAAT，并对生殖器标本进行了临床实验室改进修正案(CLIA)验证研究。HSV-2的型特异性血清学可能有助于识别生殖器疱疹患者(见生殖器疱疹)。此外，对溃疡进行免疫组织化学活检可帮助确定异常溃疡或对初始治疗无反应溃疡的病因。所有已知无HIV感染且表现为生殖器、肛门或肛周溃疡的人都应进行HIV检测(见疾病特异性章节中的诊断考虑)。对于怀疑GUD的病例(如梅毒、疱疹或LGV的口腔表现)，应考虑在生殖器外部位进行NAAT检测。市售NAAT尚未获FDA批准用于这些适应症；然而，符合超说明书操作监管要求的实验室可以使用它们。

由于早期梅毒治疗可降低传播可能性，公共卫生标准要求医疗保健提供者在初次就诊时对任何疑似传染性梅毒病例的患者进行推定治疗，甚至在检测结果可用之前。也建议对疑似首次发作生殖器疱疹的患者进行推定治疗，因为HSV治疗的益处取决于及时开始治疗。临床医生应根据临床表现(即HSV病变以水疱开始，一期梅毒以丘疹开始)和流行病学情况(如疾病高发病率)选择推定治疗。

人群和社区之间以及旅行史)。例如，梅毒在MSM中如此普遍，以至于任何与男性发生性行为的男性出现生殖器溃疡时，应在进行梅毒和HSV检测后初次就诊时推定接受梅毒治疗。经过完整的诊断评估后，>25%的生殖器溃疡患者可能没有实验室确诊诊断(426)。

软下疳

软下疳患病率在美国已下降(141)。当感染确实发生时，通常与散发性暴发相关。在世界范围内，软下疳似乎也有所减少，尽管感染仍可能发生在某些非洲地区和加勒比地区。软下疳是HIV传播和获得的危险因素(197)。

诊断考虑

软下疳的明确诊断需要在商业来源不广泛可得的特殊培养基上鉴定*H.ducreyi*；即使使用这些培养基，敏感性也<80%(427)。美国没有FDA批准的针对*H.ducreyi*的NAAT；然而，此类检测可由已开发自有NAAT并对生殖器标本进行CLIA验证研究的临床实验室执行。

一个或多个深在、疼痛的生殖器溃疡合并触痛性化脓性腹股沟淋巴结病提示软下疳诊断；腹股沟淋巴结炎通常发生于<50%的病例(428)。出于临床和监测目的,如果满足以下全部四项标准,可作出软下疳的 probable 诊断:1) 患者有一个或多个疼痛性生殖器溃疡;2) 临床表现、生殖器溃疡外观以及(如果存在)区域淋巴结病为软下疳的典型表现;3) 患者在溃疡出现后至少7-14天进行的暗视野检查或NAAT(即溃疡渗出物或浆液)或梅毒血清学检测无*T.pallidum*感染证据；以及4) 对溃疡渗出物或液体进行的HSV-1或HSV-2 NAAT或HSV培养为阴性。

治疗

成功的抗菌药物治疗可治愈软下疳感染、缓解临床症状并防止传播给他人。在晚期病例中，尽管治疗成功，仍可能导致生殖器瘢痕和由化脓性腹股沟淋巴结炎引起的直肠或泌尿生殖道瘘管。

Recommended Regimens for Chancroid
Azithromycin 1 g orally in a single dose *or* **Ceftriaxone** 250 mg IM in a single dose *or* **Ciprofloxacin** 500 mg orally 2 times/day for 3 days *or* **Erythromycin base** 500 mg orally 3 times/day for 7 days

Azithromycin and ceftriaxone offer the advantage of single-dose therapy (*429*). Worldwide, several isolates with intermediate resistance to either ciprofloxacin or erythromycin have been reported. However, because cultures are not routinely performed, and chancroid is uncommon, data are limited regarding prevalence of *H. ducreyi* antimicrobial resistance.

Other Management Considerations

Men who are uncircumcised and persons with HIV infection do not respond as well to treatment as persons who are circumcised or are HIV negative (*430*). Patients should be tested for HIV at the time chancroid is diagnosed. If the initial HIV test results were negative, the provider can consider the benefits of offering more frequent testing and HIV PrEP to persons at increased risk for HIV infection.

Follow-Up

Patients should be reexamined 3–7 days after therapy initiation. If treatment is successful, ulcers usually improve symptomatically within 3 days and objectively within 7 days after therapy. If no clinical improvement is evident, the clinician should consider whether the diagnosis is correct, another STI is present, the patient has HIV infection, the treatment was not used as instructed, or the *H. ducreyi* strain causing the infection is resistant to the prescribed antimicrobial. The time required for complete healing depends on the size of the ulcer; large ulcers might require >2 weeks. In addition, healing can be slower for uncircumcised men who have ulcers under the foreskin. Clinical resolution of fluctuant lymphadenopathy is slower than that of ulcers and might require needle aspiration or incision and drainage, despite otherwise successful therapy. Although needle aspiration of buboes is a simpler procedure, incision and drainage might be preferred because of reduced need for subsequent drainage procedures.

Management of Sex Partners

Regardless of whether disease symptoms are present, sex partners of patients with chancroid should be examined and treated if they had sexual contact with the patient during the 10 days preceding the patient's symptom onset.

Special Considerations

Pregnancy

Data indicate ciprofloxacin presents a low risk to the fetus during pregnancy but has potential for toxicity during breastfeeding (*431*). Alternative drugs should be used if the patient is pregnant or lactating. No adverse effects of chancroid on pregnancy outcome have been reported.

HIV Infection

Persons with HIV infection who have chancroid infection should be monitored closely because they are more likely to experience chancroid treatment failure and to have ulcers that heal slowly (*430*,*432*). Persons with HIV might require repeated or longer courses of therapy, and treatment failures can occur with any regimen. Data are limited concerning the therapeutic efficacy of the recommended single-dose azithromycin and ceftriaxone regimens among persons with HIV infection.

Children

Because sexual contact is the major primary transmission route among U.S. patients, diagnosis of chancroid ulcers among infants and children, especially in the genital or perineal region, is highly suspicious of sexual abuse. However, *H. ducreyi* is recognized as a major cause of nonsexually transmitted cutaneous ulcers among children in tropical regions and, specifically, countries where yaws is endemic (*433*–*435*). Acquisition of a lower-extremity ulcer attributable to *H. ducreyi* in a child without genital ulcers and reported travel to a region where yaws is endemic should not be considered evidence of sexual abuse.

Genital Herpes

Genital herpes is a chronic, lifelong viral infection. Two types of HSV can cause genital herpes: HSV-1 and HSV-2. Most cases of recurrent genital herpes are caused by HSV-2, and 11.9% of persons aged 14–49 years are estimated to be infected in the United States (*436*). However, an increasing proportion of anogenital herpetic infections have been attributed to HSV-1, which is especially prominent among young women and MSM (*186*,*437*,*438*).

The majority of persons infected with HSV-2 have not had the condition diagnosed, many of whom have mild or unrecognized infections but shed virus intermittently in the anogenital area. Consequently, most genital herpes infections are transmitted by persons unaware that they have the infection or who are asymptomatic when transmission occurs. Management of genital HSV should address the chronic nature of the infection rather than focusing solely on treating acute episodes of genital lesions.

软下疳的推荐治疗方案
阿奇霉素 1 g 口服，单次给药 或 **头孢曲松** 250 mg IM，单次给药 或 **环丙沙星** 500 mg 口服每日2次连用3天 或 **红霉素碱** 500 mg 口服，每日3次，共7天

阿奇霉素和头孢曲松具有单剂治疗的优势(429)。在世界范围内，已报道若干对环丙沙星或红霉素中介耐药的分离株。然而，由于不常规进行培养，且软下疳不常见，关于*H.ducrey*i抗菌药物耐药流行率的数据有限。

其他管理考虑

未行包皮环切术的男性和HIV感染者对治疗的反应不如已行包皮环切术者或HIV阴性者(430)。患者在诊断软下疳时应进行HIV检测。如果初始HIV检测结果为阴性，提供者可考虑向HIV感染风险增加者提供更频繁检测和HIV PrEP的益处。

随访

患者应在开始治疗后3-7天复查。如果治疗成功，溃疡通常在治疗后3天内症状改善，7天内客观改善。如果无明显临床改善，临床医生应考虑诊断是否正确、是否存在其他STI、患者是否有HIV感染、治疗是否未按指示使用，或引起感染的*H.ducrey*i菌株对处方抗菌药物耐药。完全愈合所需时间取决于溃疡大小；大溃疡可能需要>2周。此外，包皮过长且有包皮下溃疡的男性愈合可能较慢。波动性淋巴结病的临床消退比溃疡慢，尽管治疗其他方面成功，仍可能需要针吸或切开引流。虽然针吸腹股沟淋巴结炎是较简单的操作，但切开引流可能更可取，因为可减少后续引流操作的需要。

性伴侣的管理

无论是否存在疾病症状，软下疳患者的性伴侣如果在患者症状出现前10天内与患者有性接触，应接受检查和治疗。

特殊考虑

妊娠

数据表明环丙沙星在妊娠期间对胎儿风险低，但在哺乳期间有潜在毒性(431)。如果患者妊娠或哺乳，应使用替代药物。未见软下疳对妊娠结局不良影响的报道。

HIV感染

HIV感染者合并软下疳感染应密切监测，因为他们更可能经历软下疳治疗失败和溃疡愈合缓慢(*430*,*432*)。HIV感染者可能需要重复或更长疗程的治疗，任何方案都可能发生治疗失败。关于推荐的单剂阿奇霉素和头孢曲松方案在HIV感染者中的治疗疗效数据有限。

儿童

由于性接触是美国患者的主要原发传播途径，婴儿和儿童软下疳溃疡的诊断，尤其是生殖器或会阴区域，高度提示性虐待。然而，*H.ducrey*i被认为是热带地区儿童非性传播皮肤溃疡的主要原因，特别是雅司病流行国家(*433* - *435*)。儿童因*H.ducrey*i发生下肢溃疡且无生殖器溃疡，并有前往雅司病流行地区旅行史，不应被视为性虐待的证据。

生殖器疱疹

生殖器疱疹是一种慢性、终身性病毒感染。两种类型的HSV可引起生殖器疱疹：HSV-1和HSV-2。大多数复发性生殖器疱疹病例由HSV-2引起，估计美国14-49岁人群中11.9%感染(436)。然而，越来越多的肛门生殖器疱疹感染归因于HSV-1，这在年轻女性和MSM中尤为突出(*186*,*437*,*438*)。

大多数HSV-2感染者未得到诊断，其中许多人为轻度或未被识别的感染，但会在肛门生殖器区域间歇性排毒。因此，大多数生殖器疱疹感染由不知道自己感染或传播发生时无症状的人传播。生殖器HSV的管理应针对感染的慢性性质，而非仅关注治疗生殖器病变的急性发作。

Diagnostic Considerations

Clinical diagnosis of genital herpes can be difficult because the self-limited, recurrent, painful, and vesicular or ulcerative lesions classically associated with HSV are absent in many infected persons at the time of clinical evaluation. If genital lesions are present, clinical diagnosis of genital herpes should be confirmed by type-specific virologic testing from the lesion by NAAT or culture (*186*). Recurrences and subclinical shedding are much more frequent for HSV-2 genital herpes infection than for HSV-1 genital herpes (*439*,*440*). Therefore, prognosis and counseling depend on which HSV type is present. Type-specific serologic tests can be used to aid in the diagnosis of HSV infection in the absence of genital lesions. Both type-specific virologic and type-specific serologic tests for HSV should be available in clinical settings that provide care to persons with or at risk for STIs. HSV-2 genital herpes infection increases the risk for acquiring HIV twofold to threefold; therefore, all persons with genital herpes should be tested for HIV (*441*).

Virologic Tests

HSV NAAT assays are the most sensitive tests because they detect HSV from genital ulcers or other mucocutaneous lesions; these tests are increasingly available (*442*–*444*). Although multiple FDA-cleared assays exist for HSV detection, these tests vary in sensitivity from 90.9% to 100%; however, they are considered highly specific (*445*–*447*). PCR is also the test of choice for diagnosing HSV infections affecting the central nervous system (CNS) and systemic infections (e.g., meningitis, encephalitis, and neonatal herpes). HSV PCR of the blood should not be performed to diagnose genital herpes infection, except in cases in which concern exists for disseminated infection (e.g., hepatitis). In certain settings, viral culture is the only available virologic test. The sensitivity of viral culture is low, especially for recurrent lesions, and decreases rapidly as lesions begin to heal (*443*,*448*). Viral culture isolates and PCR amplicons should be typed to determine whether HSV-1 or HSV-2 is causing the infection. Failure to detect HSV by NAAT or culture, especially in the presence of older lesions or the absence of active lesions, does not indicate an absence of HSV infection because viral shedding is intermittent. Similarly, random or blind genital swabs in the absence of lesions should not be used to diagnose genital HSV infection because sensitivity is low, and a negative result does not exclude the presence of HSV infection.

Cytologic detection of cellular changes associated with HSV infection is an insensitive and nonspecific method of diagnosing genital lesions (i.e., Tzanck preparation) and therefore should not be relied on. Although a direct immunofluorescence assay using fluorescein-labeled monoclonal antibodies is also available for detecting HSV antigen from genital specimens, this assay lacks sensitivity and is not recommended (*449*).

Type-Specific Serologic Tests

Both type-specific and type-common antibodies to HSV develop during the first weeks after infection and persist indefinitely. The majority of available, accurate type-specific HSV serologic assays are based on the HSV-specific glycoprotein G2 (gG2) (HSV-2) and glycoprotein G1 (gG1) (HSV-1). Type-common antibody tests do not distinguish between HSV-1 and HSV-2 infection; therefore, type-specific serologic assays should be requested (*450*–*452*).

Both laboratory-based assays and POC tests that provide results for HSV-2 antibodies from capillary blood or serum during a clinic visit are available. The sensitivity of glycoprotein G type-specific tests for detecting HSV-2 antibody varies from 80% to 98%; false-negative results might be more frequent at early stages of infection (*451*,*453*,*454*). Therefore, in cases of recent suspected HSV-2 acquisition, repeat type-specific antibody testing 12 weeks after the presumed time of acquisition is indicated. The most commonly used test, HerpeSelect HSV-2 enzyme immunoassay (EIA), often is falsely positive at low index values (1.1–3.0) (*457*–*457*). One study reported an overall specificity of 57.4%, with a specificity of 39.8% for index values of 1.1–2.9 (*458*). Because of the poor specificity of commercially available type-specific EIAs, particularly with low index values (<3.0), a confirmatory test (Biokit or Western blot) with a second method should be performed before test interpretation. Use of confirmatory testing with the Biokit or the Western blot assays have been reported to improve accuracy of HSV-2 serologic testing (*459*). The HerpeSelect HSV-2 immunoblot should not be used for confirmation because it uses the same antigen as the HSV-2 EIA. If confirmatory tests are unavailable, patients should be counseled about the limitations of available testing before obtaining serologic tests, and health care providers should be aware that false-positive results occur. Immunoglobulin M (IgM) testing for HSV-1 or HSV-2 is not useful because IgM tests are not type specific and might be positive during recurrent genital or oral episodes of herpes (*460*). Therefore, HSV IgM testing is not recommended.

Because approximately all HSV-2 infections are sexually acquired, presence of type-specific HSV-2 antibody implies anogenital infection. In this instance, education and counseling for persons with genital HSV infections should be provided. The presence of HSV-1 antibody alone is more difficult to interpret. HSV-1 serologic testing does not distinguish between oral and genital infection and typically should not be performed for diagnosing genital HSV-1 infection. Persons with HSV-1 antibodies often have oral HSV infection acquired during childhood, which might be asymptomatic. Lack of symptoms in a person who is HSV-1 seropositive does not

诊断考虑

生殖器疱疹的临床诊断可能困难，因为在许多感染者接受临床评估时，经典与HSV相关的自限性、复发性、疼痛性水疱或溃疡性病变并不存在。如果存在生殖器病变，生殖器疱疹的临床诊断应通过从病变处进行型特异性病毒学检测(NAAT或培养)确认(186)。HSV-2生殖器疱疹感染的复发和亚临床排毒比HSV-1生殖器疱疹更频繁(*439*, *440*)。因此，预后和咨询取决于存在哪种HSV型别。型特异性血清学检测可用于在无生殖器病变时辅助诊断HSV感染。为STI患者或有STI风险者提供服务的临床机构应同时具备HSV的型特异性病毒学和型特异性血清学检测。HSV-2生殖器疱疹感染使HIV感染风险增加两倍至三倍；因此，所有生殖器疱疹患者都应进行HIV检测(441)。

病毒学检测

HSV NAAT检测是最敏感的检测，因为它们可从生殖器溃疡或其他黏膜皮肤病变中检测HSV；这些检测越来越可用(*442* - *444*)。尽管存在多种FDA批准的HSV检测方法，这些检测的敏感性从90.9%到100%不等；然而，它们被认为具有高度特异性(*445* - *447*)。PCR也是诊断影响中枢神经系统(CNS)的HSV感染和全身性感染(例如脑膜炎、脑炎和新生儿疱疹)的首选检测。不应进行血液HSV PCR来诊断生殖器疱疹感染，除非担心播散性感染(例如肝炎)。在某些情况下，病毒培养是唯一可用的病毒学检测。病毒培养的敏感性低，尤其是对复发性病变，并且随着病变开始愈合而迅速下降(*443*, *448*)。病毒培养分离株和PCR扩增子应进行分型，以确定是HSV-1还是HSV-2引起感染。NAAT或培养未能检测到HSV，尤其是在存在较旧病变或无活动性病变时，并不表明没有HSV感染，因为病毒排毒是间歇性的。同样，在无病变时不应使用随机或盲法生殖器拭子来诊断生殖器HSV感染，因为敏感性低，且阴性结果不能排除HSV感染的存在。

细胞学检测HSV感染相关的细胞变化是诊断生殖器病变的敏感性和特异性均差的方法(即Tzanck涂片)，因此不应依赖。尽管使用荧光素标记单克隆抗体的直接免疫荧光试验也可用于检测生殖器标本中的HSV抗原，但该试验缺乏敏感性，不推荐使用(449)。

型特异性血清学检测

针对HSV的型特异性和型共同性抗体均在感染后最初几周内产生并持续存在。大多数可用的、准确的型特异性HSV血清学试验基于HSV特异性糖蛋白G2(gG2)(HSV-2)和糖蛋白G1(gG1)(HSV-1)。型共同性抗体检测不能区分HSV-1和HSV-2感染；因此，应要求进行型特异性血清学试验(*450* - *452*)。

基于实验室的检测和POC检测均可在门诊就诊期间利用毛细血管血或血清提供HSV-2抗体结果。糖蛋白G型特异性试验检测HSV-2抗体的敏感性为80%至98%；在感染早期，假阴性结果可能更为常见(*451*, *453*, *454*)。因此，对于近期疑似获得HSV-2的病例，建议在推测获得时间后12周重复进行型特异性抗体检测。最常用的检测方法HerpeSelect HSV-2酶免疫分析(EIA)在低指数值(1.1-3.0)时常常出现假阳性(*457* - *457*)。一项研究报告总体特异性为57.4%，指数值1.1-2.9时的特异性为39.8%(458)。由于市售型特异性EIA的特异性较差，尤其是低指数值(<3.0)时,在解释检测结果之前应使用第二种方法进行确认试验(Biokit或Western blot)。据报道,使用Biokit或Western blot试验进行确认检测可提高HSV-2血清学检测的准确性(459)。HerpeSelect HSV-2免疫印迹不应作为确认试验使用,因为它使用与HSV-2 EIA相同的抗原。如果无法进行确认试验,应在进行血清学检测前告知患者现有检测的局限性,且卫生保健提供者应意识到假阳性结果会发生。
HSV-1或HSV-2的免疫球蛋白M(IgM)检测没有用处,因为IgM检测不是型特异性的,并且在生殖器或口腔疱疹复发发作期间可能呈阳性(460)。因此,不推荐进行HSV IgM检测。

由于几乎所有HSV-2感染均为性获得性，型特异性HSV-2抗体的存在意味着肛门生殖器感染。在这种情况下，应为生殖器HSV感染者提供教育和咨询。仅HSV-1抗体存在的解释较为困难。HSV-1血清学检测不能区分口腔感染和生殖器感染，通常不应进行HSV-1生殖器感染的诊断。具有HSV-1抗体的人通常在儿童期获得口腔HSV感染，可能无症状。
HSV-1血清学阳性者缺乏症状并不

distinguish anogenital from orolabial or cutaneous infection, and, regardless of site of infection, these persons remain at risk for acquiring HSV-2. In addition, HSV-1 serologic testing has low sensitivity for detection of HSV-1 antibody (*458*). However, acquisition of HSV-1 genital herpes is increasing, and HSV-1 genital herpes also can be asymptomatic (*437–439*,*461*,*462*). Diagnosis of HSV-1 infection is confirmed by virologic tests from genital lesions.

Type-specific HSV-2 serologic assays for diagnosing HSV-2 are useful in the following scenarios: recurrent or atypical genital symptoms or lesions with a negative HSV PCR or culture result, clinical diagnosis of genital herpes without laboratory confirmation, and a patient's partner has genital herpes. HSV-2 serologic screening among the general population is not recommended. Patients who are at higher risk for infection (e.g., those presenting for an STI evaluation, especially for persons with ≥10 lifetime sex partners, and persons with HIV infection) might need to be assessed for a history of genital herpes symptoms, followed by type-specific HSV serologic assays to diagnose genital herpes for those with genital symptoms.

Genital Herpes Management

Antiviral medication offers clinical benefits to symptomatic patients and is the mainstay of management. The goals for use of antiviral medications to treat genital herpes infection are to treat or prevent symptomatic genital herpes recurrences and improve quality of life and suppress the virus to prevent transmission to sexual partners. Counseling regarding the natural history of genital herpes, risks for sexual and perinatal transmission, and methods for reducing transmission is also integral to clinical management.

Systemic antiviral drugs can partially control the signs and symptoms of genital herpes when used to treat first clinical and recurrent episodes or when used as daily suppressive therapy. However, these drugs neither eradicate latent virus nor affect the risk, frequency, or severity of recurrences after the drug is discontinued. Randomized trials have indicated that three FDA-approved antiviral medications provide clinical benefit for genital herpes: acyclovir, valacyclovir, and famciclovir (*463–471*). Valacyclovir is the valine ester of acyclovir and has enhanced absorption after oral administration, allowing for less frequent dosing than acyclovir. Famciclovir also has high oral bioavailability. Topical therapy with antiviral drugs offers minimal clinical benefit and is discouraged.

First Clinical Episode of Genital Herpes

Newly acquired genital herpes can cause a prolonged clinical illness with severe genital ulcerations and neurologic involvement. Even persons with first-episode herpes who have mild clinical manifestations initially can experience severe or prolonged symptoms during recurrent infection. Therefore, all patients with first episodes of genital herpes should receive antiviral therapy.

Recommended Regimens for First Clinical Episode of Genital Herpes*

Acyclovir† 400 mg orally 3 times/day for 7–10 days
or
Famciclovir 250 mg orally 3 times/day for 7–10 days
or
Valacyclovir 1 g orally 2 times/day for 7–10 days

* Treatment can be extended if healing is incomplete after 10 days of therapy.
† Acyclovir 200 mg orally 5 times/day is also effective but is not recommended because of the frequency of dosing.

Recurrent HSV-2 Genital Herpes

Almost all persons with symptomatic first-episode HSV-2 genital herpes subsequently experience recurrent episodes of genital lesions. Intermittent asymptomatic shedding occurs among persons with HSV-2 genital herpes infection, even those with longstanding clinically silent infection. Antiviral therapy for recurrent genital herpes can be administered either as suppressive therapy to reduce the frequency of recurrences or episodically to ameliorate or shorten the duration of lesions. Certain persons, including those with mild or infrequent recurrent outbreaks, benefit from antiviral therapy; therefore, options for treatment should be discussed. Many persons prefer suppressive therapy, which has the additional advantage of decreasing the risk for transmitting HSV-2 genital herpes to susceptible partners (*472*,*473*).

Suppressive Therapy for Recurrent HSV-2 Genital Herpes

Suppressive therapy reduces frequency of genital herpes recurrences by 70%–80% among patients who have frequent recurrences (*469–472*). Persons receiving such therapy often report having experienced no symptomatic outbreaks. Suppressive therapy also is effective for patients with less frequent recurrences. Long-term safety and efficacy have been documented among patients receiving daily acyclovir, valacyclovir, and famciclovir (*474*). Quality of life is improved for many patients with frequent recurrences who receive suppressive therapy rather than episodic treatment (*475*). Providers should discuss with patients on an annual basis whether they want to continue suppressive therapy because frequency of genital HSV-2 recurrence diminishes over time for many persons. However, neither treatment discontinuation nor laboratory monitoring is necessary because adverse events and development of HSV antiviral resistance related to long-term antiviral use are uncommon.

区分肛门生殖器感染与口唇或皮肤感染，并且无论感染部位如何，这些人仍面临获得HSV-2的风险。此外，HSV-1血清学检测对HSV-1抗体的检测敏感性较低(458)。然而，HSV-1生殖器疱疹的获得率正在增加，HSV-1生殖器疱疹也可以是无症状的(*437 - 439*, *461*, *462*)。HSV-1感染的诊断通过生殖器病变的病毒学检测确认。

用于诊断HSV-2型特异性血清学检测在以下情况下是有用的：复发性或非典型生殖器症状或病变且HSV PCR或培养结果阴性，临床诊断为生殖器疱疹但无实验室确认，以及患者的性伴患有生殖器疱疹。不建议在普通人群中进行HSV-2血清学筛查。感染风险较高的患者(例如，因STI评估就诊者，特别是终生性伴≥10个者，以及HIV感染者)可能需要评估生殖器疱疹症状史，随后对有明显生殖器症状者进行型特异性HSV血清学检测以诊断生殖器疱疹。

生殖器疱疹管理

抗病毒药物为有症状的患者提供临床获益，是管理的基石。使用抗病毒药物治疗生殖器疱疹感染的目标是治疗或预防有症状的生殖器疱疹复发，改善生活质量，并抑制病毒以防止传播给性伴。关于生殖器疱疹自然史、性和围产期传播风险以及减少传播方法的咨询也是临床管理不可或缺的组成部分。

全身性抗病毒药物在用于治疗首次临床发作和复发性发作或用作每日抑制疗法时，可以部分控制生殖器疱疹的体征和症状。然而，这些药物既不能根除潜伏病毒，也不能在停药后影响复发的风险、频率或严重程度。随机试验表明，三种FDA批准的抗病毒药物对生殖器疱疹提供临床获益：acyclovir、valacyclovir和famciclovir(*463 - 471*)。valacyclovir是acyclovir的缬氨酸酯，口服后吸收增强，允许比acyclovir更少的给药频率。famciclovir也具有高口服生物利用度。局部抗病毒药物治疗的临床获益极小，不鼓励使用。

生殖器疱疹首次临床发作

新获得的生殖器疱疹可引起临床病程延长，伴有严重的生殖器溃疡和神经系统受累。即使是初次发作的疱疹患者，如果初期临床表现轻微，在复发性感染期间也可能出现严重或延长的症状。因此，所有初次发作生殖器疱疹的患者都应接受抗病毒治疗。

生殖器首次临床发作的推荐治疗方案
疱疹*

Acyclovir † 400 mg 口服，每日3次，共7-10天
或
Famciclovir 250 mg 口服，每日3次，共7-10天
或
Valacyclovir 1 g 口服每日2次共7-10天

* 如果治疗10天后愈合不完全，可延长治疗。† 阿昔洛韦200 mg口服每日5次也有效，但不
推荐使用，因为给药频率较高。

复发性HSV-2生殖器疱疹

几乎所有有症状的初发HSV-2生殖器疱疹患者随后都会经历生殖器病变的复发发作。HSV-2生殖器疱疹感染者中存在间歇性无症状排毒，甚至那些长期临床沉默感染者也是如此。复发性生殖器疱疹的抗病毒治疗可以作为抑制疗法以减少复发频率，或间歇性给药以改善或缩短病变持续时间。某些人，包括那些有轻度或不频繁复发发作者，从抗病毒治疗中获益；因此，应讨论治疗选择。许多人偏好抑制疗法，其额外优势是降低将HSV-2生殖器疱疹传播给易感性伴的风险(*472*, *473*)。

复发性HSV-2生殖器疱疹的抑制疗法

抑制疗法在频繁复发患者中将生殖器疱疹复发频率降低70%-80%(*469 - 472*)。接受此类治疗者常报告未经历有症状的发作。抑制疗法对复发较少者亦有效。每日接受acyclovir、valacyclovir和famciclovir的患者中长期安全性和有效性已有记录(474)。许多频繁复发患者接受抑制疗法而非间歇性治疗后生活质量得到改善(475)。提供者应每年与患者讨论是否希望继续抑制疗法，因为许多人的生殖器HSV-2复发频率随时间而减少。然而，无需停止治疗或进行实验室监测，因为与长期抗病毒使用相关的不良事件和HSV抗病毒耐药性的发展并不常见。

Treatment with valacyclovir 500 mg daily decreases the rate of HSV-2 transmission for discordant heterosexual couples in which a partner has a history of genital HSV-2 infection (*473*). Such couples should be encouraged to consider suppressive antiviral therapy as part of a strategy for preventing transmission, in addition to consistent condom use and avoidance of sexual activity during recurrences. Suppressive antiviral therapy for persons with a history of symptomatic genital herpes also is likely to reduce transmission when used by those who have multiple partners. HSV-2 seropositive persons without a history of symptomatic genital herpes have a 50% decreased risk for genital shedding, compared with those with symptomatic genital herpes (*476*). No data are available regarding efficacy of suppressive therapy for preventing HSV-2 transmission among discordant couples in which a partner has a history of asymptomatic HSV-2 infection identified by a positive HSV-2 serologic test. Among HSV-2 seropositive persons without HIV infection, oral TDF/FTC and intravaginal tenofovir are ineffective at reducing the risk for HSV-2 shedding or recurrences (*477*).

Recommended Regimens for Suppression of Recurrent HSV-2 Genital Herpes

Acyclovir 400 mg orally 2 times/day
or
Valacyclovir 500 mg orally once a day*
or
Valacyclovir 1 g orally once a day
or
Famciclovir 250 mg orally 2 times/day

* Valacyclovir 500 mg once a day might be less effective than other valacyclovir or acyclovir dosing regimens for persons who have frequent recurrences (i.e., ≥10 episodes/year).

Famciclovir appears somewhat less effective for suppression of viral shedding (*478*). Ease of administration and cost also are key considerations for prolonged treatment.

Recurrent HSV-1 Genital Herpes

Recurrences are less frequent after the first episode of HSV-1 genital herpes, compared with genital HSV-2 genital herpes, and genital shedding rapidly decreases during the first year of infection (*479*). No data are available regarding the efficacy of suppressive therapy for preventing transmission among persons with HSV-1 genital herpes infection. Because of the decreased risk for recurrences and shedding, suppressive therapy for HSV-1 genital herpes should be reserved for those with frequent recurrences through shared clinical decision-making between the patient and the provider.

Episodic Therapy for Recurrent HSV-2 Genital Herpes

Episodic treatment of recurrent herpes is most effective if therapy is initiated within 1 day of lesion onset or during the prodrome that precedes some outbreaks. The patient should be provided with a supply of drug or a prescription for the medication with instructions to initiate treatment immediately when symptoms begin. Acyclovir, famciclovir, and valacyclovir appear equally effective for episodic treatment of genital herpes (*466–470*).

Recommended Regimens for Episodic Therapy for Recurrent HSV-2 Genital Herpes*

Acyclovir 800 mg orally 2 times/day for 5 days
or
Acyclovir 800 mg orally 3 times/day for 2 days
or
Famciclovir 1 g orally 2 times/day for 1 day
or
Famciclovir 500 mg orally once, followed by 250 mg 2 times/day for 2 days
or
Famciclovir 125 mg orally 2 times/day for 5 days
or
Valacyclovir 500 mg orally 2 times/day for 3 days
or
Valacyclovir 1 g orally once daily for 5 days

* Acyclovir 400 mg orally 3 times/day for 5 days is also effective but is not recommended because of frequency of dosing.

Severe Disease

Intravenous (IV) acyclovir therapy (5–10 mg/kg body weight IV every 8 hours) should be provided for patients who have severe HSV disease or complications that necessitate hospitalization (e.g., disseminated infection, pneumonitis, or hepatitis) or CNS complications (e.g., meningitis or encephalitis). HSV-2 meningitis is a rare complication of HSV-2 genital herpes infection that affects women more than men (*480*). IV therapy should be considered until clinical improvement followed by oral antiviral therapy to complete >10 days of total therapy. Longer duration is recommended for CNS complications. HSV-2 meningitis is characterized clinically by signs of headache, photophobia, fever, meningismus, and cerebrospinal fluid (CSF) lymphocytic pleocytosis, accompanied by mildly elevated protein and normal glucose (*481*). Optimal therapies for HSV-2 meningitis have not been well studied (*482*); however, acyclovir 5–10 mg/kg body weight IV every 8 hours until clinical improvement is observed, followed by high-dose oral antiviral therapy (valacyclovir 1 g 3 times/day) to complete a 10- to 14-day course of total therapy, is recommended. For patients with previous episodes of documented HSV-2 meningitis, oral valacyclovir may be used for the entire course during episodes of recurrent HSV-2 meningitis. A randomized clinical trial indicated that suppressive therapy (valacyclovir 500 mg 2 times/day) did not prevent recurrent HSV-2 meningitis episodes; however, the dose might not have been sufficient for CNS penetration (*483*). Valacyclovir

每日服用 valacyclovir 500 mg 可降低 HSV-2 传播率，适用于一方有生殖器 HSV-2 感染史的不一致异性伴侣(473)。应鼓励此类伴侣考虑将抑制性抗病毒治疗作为预防传播策略的一部分，同时坚持使用安全套并在复发期间避免性活动。对于有症状性生殖器疱疹病史者，抑制性抗病毒治疗在有多名性伴侣时也可能减少传播。无有症状生殖器疱疹病史的 HSV-2 血清学阳性者，其生殖器排毒风险较有症状性生殖器疱疹者降低 50%(476)。目前尚无数据表明抑制性治疗对预防一方经 HSV-2 血清学检测阳性确认有无症状 HSV-2 感染史的不一致伴侣间 HSV-2 传播的疗效。在无 HIV 感染的 HSV-2 血清学阳性者中，口服 TDF/FTC 和阴道内 tenofovir 在降低 HSV-2 排毒或复发风险方面无效(477)。

复发性HSV-2生殖器疱疹抑制治疗的推荐方案

Acyclovir 400 mg 口服每日2次
或
伐昔洛韦500毫克口服每日一次*
或
Valacyclovir 1 g 口服，每日一次
或
Famciclovir 250 mg 口服每日2次

* Valacyclovir 500 mg 每日一次可能不如其他方案有效
伐昔洛韦或阿昔洛韦给药方案，用于频繁复发(即≥10次/年)的患者。

泛昔洛韦对抑制病毒排出的效果似乎略低(478)。给药便利性和成本也是长期治疗的关键考虑因素。

复发性HSV-1生殖器疱疹

与生殖器 HSV-2 生殖器疱疹相比，HSV-1 生殖器疱疹首次发作后复发较少见，且生殖器排毒在感染第一年内迅速减少(479)。目前尚无数据表明抑制性治疗对预防 HSV-1 生殖器疱疹感染者传播的疗效。由于复发和排毒风险降低，HSV-1 生殖器疱疹的抑制性治疗应保留给频繁复发者，并通过患者与医务人员共同临床决策来决定。

复发性HSV-2生殖器疱疹的发作期治疗

复发性疱疹的间歇性治疗如果在病变出现后1天内或在前驱期(某些暴发前出现)开始治疗最为有效。应向患者提供药物或处方，并指示在症状开始时立即开始治疗。阿昔洛韦、泛昔洛韦和伐昔洛韦对生殖器疱疹的间歇性治疗效果似乎相当(*466 - 470*)。

复发性HSV-2生殖器疱疹间歇性治疗的推荐方案*

阿昔洛韦 800 mg口服每日2次，共5天**阿昔洛韦** 800 mg口服每日3次，共2天**泛昔洛韦** 1 g口服每日2次，共1天
或
或
泛昔洛韦 500 mg口服一次，随后250 mg每日2次，共2天
或
泛昔洛韦 125 mg口服每日2次，共5天**伐昔洛韦** 500 mg口服每日2次，共3天**伐昔洛韦** 1 g口服每日1次，共5天
或

* 阿昔洛韦 400 mg 口服，每日3次，共5天也有效，但不推荐使用，因为给药频率较高。

严重疾病

对于患有严重 HSV 疾病或需要住院的并发症(如播散性感染、肺炎或肝炎)或 CNS 并发症(如脑膜炎或脑炎)的患者，应给予静脉(IV)acyclovir 治疗(5-10 mg/kg 体重 IV 每 8 小时一次)。HSV-2 脑膜炎是 HSV-2 生殖器疱疹感染的罕见并发症，女性较男性更易受累(480)。应考虑 IV 治疗直至临床改善，随后口服抗病毒治疗以完成 >10 天的总疗程。CNS 并发症建议延长疗程。HSV-2 脑膜炎的临床特征为头痛、畏光、发热、脑膜刺激征和脑脊液(CSF)淋巴细胞增多，伴蛋白轻度升高和葡萄糖正常(481)。HSV-2 脑膜炎的最佳治疗尚未得到充分研究(482)；然而，建议 acyclovir 5-10 mg/kg 体重 IV 每 8 小时一次直至观察到临床改善，随后高剂量口服抗病毒治疗(valacyclovir 1 g 3 次/日)以完成 10-14 天的总疗程。对于既往有确诊 HSV-2 脑膜炎发作的患者，在复发性 HSV-2 脑膜炎发作期间可全程使用口服 valacyclovir。一项随机临床试验表明，抑制性治疗(valacyclovir 500 mg 2 次/日)未能预防复发性 HSV-2 脑膜炎发作；然而，该剂量可能不足以穿透 CNS(483)。valacyclovir

500 mg 2 times/day is not recommended for suppression of HSV-2 meningitis; higher doses have not been studied in clinical trials. HSV meningitis should be distinguished from encephalitis, which requires a longer course (14–21 days) of IV therapy. Impaired renal function warrants an adjustment in acyclovir dosage.

Hepatitis

Hepatitis is a rare manifestation of disseminated HSV infection, often reported among pregnant women who acquire HSV during pregnancy (*484*). Pregnant women in any trimester can present with fever and hepatitis (markedly elevated transaminases) but might not have any genital or skin lesions. HSV hepatitis is associated with fulminant liver failure and high mortality (25%). Therefore, a high index of suspicion for HSV is necessary, with a confirmatory diagnosis by HSV PCR from blood (*485*). Among pregnant women with fever and unexplained severe hepatitis, disseminated HSV infection should be considered, and empiric IV acyclovir should be initiated pending confirmation (*484*).

Prevention

Consistent and correct condom use has been reported in multiple studies to decrease, but not eliminate, the risk for HSV-2 transmission from men to women (*486*–*488*). Condoms are less effective for preventing transmission from women to men (*489*). Two randomized clinical trials of medical male circumcision (MMC) demonstrated a decreased risk for HSV-2 acquisition among men in Uganda and South Africa (*66*,*68*). Results from a third trial conducted in Kenya did not demonstrate a substantial difference in HSV-2 acquisition among men who received MMC (*490*). A systematic review indicated high consistency for decreased risk for HSV-2 acquisition among women with a male partner who underwent MMC (*491*). These data indicate that MMC can be associated with decreased risk for HSV-2 acquisition among adult heterosexual men and with decreased risk for HSV-2 transmission from male to female partners.

Randomized clinical trials have demonstrated that PrEP with daily oral TDF/FTC decreases the risk for HSV-2 acquisition by 30% in heterosexual partnerships (*492*). Pericoital intravaginal tenofovir 1% gel also decreases the risk for HSV-2 acquisition among heterosexual women (*493*). Among MSM and transgender women, daily oral TDF/FTC decreases the risk for severe ulcers with symptomatic genital HSV-2 infection but not for HSV-2 acquisition (*494*). Insufficient evidence exists that TDF/FTC use among those who are not at risk for HIV acquisition will prevent HSV-2 infection, and it should not be used for that sole purpose. Oral TDF does not prevent HSV-2 acquisition among persons with HIV infection who are taking TDF as part of their ART regimen (*495*). No data indicate that antivirals (acyclovir, valacyclovir, or famciclovir) can be taken as PrEP by persons without HSV-2 to prevent its acquisition.

Counseling

Counseling of persons with genital herpes and their sex partners is crucial for management. The goals of counseling include helping patients cope with the infection and preventing sexual and perinatal transmission. Although initial counseling can be provided at the first visit, patients often benefit from learning about the chronic aspects of the disease after the acute illness subsides. Multiple resources, including Internet sites and printed materials, are available to assist patients, their partners, and clinicians who provide counseling (*496*,*497*) (https://www.ashasexualhealth.org and https://www.cdc.gov/std/herpes).

Although the psychological effect of a serologic diagnosis of HSV-2 infection in a person with asymptomatic or unrecognized genital herpes appears minimal and transient (*498*,*499*), certain persons with HSV infection might express anxiety concerning genital herpes that does not reflect the actual clinical severity of their disease; the psychological effect of HSV infection can be substantial. Common concerns about genital herpes include the severity of initial clinical manifestations, recurrent episodes, sexual relationships and transmission to sex partners, and ability to bear healthy children.

Symptomatic HSV-2 Genital Herpes

When counseling persons with symptomatic HSV-2 genital herpes infection, the provider should discuss the following:

- The natural history of the disease, with emphasis on the potential for recurrent episodes, asymptomatic viral shedding, and the attendant risks for sexual transmission of HSV to occur during asymptomatic periods (asymptomatic viral shedding is most frequent during the first 12 months after acquiring HSV-2).
- The effectiveness of daily suppressive antiviral therapy for preventing symptomatic recurrent episodes of genital herpes for persons experiencing a first episode or recurrent genital herpes.
- The effectiveness of daily use of valacyclovir in reducing risk for transmission of HSV-2 among persons without HIV (*473*) and use of episodic therapy to shorten the duration of recurrent episodes.
- The importance of informing current sex partners about genital herpes and informing future partners before initiating a sexual relationship.
- The importance of abstaining from sexual activity with uninfected partners when lesions or prodromal symptoms are present.

500 mg每日2次不推荐用于抑制HSV-2脑膜炎；更高剂量尚未在临床试验中研究。HSV脑膜炎应与脑炎相区分，后者需要更长疗程(14-21天)的静脉治疗。肾功能受损需要调整阿昔洛韦剂量。

肝炎

肝炎是播散性 HSV 感染的罕见表现，常报道于妊娠期间获得 HSV 的孕妇(484)。任何妊娠期的孕妇均可表现为发热和肝炎(转氨酶显著升高)，但可能没有任何生殖器或皮肤病变。HSV 肝炎与暴发性肝衰竭和高死亡率(25%)相关。因此，必须高度怀疑 HSV，并通过血液 HSV PCR 确认诊断(485)。对于发热和不明原因严重肝炎的孕妇，应考虑播散性 HSV 感染，并在等待确认期间开始经验性 IV acyclovir 治疗(484)。

预防

多项研究报道，坚持正确使用安全套可降低但不能消除男性向女性传播 HSV-2 的风险(*486* - *488*)。安全套在预防女性向男性传播方面效果较差(489)。两项医学男性包皮环切术(MMC)的随机临床试验表明，乌干达和南非的男性 HSV-2 感染风险降低(*66*, *68*)。在肯尼亚进行的第三项试验结果未显示接受 MMC 的男性在 HSV-2 感染方面有实质性差异(490)。一项系统综述表明，男性伴侣接受 MMC 的女性 HSV-2 感染风险降低具有高度一致性(491)。这些数据表明，MMC 可能与成年异性恋男性 HSV-2 感染风险降低以及男性向女性伴侣传播 HSV-2 风险降低相关。

随机临床试验已证明，每日口服 TDF/FTC 进行 PrEP 可使异性伴侣关系中 HSV-2 感染风险降低 30%(492)。性交前后阴道内使用 tenofovir 1% 凝胶也可降低异性女性中 HSV-2 的感染风险(493)。在 MSM 和跨性别女性中，每日口服 TDF/FTC 可降低有症状生殖器 HSV-2 感染所致严重溃疡的风险，但不能降低 HSV-2 感染风险(494)。尚无充分证据表明，在无 HIV 感染风险者中使用 TDF/FTC 可预防 HSV-2 感染，不应仅为此目的使用。口服 TDF 不能预防已感染 HIV 者获得 HSV-2

正在将TDF作为其ART方案的一部分服用(495)。没有数据表明抗病毒药物(阿昔洛韦、伐昔洛韦或泛昔洛韦)可被无HSV-2的人用作PrEP以预防其获得。

咨询

对生殖器疱疹患者及其性伴进行咨询对管理至关重要。咨询目标包括帮助患者应对感染以及预防性和围产期传播。虽然可在首次就诊时提供初始咨询，但患者在急性疾病消退后了解疾病的慢性方面往往获益。多种资源，包括互联网网站和印刷材料，可用于帮助患者、其性伴以及提供咨询的临床医生(*496*, *497*)(https://www.ashasexualhealth.org 和 https://www.cdc.gov/std/herpes)。

尽管对无症状或未被识别的生殖器疱疹患者进行 HSV-2 血清学诊断的心理影响似乎轻微且短暂(*498*, *499*)，但某些 HSV 感染者可能对生殖器疱疹表现出焦虑，而这种焦虑并不反映其疾病的实际临床严重程度；HSV 感染的心理影响可能相当大。对生殖器疱疹的常见担忧包括初始临床表现的严重程度、复发发作、性关系及向性伴传播，以及生育健康子女的能力。

有症状的HSV-2生殖器疱疹

在为有症状的HSV-2生殖器疱疹感染者提供咨询时，提供者应讨论以下内容：

- 疾病的自然史，重点在于
  复发发作的可能性、无症状病毒排出以及无症状期间HSV性传播的相关风险(无症状病毒排出在获得HSV-2后的前12个月内最为频繁)。
- 每日抑制性抗病毒治疗的有效性用于
  为经历初次发作或复发性生殖器疱疹的患者预防生殖器疱疹的有症状复发发作。
- 每日使用valacyclovir在减少
  无HIV感染者中HSV-2的传播风险(473)以及使用间歇性治疗以缩短复发发作的持续时间。
- 告知当前性伴侣有关
  生殖器疱疹，并在开始性关系之前告知未来的伴侣。
- 重要性在于避免与以下对象发生性行为
  当存在病变或前驱症状时，未感染的伴侣。

- The effectiveness of male latex condoms, which when used consistently and correctly can reduce, but not eliminate, the risk for genital herpes transmission (*486–488*).
- The type-specific serologic testing of partners of persons with symptomatic HSV-2 genital herpes to determine whether such partners are already HSV seropositive or whether risk for acquiring HSV exists.
- The low risk for neonatal HSV except when genital herpes is acquired late in pregnancy or if prodrome or lesions are present at delivery.
- The increased risk for HIV acquisition among HSV-2 seropositive persons who are exposed to HIV (*76*,*471*).
- The lack of effectiveness of episodic or suppressive therapy among persons with HIV infection to reduce risk for transmission to partners who might be at risk for HSV-2 acquisition.

Asymptomatic HSV-2 Genital Herpes

When counseling persons with asymptomatic HSV-2 genital herpes infection, the provider should consider the following:

- Asymptomatic persons who receive a diagnosis of HSV-2 by type-specific serologic testing (with confirmatory testing, if needed) should receive education about the symptoms of genital herpes infection (see Diagnostic Considerations).
- Episodic and suppressive antiviral therapies are used predominantly to treat recurrences, prevent recurrences, and prevent transmission to sex partners of persons with symptomatic HSV-2 infection.
- For patients with serological evidence of HSV-2 (with combination testing if needed) without symptomatic recurrences, neither episodic nor suppressive therapy is indicated for prevention of recurrences (see Diagnostic Considerations).
- Among persons with asymptomatic infection, the efficacy of suppressive therapy to prevent HSV-2 transmission to sex partners has not been studied.
- Because of the decreased risk for shedding among those with asymptomatic HSV-2 genital herpes, the benefit of suppressive therapy for preventing transmission is unknown among this population.

HSV-1 Genital Herpes

When counseling persons with HSV-1 genital herpes infection, the provider should consider the following:

- Persons with virologic laboratory-documented symptomatic HSV-1 genital herpes infection should be educated that the risk for recurrent genital herpes and genital shedding is lower with HSV-1 infection, compared with HSV-2 infection.
- Because of the decreased risk for recurrences and shedding, suppressive therapy for HSV-1 genital herpes should be reserved for those with frequent recurrences.
- For patients with frequently recurring HSV-1 genital herpes, suppressive therapy might be considered. Suppressive therapy to prevent HSV-1 transmission to sex partners has not been studied.

For persons with symptomatic HSV-1 genital herpes or asymptomatic HSV-2 genital herpes, suppressive therapy can be considered for those who have substantial psychosocial distress caused by the diagnosis of genital herpes. For women who have genital herpes, the providers who care for them during pregnancy and those who will care for their newborn infant should be informed of their infection (see Genital Herpes During Pregnancy).

Management of Sex Partners

The sex partners of persons who have symptomatic genital herpes can benefit from evaluation and counseling. Symptomatic sex partners should be evaluated and treated in the same manner as patients who have symptomatic genital herpes. Asymptomatic sex partners of patients who have symptomatic genital herpes should be asked about a history of genital symptoms and offered type-specific serologic testing for HSV-2. For partners without genital herpes, no data are available on which to base a recommendation for PEP or PrEP with antiviral medications or that they would prevent acquisition, and this should not be offered to patients as a prevention strategy.

Special Considerations

Drug Allergy, Intolerance, or Adverse Reactions

Allergic and other adverse reactions to oral acyclovir, valacyclovir, and famciclovir are rare. Desensitization to acyclovir has been described (*500*).

HIV Infection

Immunocompromised patients can have prolonged or severe episodes of genital, perianal, or oral herpes. Lesions caused by HSV are common among persons with HIV infection and might be severe, painful, and atypical (*501*). HSV shedding is increased among persons with HIV infection (*502*). Whereas ART reduces the severity and frequency of symptomatic genital herpes, frequent subclinical shedding still occurs (*503*,*504*). Clinical manifestations of genital herpes might worsen during immune reconstitution early after initiation of ART. HSV-2 type-specific serologic testing can be considered for persons with HIV infection during their initial evaluation, particularly among those with a history of genital symptoms indicative of HSV infection.

- 男性乳胶避孕套的有效性，在使用时
  持续且正确使用可降低但不能消除生殖器疱疹传播的风险(*486 - 488*)。
- 对感染者伴侣进行型特异性血清学检测
  对有症状的HSV-2生殖器疱疹患者的伴侣进行检测，以确定这些伴侣是否已经HSV血清阳性或是否存在获得HSV的风险。
- 除生殖器疱疹外，新生儿HSV感染风险较低
  是在妊娠晚期获得感染，或分娩时存在前驱症状或病变。
- HSV-2 感染者中 HIV 感染风险增加
  血清阳性者暴露于HIV(*76*, *471*)。
- 间歇性或抑制性疗法的有效性不足
  在HIV感染者中以减少传播给可能面临HSV-2获得风险的伴侣的风险。

无症状HSV-2生殖器疱疹

在为无症状HSV-2生殖器疱疹感染者提供咨询时，提供者应考虑以下内容：

- 无症状但被诊断为HSV-2感染者
  通过型特异性血清学检测(必要时进行确认检测)确诊者应接受关于生殖器疱疹感染症状的教育(见诊断考虑)。
- 采用发作期和抑制性抗病毒治疗
  主要用于治疗复发、预防复发以及预防传播给有症状HSV-2感染者的性伴侣。
- 对于具有HSV-2血清学证据的患者(伴有
  必要时联合检测)但无有症状复发者，既不指示间歇性治疗也不指示抑制性治疗用于预防复发(见诊断考虑)。
- 在无症状感染者中，疗效
  抑制性治疗预防HSV-2传播给性伴侣的作用尚未被研究。
- 由于这些人排毒风险降低
  对于无症状HSV-2生殖器疱疹患者，抑制疗法预防传播的获益在该人群中尚不清楚。

HSV-1 生殖器疱疹

在为HSV-1生殖器疱疹感染者提供咨询时，医务人员应考虑以下事项：

- 有病毒学实验室记录的人员
  应告知有症状的HSV-1生殖器疱疹感染者，与HSV-2感染相比，HSV-1感染的生殖器疱疹复发风险和生殖道排毒风险较低。
- 由于复发和排毒风险降低，
  HSV-1生殖器疱疹的抑制疗法应保留用于频繁复发者。
- 对于频繁复发性HSV-1生殖器
  疱疹，可考虑抑制疗法。预防HSV-1传播给性伴侣的抑制疗法尚未进行研究。

对于有症状的HSV-1生殖器疱疹或无症状的HSV-2生殖器疱疹患者，对于因生殖器疱疹诊断而产生显著心理社会困扰者，可考虑抑制疗法。对于患有生殖器疱疹的女性，其妊娠期照护人员及将照护其新生儿的人员应被告知其感染情况(见妊娠期生殖器疱疹)。

性伴侣的管理

有症状生殖器疱疹患者的性伴可从评估和咨询中获益。有症状的性伴应按有症状生殖器疱疹患者相同的方式进行评估和治疗。有症状生殖器疱疹患者的无症状性伴应询问生殖器症状史，并提供 HSV-2 型特异性血清学检测。对于无生殖器疱疹的性伴，尚无数据可作为推荐使用抗病毒药物进行 PEP 或 PrEP 的依据，也无数据表明其可预防感染，不应将此作为预防策略提供给患者。

特殊考虑

药物过敏、不耐受或不良反应

口服阿昔洛韦、伐昔洛韦和泛昔洛韦的过敏及其他不良反应罕见。已有阿昔洛韦脱敏治疗的报道(500)。

HIV感染

免疫功能低下患者可出现生殖器、肛周或口腔疱疹的迁延或严重发作。由 HSV 引起的病变在 HIV 感染者中常见，且可能严重、疼痛且不典型(501)。HIV 感染者中 HSV 排毒增加(502)。尽管 ART 可降低有症状生殖器疱疹的严重程度和频率，但仍会发生频繁的亚临床排毒(*503*, *504*)。在开始 ART 后早期免疫重建期间，生殖器疱疹的临床表现可能加重。可考虑在 HIV 感染者初始评估时进行 HSV-2 型特异性血清学检测，尤其是对有提示 HSV 感染的生殖器症状史者。

Recommended therapy for first-episode genital herpes is the same as for persons without HIV infection, although treatment courses might need to be extended for lesion resolution. Suppressive or episodic therapy with oral antiviral agents is effective in decreasing the clinical manifestations of HSV infection among persons with HIV (*503*,*504*). The risk for GUD increases during the first 6 months after starting ART, especially among persons who have a CD4+ T-cell count <200 cell/mm^3. Suppressive antiviral therapy reduces the risk for GUD among this population and can be continued for 6 months after ART initiation (*504*) when the risk for GUD returns to baseline levels. Suppressive antiviral therapy among persons with HIV and HSV infection does not reduce the risk for either HIV transmission or HSV-2 transmission to susceptible sex partners (*88*,*505*). Suppressive antiviral therapy does not delay HIV disease progression and is not associated with decreased risk for HIV-related inflammation among persons taking ART (*506*). For severe HSV disease, initiating therapy with acyclovir 5–10 mg/kg IV every 8 hours might be necessary.

Recommended Regimens for Daily Suppression of Genital Herpes Among Persons with HIV Infection

Acyclovir 400–800 mg orally 2–3 times/day
or
Famciclovir 500 mg orally 2 times/day
or
Valacyclovir 500 mg orally 2 times/day

Recommended Regimens for Episodic Genital Herpes Infection Among Persons with HIV Infection

Acyclovir 400 mg orally 3 times/day for 5–10 days
or
Famciclovir 500 mg orally 2 times/day for 5–10 days
or
Valacyclovir 1 g orally 2 times/day for 5–10 days

Antiviral-Resistant HSV Infection

If lesions persist or recur in a patient receiving antiviral treatment, acyclovir resistance should be suspected and a viral culture obtained for phenotypic sensitivity testing (*507*). Molecular testing for acyclovir resistance is not available. Such persons should be managed in consultation with an infectious disease specialist, and alternative therapy should be administered. All acyclovir-resistant strains are also resistant to valacyclovir, and the majority are resistant to famciclovir. Foscarnet (40–80 mg/kg body weight IV every 8 hours until clinical resolution is attained) is the treatment of choice for acyclovir-resistant genital herpes (*508*,*509*). Intravenous cidofovir 5 mg/kg body weight once weekly might also be effective. Foscarnet and cidofovir are nephrotoxic medications that require intensive laboratory monitoring and infectious disease specialist consultation. Imiquimod 5% applied to the lesion for 8 hours 3 times/week until clinical resolution is an alternative that has been reported to be effective (*510*,*511*). Topical cidofovir gel 1% can be applied to lesions 2–4 times daily; however, cidofovir must be compounded at a pharmacy (*512*).

Prevention of antiviral resistance remains challenging among persons with HIV infection. Experience with another group of immunocompromised persons (e.g., hematopoietic stem-cell recipients) demonstrated that persons receiving daily suppressive antiviral therapy were less likely to experience acyclovir-resistant HSV infection compared with those who received episodic therapy for outbreaks (*513*).

Genital Herpes During Pregnancy

Prevention of neonatal herpes depends both on preventing acquisition of genital herpes during late pregnancy and avoiding exposure of the neonate to herpetic lesions and viral shedding during delivery. Mothers of newborns who acquire neonatal herpes often lack histories of clinically evident genital herpes (*514*,*515*). The risk for transmission to the neonate from an infected mother is high (30%–50%) among women who acquire genital herpes near the time of delivery and low (<1%) among women with prenatal histories of recurrent herpes or who acquire genital herpes during the first half of pregnancy (*516*,*517*). Women who acquire HSV in the second half of pregnancy should be managed in consultation with maternal-fetal medicine and infectious disease specialists.

All pregnant women should be asked whether they have a history of genital herpes or genital symptoms concerning for HSV infection. At the onset of labor, all women should be questioned thoroughly about symptoms of genital herpes, including prodromal symptoms (e.g., pain or burning at site before appearance of lesion), and all women should be examined thoroughly for herpetic lesions. Women without symptoms or signs of genital herpes or its prodrome can deliver vaginally. Although cesarean delivery does not eliminate the risk for HSV transmission to the neonate (*517*), women with recurrent genital herpetic lesions at the onset of labor should have a cesarean delivery to reduce the risk for neonatal HSV infection.

Routine HSV-2 serologic screening of pregnant women is not recommended. Women without known genital herpes should be counseled to abstain from vaginal intercourse during the third trimester with partners known to have or suspected of having genital herpes. In addition, to prevent HSV-1 genital herpes, pregnant women without known orolabial herpes should be advised to abstain from receptive oral sex during the third trimester with partners known to have or suspected to have orolabial herpes. Type-specific serologic tests can be useful for identifying pregnant women at risk for HSV infection and for guiding counseling regarding the risk for acquiring genital

首次发作生殖器疱疹的推荐治疗与无HIV感染者相同，尽管治疗疗程可能需要延长直至皮损消退。口服抗病毒药物的抑制性或发作性治疗可有效减少HIV感染者中HSV感染的临床表现(*503*, *504*)。在开始ART后的前6个月内，GUD的风险增加，尤其是在CD4 + T细胞计数<200 cell/mm ^{3}的人群中。抑制性抗病毒治疗可降低该人群的GUD风险，并可在ART启动后继续6个月(504)，此时GUD风险恢复至基线水平。在HIV和HSV感染者中，抑制性抗病毒治疗既不降低HIV传播风险，也不降低HSV-2向易感性伴侣传播的风险(*88*, *505*)。抑制性抗病毒治疗不延迟HIV疾病进展，且与接受ART者中HIV相关炎症风险降低无关(506)。对于严重HSV疾病，可能需要启动acyclovir 5-10 mg/kg IV每8小时一次的治疗。

HIV感染者生殖器疱疹每日抑制治疗的推荐方案

Acyclovir 400-800 mg 口服每日2-3次
或
Famciclovir 500 mg 口服每日2次
或
Valacyclovir 500 mg 口服每日2次

HIV感染者生殖器疱疹发作期治疗的推荐方案

Acyclovir 400 mg 口服，每日3次，共5-10天
或
Famciclovir 500 mg 口服每日2次共5-10天
或
Valacyclovir 1 g 口服每日2次共5-10天

抗病毒药物耐药的HSV感染

如果接受抗病毒治疗的患者病变持续存在或复发，应怀疑阿昔洛韦耐药，并应进行病毒培养以进行表型敏感性检测（507）。目前尚无阿昔洛韦耐药的分子检测方法。此类患者应在传染病专科医生会诊下进行管理，并应给予替代治疗。所有阿昔洛韦耐药株也对伐昔洛韦耐药，且大多数对泛昔洛韦耐药。膦甲酸钠（40–80 mg/kg体重，静脉注射，每8小时一次，直至临床痊愈）是阿昔洛韦耐药生殖器疱疹的首选治疗（508,509）。静脉注射西多福韦5 mg/kg体重，每周一次，也可能有效。膦甲酸钠和西多福韦是具有肾毒性的药物，需要密集的实验室监测和感染疾病专科会诊。5%咪喹莫特涂抹于皮损处8小时，每周3次，直至临床痊愈，是一种据报道有效的替代方案(*510*,*511*)。1%西多福韦外用凝胶可每日涂抹于皮损处2-4次；但西多福韦须在药房配制(512)。

在HIV感染者中预防抗病毒耐药仍具有挑战性。另一组免疫功能低下人群(如造血干细胞移植受者)的经验表明，与因发作而接受间歇治疗者相比，接受每日抑制性抗病毒治疗者发生阿昔洛韦耐药HSV感染的可能性较低(513)。

妊娠期生殖器疱疹

新生儿疱疹的预防既取决于预防妊娠晚期获得生殖器疱疹，也取决于避免新生儿在分娩期间暴露于疱疹性皮损和病毒排出。新生儿疱疹新生儿的母亲往往缺乏临床明显生殖器疱疹的病史(*514*, *515*)。在临近分娩时获得生殖器疱疹的妇女中，感染母亲向新生儿传播的风险高(30%-50%)，而在有复发性疱疹产前病史或在妊娠前半期获得生殖器疱疹的妇女中风险低(<1%)(*516*, *517*)。在妊娠后半期获得HSV的妇女应咨询母胎医学和感染病专家进行管理。

应询问所有孕妇是否有生殖器疱疹病史或提示HSV感染的生殖器症状。分娩开始时，应彻底询问所有妇女生殖器疱疹的症状，包括前驱症状(例如，皮损出现前部位疼痛或烧灼感)，并应彻底检查所有妇女是否有疱疹性皮损。无生殖器疱疹或其前驱症状或体征的妇女可经阴道分娩。尽管剖宫产不能消除HSV向新生儿传播的风险(517)，但分娩开始时存在复发性生殖器疱疹皮损的妇女应行剖宫产以降低新生儿HSV感染风险。

不建议对孕妇进行常规HSV-2血清学筛查。应建议无已知生殖器疱疹的妇女在妊娠晚期避免与已知或疑似生殖器疱疹的伴侣进行阴道性交。此外，为预防HSV-1生殖器疱疹，应建议无已知口唇疱疹的孕妇在妊娠晚期避免与已知或疑似口唇疱疹的伴侣进行接受性口交。型特异性血清学检测可用于识别有HSV感染风险的孕妇，并指导关于获得生殖器

herpes during pregnancy. For example, such testing might be offered to a woman with no history of genital herpes whose sex partner has HSV infection. Many fetuses are exposed to acyclovir each year, and the medication is believed to be safe for use during all trimesters of pregnancy. A case-control study reported an increased risk for the rare neonatal outcome of gastroschisis among women who used antiviral medications between the month before conception and the third month of pregnancy (*518*). Acyclovir is also believed to be safe during breastfeeding (*431*,*519*). Although data regarding prenatal exposure to valacyclovir and famciclovir are limited, data from animal trials indicate that these drugs also pose a low risk among pregnant women (*520*). Acyclovir can be administered orally to pregnant women with first-episode genital herpes or recurrent herpes and should be administered IV to pregnant women with severe HSV (see Genital Herpes, Hepatitis). Suppressive acyclovir treatment starting at 36 weeks' gestation reduces the frequency of cesarean delivery among women who have recurrent genital herpes by diminishing the frequency of recurrences at term (*521*–*523*). However, such treatment might not protect against transmission to neonates in all cases (*524*). No data support use of antiviral therapy among asymptomatic HSV-seropositive women without a history of genital herpes. In addition, the effectiveness of antiviral therapy among sex partners with a history of genital herpes to decrease the risk for HSV transmission to a pregnant woman has not been studied. Additional information on the clinical management of genital herpes in pregnancy is available through existing guidelines (*525*).

Recommended Regimen for Suppression of Recurrent Genital Herpes Among Pregnant Women*

Acyclovir 400 mg orally 3 times/day
or
Valacyclovir 500 mg orally 2 times/day

* Treatment recommended starting at 36 weeks' gestation.

Neonatal Herpes

Newborn infants exposed to HSV during birth, as documented by virologic testing of maternal lesions at delivery or presumed by observation of maternal lesions, should be followed clinically in consultation with a pediatric infectious disease specialist. Detailed guidance is available regarding management of neonates who are delivered vaginally in the presence of maternal genital herpes lesions and is beyond the scope of these guidelines; more information is available from the AAP (https://redbook.solutions.aap.org). Surveillance cultures or PCR of mucosal surfaces of the neonate to detect HSV infection might be considered before the development of clinical signs of neonatal herpes to guide treatment initiation. In addition, administration of acyclovir might be considered for neonates born to women who acquired HSV near term because the risk for neonatal herpes is high for these newborn infants. All newborn infants who have neonatal herpes should be promptly evaluated and treated with systemic acyclovir. The recommended regimen for infants treated for known or suspected neonatal herpes is acyclovir 20 mg/kg body weight IV every 8 hours for 14 days if disease is limited to the skin and mucous membranes, or for 21 days for disseminated disease and disease involving the CNS.

Granuloma Inguinale (Donovanosis)

Granuloma inguinale (donovanosis) is a genital ulcerative disease caused by the intracellular gram-negative bacterium *Klebsiella granulomatis* (formerly known as *Calymmatobacterium granulomatis*). The disease occurs rarely in the United States; however, sporadic cases have been described in India, South Africa, and South America (*526*–*535*). Although granuloma inguinale was previously endemic in Australia, it is now extremely rare (*536*,*537*). Clinically, the disease is characterized as painless, slowly progressive ulcerative lesions on the genitals or perineum without regional lymphadenopathy; subcutaneous granulomas (pseudobuboes) also might occur. The lesions are highly vascular (i.e., beefy red appearance) and can bleed. Extragenital infection can occur with infection extension to the pelvis, or it can disseminate to intra-abdominal organs, bones, or the mouth. The lesions also can develop secondary bacterial infection and can coexist with other sexually transmitted pathogens.

Diagnostic Considerations

The causative organism of granuloma inguinale is difficult to culture, and diagnosis requires visualization of dark-staining Donovan bodies on tissue crush preparation or biopsy. Although no FDA-cleared molecular tests for the detection of *K. granulomatis* DNA exist, molecular assays might be useful for identifying the causative agent.

Treatment

Multiple antimicrobial regimens have been effective; however, only a limited number of controlled trials have been published (*538*). Treatment has been reported to halt progression of lesions, and healing typically proceeds inward from the ulcer margins. Prolonged therapy is usually required to permit granulation and reepithelialization of the ulcers. Relapse can occur 6–18 months after apparently effective therapy.

妊娠期疱疹。例如，对于无生殖器疱疹病史但性伴侣有HSV感染的女性，可提供此类检测。每年有许多胎儿暴露于阿奇霉素，且该药物被认为在妊娠各期使用均安全。一项病例对照研究报告，在受孕前一个月至妊娠第三个月期间使用抗病毒药物的女性中，罕见新生儿结局腹裂的风险增加(518)。阿奇霉素在母乳喂养期间也被认为安全(*431*, *519*)。尽管关于产前暴露于伐昔洛韦和泛昔洛韦的数据有限，但动物试验数据表明这些药物对孕妇的风险也较低(520)。阿奇霉素可口服给予首次发作生殖器疱疹或复发性疱疹的孕妇，对于严重HSV的孕妇应静脉给药(见生殖器疱疹、肝炎)。从妊娠36周开始抑制性阿奇霉素治疗，通过减少足月时复发的频率，降低复发性生殖器疱疹女性的剖宫产分娩频率(*521* - *523*)。然而，此类治疗可能并非在所有情况下都能预防传播给新生儿(524)。没有数据支持在无生殖器疱疹病史的无症状HSV血清阳性女性中使用抗病毒治疗。此外，尚未研究对有生殖器疱疹病史的性伴侣进行抗病毒治疗以降低HSV传播给孕妇风险的有效性。关于妊娠期生殖器疱疹临床管理的更多信息可通过现有指南获取(525)。

孕妇复发性生殖器疱疹抑制治疗的推荐方案 *

Acyclovir 400 mg 口服每日3次
或
Valacyclovir 500 mg 口服每日2次

* 建议从妊娠36周开始治疗。

新生儿疱疹

出生时暴露于HSV的新生儿，如通过分娩时母体病变的病毒学检测记录或通过观察母体病变推定，应在儿科感染病专家咨询下进行临床随访。关于在存在母体生殖器疱疹病变时经阴道分娩新生儿的管理的详细指导已 available，超出本指南范围；更多信息可从AAP获取(https://redbook.solutions.aap.org)。在出现新生儿疱疹临床症状之前，可考虑对新生儿黏膜表面进行监测培养或PCR以检测HSV感染，以指导治疗启动。

临床体征以指导治疗启动。此外，对于在足月附近获得HSV的女性所生的新生儿，可考虑给予阿奇霉素，因为这些新生儿的 neonatal herpes 风险较高。所有患有新生儿疱疹的新生儿应及时评估并接受全身性阿奇霉素治疗。对于已知或疑似新生儿疱疹的婴儿，推荐方案为：如果疾病局限于皮肤和黏膜，阿奇霉素 20 mg/kg 体重 IV 每8小时一次，共14天；对于播散性疾病和累及CNS的疾病，共21天。

腹股沟肉芽肿(腹股沟肉芽肿)

腹股沟肉芽肿(donovanosis)是一种生殖器溃疡性疾病，由细胞内革兰阴性细菌*Klebsiella granulomatis*(旧称*Calymmatobacterium granulomatis*)引起。该病在美国罕见；然而，印度、南非和南美洲已有散发病例描述(*526* - *535*)。尽管腹股沟肉芽肿以前在澳大利亚呈地方性流行，但现在极为罕见(*536*, *537*)。临床上，该病的特征为生殖器或会阴部无痛、缓慢进展的溃疡性病变，无区域淋巴结肿大；也可能出现皮下肉芽肿(假性腹股沟淋巴结炎)。病变血管丰富(即牛肉红色外观)，可出血。感染可扩展至骨盆而发生生殖器外感染，或播散至腹腔内器官、骨骼或口腔。病变也可发生继发性细菌感染，并可与其他性传播病原体共存。

诊断考虑

腹股沟肉芽肿的致病微生物难以培养，诊断需要组织压片或活检标本中观察到深染的杜诺凡小体。尽管尚无FDA批准的检测*K.granulomatis* DNA的分子检测方法，但分子学检测可能有助于鉴定致病微生物。

治疗

多种抗菌方案均有效；然而，已发表的对照试验数量有限(538)。据报道治疗可阻止皮损进展，愈合通常从溃疡边缘向内进行。通常需要延长治疗以促进溃疡的肉芽形成和再上皮化。在明显有效治疗后6-18个月可能发生复发。

Recommended Regimen for Granuloma Inguinale (Donovanosis)
Azithromycin 1 g orally once weekly or 500 mg daily for >3 weeks and until all lesions have completely healed

Alternative Regimens
Doxycycline 100 mg orally 2 times/day for at least 3 weeks and until all lesions have completely healed *or* **Erythromycin base** 500 mg orally 4 times/day for >3 weeks and until all lesions have completely healed *or* **Trimethoprim-sulfamethoxazole** one double-strength (160 mg/800 mg) tablet orally 2 times/day for >3 weeks and until all lesions have completely healed

The addition of another antibiotic to these regimens can be considered if improvement is not evident within the first few days of therapy.

Other Management Considerations

Patients should be followed clinically until signs and symptoms have resolved. All persons who receive a diagnosis of granuloma inguinale should be tested for HIV.

Follow-Up

Patients should be followed clinically until signs and symptoms resolve.

Management of Sex Partners

Persons who have had sexual contact with a patient who has granuloma inguinale within the 60 days before onset of the patient's symptoms should be examined and offered therapy. However, the value of empiric therapy in the absence of clinical signs and symptoms has not been established.

Special Considerations

Pregnancy

Use of doxycycline in pregnancy might be associated with discoloration of teeth; however, the risk is not well defined. Doxycycline is compatible with breastfeeding (*431*). Sulfonamides can be associated with neonatal kernicterus among those with glucose-6-phospate dehydrogenase deficiency and should be avoided during the third trimester and while breastfeeding (*431*). For these reasons, pregnant and lactating women with granuloma inguinale should be treated with a macrolide regimen (erythromycin or azithromycin).

HIV Infection

Persons with granuloma inguinale and HIV infection should receive the same regimens as those who do not have HIV.

Lymphogranuloma Venereum

LGV is caused by *C. trachomatis* serovars L1, L2, or L3 (*539*,*540*). LGV can cause severe inflammation and invasive infection, in contrast with *C. trachomatis* serovars A–K that cause mild or asymptomatic infection. Clinical manifestations of LGV can include GUD, lymphadenopathy, or proctocolitis. Rectal exposure among MSM or women can result in proctocolitis, which is the most common presentation of LGV infection (*541*), and can mimic inflammatory bowel disease with clinical findings of mucoid or hemorrhagic rectal discharge, anal pain, constipation, fever, or tenesmus (*542*,*543*). Outbreaks of LGV proctocolitis have been reported among MSM with high rates of HIV infection (*544*–*547*). LGV proctocolitis can be an invasive, systemic infection and, if it is not treated early, can lead to chronic colorectal fistulas and strictures; reactive arthropathy has also been reported. However, reports indicate that rectal LGV can also be asymptomatic (*548*). A common clinical manifestation of LGV among heterosexuals is tender inguinal or femoral lymphadenopathy that is typically unilateral. A self-limited genital ulcer or papule sometimes occurs at the site of inoculation. However, by the time persons seek care, the lesions have often disappeared. LGV-associated lymphadenopathy can be severe, with bubo formation from fluctuant or suppurative inguinal or femoral lymphadenopathy. Oral ulceration can occur and might be associated with cervical adenopathy (*549*–*551*). Persons with genital or colorectal LGV lesions can also experience secondary bacterial infection or can be infected with other sexually and nonsexually transmitted pathogens.

Diagnostic Considerations

A definitive LGV diagnosis can be made only with LGV-specific molecular testing (e.g., PCR-based genotyping). These tests can differentiate LGV from non–LGV *C. trachomatis* in rectal specimens. However, these tests are not widely available, and results are not typically available in a time frame that would influence clinical management. Therefore, diagnosis is based on clinical suspicion, epidemiologic information, and a *C. trachomatis* NAAT at the symptomatic anatomic site, along with exclusion of other etiologies for proctocolitis, inguinal lymphadenopathy, or genital, oral, or rectal ulcers (*551*,*552*). Genital or oral lesions, rectal specimens, and lymph node specimens (i.e., lesion swab or bubo aspirate) can be tested for *C. trachomatis* by NAAT or culture. NAAT is the preferred approach for testing because it can detect both LGV strains and non–LGV *C. trachomatis* strains (*553*). Therefore, all persons presenting with proctocolitis should be tested for chlamydia with a NAAT performed on rectal specimens. Severe symptoms of proctocolitis (e.g., bloody discharge, tenesmus, and rectal

腹股沟肉芽肿(杜诺凡病)推荐治疗方案
阿奇霉素 1 g口服，每周1次，或500 mg每日1次，疗程>3周，直至所有皮损完全愈

替代方案
多西环素 100 mg口服，每日2次，至少3周，直至所有皮损完全愈合 或 **红霉素碱** 500 mg口服，每日4次，疗程>3周，直至所有皮损完全愈合 或 **甲氧苄啶-磺胺甲噁唑**双倍强度片(160 mg/800 mg)1片口服，每日2次，疗程>3周，直至所有皮损完全愈合

若治疗最初几天内未见明显改善，可考虑在这些方案中加用另一种抗生素。

其他管理考虑

患者应接受临床随访直至体征和症状消退。所有诊断为腹股沟肉芽肿者均应接受HIV检测。

随访

应临床随访患者直至体征和症状消退。

性伴侣的管理

在患者症状出现前60天内与其有性接触者应接受检查和治疗建议。然而，在无临床体征和症状的情况下经验性治疗的价值尚未确定。

特殊考虑

妊娠

妊娠期使用多西环素可能与牙齿变色有关；然而，风险尚未明确。多西环素与母乳喂养兼容(431)。磺胺类药物可能与葡萄糖-6-磷酸脱氢酶缺乏者的新生儿核黄疸相关，应在妊娠第三个月和母乳喂养期间避免使用(431)。因此，患有腹股沟肉芽肿的孕妇和哺乳期妇女应接受大环内酯类方案(红霉素或阿奇霉素)治疗。

HIV感染

合并HIV感染的腹股沟肉芽肿患者应接受与无HIV感染者相同的方案。

性病性淋巴肉芽肿

LGV 由*C.trachomatis*血清型 L1、L2 或 L3 引起(*539*,*540*)。与引起轻度或无症状感染的*C.trachomatis*血清型 A-K 不同，LGV 可引起严重炎症和侵袭性感染。LGV 的临床表现可包括 GUD、淋巴结病或直肠结肠炎。MSM 或女性的直肠暴露可导致直肠结肠炎，这是 LGV 感染最常见的表现(541)，并且可模仿炎症性肠病，临床表现为黏液性或出血性直肠分泌物、肛门疼痛、便秘、发热或里急后重(*542*,*543*)。已有报道在 HIV 感染率高的 MSM 中发生 LGV 直肠结肠炎暴发(*544 - 547*)。LGV 直肠结肠炎可为侵袭性、全身性感染，如果未早期治疗，可导致慢性结直肠瘘和狭窄；也有反应性关节病的报道。然而，有报告表明直肠 LGV 也可无症状(548)。异性恋者中 LGV 的常见临床表现是通常为单侧的有压痛腹股沟或股部淋巴结病。有时在接种部位出现自限性生殖器溃疡或丘疹。然而，当患者就医时，病变往往已经消失。LGV 相关淋巴结病可能严重，伴有波动性或化脓性腹股沟或股部淋巴结病形成横痃。口腔溃疡可发生，并可能与颈部淋巴结病相关(*549 - 551*)。有生殖器或结直肠 LGV 病变的人也可能发生继发性细菌感染，或感染其他性传播和非性传播病原体。

诊断考虑

明确的 LGV 诊断只能通过 LGV 特异性分子检测(例如基于 PCR 的基因分型)作出。这些检测可在直肠标本中区分 LGV 与非 LGV *C.trachomatis*。然而，这些检测并未广泛可用，且结果通常无法在足以影响临床管理的时间范围内获得。因此，诊断基于临床怀疑、流行病学信息以及在症状性解剖部位进行的*C.trachomatis* NAAT，同时排除直肠结肠炎、腹股沟淋巴结病或生殖器、口腔或直肠溃疡的其他病因(*551*,*552*)。生殖器或口腔病变、直肠标本和淋巴结标本(即病变拭子或横痃抽吸物)可通过 NAAT 或培养检测*C.NAAT* 是首选的检测方法，因为它可检测 *LGV* 株和非 *LGV C.trachomatis*株*(553)*。因此，所有表现为直肠结肠炎的人都应通过直肠标本进行 *NAAT* 检测衣原体。直肠结肠炎的严重症状*(*例如血性分泌物、里急后重和直肠

ulcers) indicate LGV. A rectal Gram stain with >10 white blood cells (WBCs) has also been associated with rectal LGV (*545*,*554*,*555*).

Chlamydia serology (complement fixation or microimmunofluorescence) should not be used routinely as a diagnostic tool for LGV because the utility of these serologic methods has not been established, interpretation has not been standardized, and validation for clinical proctitis presentation has not been done. It might support an LGV diagnosis in cases of isolated inguinal or femoral lymphadenopathy for which diagnostic material for *C. trachomatis* NAAT cannot be obtained.

Treatment

At the time of the initial visit (before diagnostic NAATs for chlamydia are available), persons with a clinical syndrome consistent with LGV should be presumptively treated. Presumptive treatment for LGV is indicated among patients with symptoms or signs of proctocolitis (e.g., bloody discharge, tenesmus, or ulceration); in cases of severe inguinal lymphadenopathy with bubo formation, particularly if the patient has a recent history of a genital ulcer; or in the presence of a genital ulcer if other etiologies have been ruled out. The goal of treatment is to cure infection and prevent ongoing tissue damage, although tissue reaction to the infection can result in scarring. Buboes might require aspiration through intact skin or incision and drainage to prevent formation of inguinal or femoral ulcerations.

Recommended Regimen for Lymphogranuloma Venereum
Doxycycline 100 mg orally 2 times/day for 21 days

Alternative Regimens
Azithromycin 1 g orally once weekly for 3 weeks*
or
Erythromycin base 500 mg orally 4 times/day for 21 days

* Because this regimen has not been validated, a test of cure with *C. trachomatis* NAAT 4 weeks after completion of treatment can be considered.

The optimal treatment duration for symptomatic LGV has not been studied in clinical trials. The recommended 21-day course of doxycycline is based on long-standing clinical practice and is highly effective, with an estimated cure rate of >98.5% (*555*,*556*). Shorter courses of doxycycline might be effective on the basis of a small retrospective study of MSM with rectal LGV, 50% of whom were symptomatic, who received a 7- to 14-day course of doxycycline and had a 97% cure rate (*558*). Randomized prospective studies of shorter-course doxycycline for treating LGV are needed. Longer courses of therapy might be required in the setting of fistulas, buboes, and other forms of severe disease (*559*).

A small nonrandomized study from Spain involving patients with rectal LGV demonstrated cure rates of 97% with a regimen of azithromycin 1 g once weekly for 3 weeks (*560*). Pharmacokinetic data support this dosing strategy (*561*); however, this regimen has not been validated. Fluoroquinolone-based treatments also might be effective; however, the optimal duration of treatment has not been evaluated. The clinical significance of asymptomatic LGV is unknown, and it is effectively treated with a 7-day course of doxycycline (*562*).

Other Management Considerations

Patients should be followed clinically until signs and symptoms have resolved. Persons who receive an LGV diagnosis should be tested for other STIs, especially HIV, gonorrhea, and syphilis. Those whose HIV test results are negative should be offered HIV PrEP.

Follow-Up

All persons who have been treated for LGV should be retested for chlamydia approximately 3 months after treatment. If retesting at 3 months is not possible, providers should retest at the patient's next visit for medical care within the 12-month period after initial treatment.

Management of Sex Partners

Persons who have had sexual contact with a patient who has LGV within the 60 days before onset of the patient's symptoms should be evaluated, examined, and tested for chlamydial infection, depending on anatomic site of exposure. Asymptomatic partners should be presumptively treated with a chlamydia regimen (doxycycline 100 mg orally 2 times/day for 7 days).

Special Considerations

Pregnancy

Use of doxycycline in pregnancy might be associated with discoloration of teeth; however, the risk is not well defined (*563*). Doxycycline is compatible with breastfeeding (*431*). Azithromycin might prove useful for LGV treatment during pregnancy, at a presumptive dose of 1 g weekly for 3 weeks; no published data are available regarding an effective dose and duration of treatment. Pregnant and lactating women with LGV can be treated with erythromycin, although this regimen is associated with frequent gastrointestinal side effects. Pregnant women treated for LGV should have a test of cure performed 4 weeks after the initial *C. trachomatis* NAAT-positive test.

溃疡)提示LGV。直肠革兰染色白细胞(WBC)>10个也与直肠LGV相关(*545*,*554*,*555*)。

衣原体血清学(补体结合试验或微量免疫荧光)不应常规用作LGV的诊断工具，因为这些血清学方法的实用性尚未确定，判读尚未标准化，且尚未针对临床直肠炎表现进行验证。在孤立性腹股沟或股部淋巴结病且无法获取*C.trachomatis* NAAT诊断材料的情况下，血清学可能支持LGV诊断。

治疗

在初次就诊时(在可获得衣原体诊断性 NAAT 之前)，符合 LGV 临床综合征的人应接受推定治疗。对于有直肠结肠炎症状或体征(例如血性分泌物、里急后重或溃疡)的患者；严重腹股沟淋巴结病伴横痃形成，特别是如果患者近期有生殖器溃疡史；或在排除其他病因的情况下存在生殖器溃疡时，指示进行 LGV 推定治疗。治疗的目的是治愈感染并防止持续的组织损伤，尽管对感染的组织反应可导致瘢痕形成。横痃可能需要经完整皮肤抽吸或切开引流，以防止形成腹股沟或股部溃疡。

性病性淋巴肉芽肿的推荐治疗方案
多西环素 100 mg 口服每日2次共21天

替代方案
阿奇霉素 1 g 口服，每周一次，共 3 周 *
或
Erythromycin碱 500 mg 口服每日4次共21天

* 由于该方案尚未经过验证，应使用*C.trachomatis*进行治愈检测可在治疗完成后4周考虑进行NAAT。

症状性 LGV 的最佳治疗持续时间尚未在临床试验中研究。推荐的 21 天多西环素疗程基于长期临床实践，且高度有效，估计治愈率 >98.5%(*555*,*556*)。根据一项针对直肠 LGV 的 MSM 的小型回顾性研究，较短疗程的多西环素可能有效，其中 50% 有症状，接受 7 至 14 天多西环素疗程，治愈率为 97%(558)。需要对较短疗程多西环素治疗 LGV 进行随机前瞻性研究。在瘘管、横痃和其他形式严重疾病的情况下，可能需要更长疗程的治疗(559)。

来自西班牙的一项涉及直肠 LGV 患者的小型非随机研究显示，阿奇霉素 1 g 每周一次，共 3 周的方案治愈率为 97%(560)。药代动力学数据支持这种给药策略(561)；然而，该方案尚未得到验证。基于氟喹诺酮类的治疗也可能有效；然而，最佳治疗持续时间尚未评估。无症状 LGV 的临床意义尚不清楚，7 天多西环素疗程可有效治疗(562)。

其他管理考虑

患者应接受临床随访直至体征和症状消退。诊断为LGV者应接受其他STI检测，尤其是HIV、淋病和梅毒。HIV检测结果为阴性者应接受HIV PrEP

随访

所有接受过LGV治疗者应在治疗后约3个月重新检测衣原体。若3个月时无法复检，医务人员应在初次治疗后12个月内患者下次就医时进行复检。

性伴侣的管理

在患者症状出现前60天内与其有性接触者应根据暴露解剖部位进行评估、检查和衣原体感染检测。无症状伴侣应接受衣原体方案推定治疗(多西环素100 mg口服，每日2次，共7天)。

特殊考虑

妊娠

妊娠期使用多西环素可能与牙齿变色相关；然而，该风险尚未被充分明确(563)。多西环素与母乳喂养相容(431)。阿奇霉素可能对妊娠期LGV的治疗有用，推测剂量为1 g每周一次，共3周；关于有效剂量和治疗持续时间，尚无已发表数据。妊娠期和哺乳期患有LGV的女性可使用红霉素治疗，尽管该方案与频繁的胃肠道副作用相关。接受LGV治疗的妊娠女性应在初始*C.trachomatis* NAAT阳性检测后4周进行治愈检测。

HIV Infection

Persons with LGV and HIV infection should receive the same regimens as those who do not have HIV. Prolonged therapy might be required because a delay in resolution of symptoms might occur.

Syphilis

Syphilis is a systemic disease caused by *T. pallidum*. The disease has been divided into stages on the basis of clinical findings, which guide treatment and follow-up. Persons who have syphilis might seek treatment for signs or symptoms. Primary syphilis classically presents as a single painless ulcer or chancre at the site of infection but can also present with multiple, atypical, or painful lesions (*564*). Secondary syphilis manifestations can include skin rash, mucocutaneous lesions, and lymphadenopathy. Tertiary syphilis can present with cardiac involvement, gummatous lesions, tabes dorsalis, and general paresis.

Latent infections (i.e., those lacking clinical manifestations) are detected by serologic testing. Latent syphilis acquired within the preceding year is referred to as early latent syphilis; all other cases of latent syphilis are classified as late latent syphilis or latent syphilis of unknown duration.

T. pallidum can infect the CNS, which can occur at any stage of syphilis and result in neurosyphilis. Early neurologic clinical manifestations or syphilitic meningitis (e.g., cranial nerve dysfunction, meningitis, meningovascular syphilis, stroke, and acute altered mental status) are usually present within the first few months or years of infection. Late neurologic manifestations (e.g., tabes dorsalis and general paresis) occur 10 to >30 years after infection.

Infection of the visual system (ocular syphilis) or auditory system (otosyphilis) can occur at any stage of syphilis but is commonly identified during the early stages and can present with or without additional CNS involvement. Ocular syphilis often presents as panuveitis but can involve structures in both the anterior and posterior segment of the eye, including conjunctivitis, anterior uveitis, posterior interstitial keratitis, optic neuropathy, and retinal vasculitis. Ocular syphilis can result in permanent vision loss. Otosyphilis typically presents with cochleo-vestibular symptoms, including tinnitus, vertigo, and sensorineural hearing loss. Hearing loss can be unilateral or bilateral, have a sudden onset, and progress rapidly. Otosyphilis can result in permanent hearing loss.

Diagnostic Considerations

Darkfield examinations and molecular tests for detecting *T. pallidum* directly from lesion exudate or tissue are the definitive methods for diagnosing early syphilis and congenital syphilis (*565*). Although no *T. pallidum* direct-detection molecular NAATs are commercially available, certain laboratories provide locally developed and validated PCR tests for detecting *T. pallidum* DNA. A presumptive diagnosis of syphilis requires use of two laboratory serologic tests: a nontreponemal test (i.e., Venereal Disease Research Laboratory [VDRL] or rapid plasma reagin [RPR] test) and a treponemal test (i.e., the *T. pallidum* passive particle agglutination [TP-PA] assay, various EIAs, chemiluminescence immunoassays [CIAs] and immunoblots, or rapid treponemal assays) (*566*–*568*). At least 18 treponemal-specific tests are cleared for use in the United States. Use of only one type of serologic test (nontreponemal or treponemal) is insufficient for diagnosis and can result in false-negative results among persons tested during primary syphilis and false-positive results among persons without syphilis or previously treated syphilis.

Nontreponemal Tests and Traditional Algorithm

False-positive nontreponemal test results can be associated with multiple medical conditions and factors unrelated to syphilis, including other infections (e.g., HIV), autoimmune conditions, vaccinations, injecting drug use, pregnancy, and older age (*566*,*569*). Therefore, persons with a reactive nontreponemal test should always receive a treponemal test to confirm the syphilis diagnosis (i.e., traditional algorithm). Nontreponemal test antibody titers might correlate with disease activity and are used for monitoring treatment response. Serum should be diluted to identify the highest titer, and results should be reported quantitatively. A fourfold change in titer, equivalent to a change of two dilutions (e.g., from 1:16 to 1:4 or from 1:8 to 1:32), is considered necessary for demonstrating a clinically significant difference between two nontreponemal test results obtained by using the same serologic test, preferably from the same manufacturer to avoid variation in results. Sequential serologic tests for a patient should be performed using the same testing method (VDRL or RPR), preferably by the same laboratory. VDRL and RPR are equally valid assays; however, quantitative results from the two tests cannot be compared directly with each other because the methods are different, and RPR titers frequently are slightly higher than VDRL titers.

Nontreponemal test titers usually decrease after treatment and might become nonreactive with time. However, for certain persons, nontreponemal antibodies might decrease less than fourfold after treatment (i.e., inadequate serologic response) or might decline appropriately but fail to serorevert and

HIV感染

合并HIV感染的LGV患者应接受与无HIV感染者相同的方案。由于症状消退可能延迟，可能需要延长治疗。

梅毒

梅毒是由*T.pallidum*引起的系统性疾病。该病根据临床表现分为不同阶段，用以指导治疗和随访。患有梅毒的人可能因体征或症状而寻求治疗。一期梅毒典型表现为感染部位单个无痛性溃疡或硬下疳，但也可表现为多个、非典型或疼痛性病变(564)。二期梅毒表现可包括皮疹、黏膜皮肤病变和淋巴结病。三期梅毒可表现为心脏受累、树胶肿性病变、脊髓痨和麻痹性痴呆。

潜伏感染(即缺乏临床表现者)通过血清学检测发现。在前一年内获得的潜伏梅毒称为早期潜伏梅毒；所有其他潜伏梅毒病例归类为晚期潜伏梅毒或病期不明的潜伏梅毒。

*T.pallidum*可感染CNS，可发生于梅毒的任何阶段并导致神经梅毒。早期神经系统临床表现或梅毒性脑膜炎(例如脑神经功能障碍、脑膜炎、脑膜血管梅毒、卒中和急性精神状态改变)通常出现在感染后的最初几个月或几年内。晚期神经系统表现(例如脊髓痨和麻痹性痴呆)发生于感染后10至>30年。

视觉系统感染(眼梅毒)或听觉系统感染(耳梅毒)可发生在梅毒的任何阶段，但通常在早期阶段被识别，并可伴有或不伴有其他CNS受累。眼梅毒常表现为全葡萄膜炎，但可累及眼前节和眼后节结构，包括结膜炎、前葡萄膜炎、后部间质性角膜炎、视神经病变和视网膜血管炎。眼梅毒可导致永久性视力丧失。耳梅毒通常表现为耳蜗前庭症状，包括耳鸣、眩晕和感音神经性听力损失。听力损失可为单侧或双侧，可突然起病并迅速进展。耳梅毒可导致永久性听力损失。

诊断注意事项

暗视野检查和用于直接从病变渗出物或组织中检测*T.pallidum*的分子检测是诊断早期梅毒和先天性梅毒的确诊方法(565)。尽管尚无*T.pallidum*直接检测分子NAATs在市面销售，某些实验室提供本地开发并验证的PCR检测以检测*T.pallidum* DNA。梅毒的推定诊断需要使用两种实验室血清学检测：一种非密螺旋体检测(即性病研究实验室[VDRL]或快速血浆反应素[RPR]检测)和一种密螺旋体检测(即*T.pallidum*被动颗粒凝集[TP-PA]试验、各种EIAs、化学发光免疫分析[CIAs]和免疫印迹，或快速密螺旋体试验)(*566 - 568*)。至少有18种密螺旋体特异性检测在美国获准使用。仅使用一种类型的血清学检测(非密螺旋体或密螺旋体)不足以诊断，并可在一期梅毒期间接受检测者中导致假阴性结果，在无梅毒或既往接受过治疗的梅毒者中导致假阳性结果。

非密螺旋体试验与传统算法

假阳性非密螺旋体检测结果可与多种与梅毒无关的医学状况和因素相关，包括其他感染(如HIV)、自身免疫性疾病、疫苗接种、注射吸毒、妊娠和高龄(*566*,*569*)。因此，非密螺旋体检测呈反应性者应始终接受密螺旋体检测以确认梅毒诊断(即传统算法)。非密螺旋体检测抗体滴度可能与疾病活动性相关，并用于监测治疗反应。血清应稀释以确定最高滴度，结果应定量报告。滴度四倍变化，相当于两个稀释度的变化(例如，从1:16到1:4或从1:8到1:32)，被认为足以证明使用相同血清学检测(最好来自同一制造商以避免结果变异)获得的两次非密螺旋体检测结果之间存在临床显著差异。对患者的连续血清学检测应使用相同的检测方法(VDRL或RPR)，最好由同一实验室进行。VDRL和RPR是同等有效的检测；然而，两种检测的定量结果不能直接相互比较，因为方法不同，且RPR滴度通常略高于VDRL滴度。

非密螺旋体试验滴度通常在治疗后下降，并可能随时间推移转为无反应性。然而，对于某些人，非密螺旋体抗体在治疗后可能下降不足四倍(即血清学应答不充分)，或可能适当下降但未能血清转阴并且

persist for a long period. Atypical nontreponemal serologic test results (e.g., unusually high, unusually low, or fluctuating titers) might occur regardless of HIV status. When serologic tests do not correspond with clinical findings indicative of primary, secondary, or latent syphilis, presumptive treatment is recommended for persons with risk factors for syphilis, and use of other tests (e.g., biopsy for histology and immunostaining and PCR of lesion) should be considered. For the majority of persons with HIV infection, serologic tests are accurate and reliable for diagnosing syphilis and evaluating response to treatment.

Treponemal Tests and Reverse Sequence Algorithm

The majority of patients who have reactive treponemal tests will have reactive tests for the remainder of their lives, regardless of adequate treatment or disease activity. However, 15%–25% of patients treated during the primary stage revert to being serologically nonreactive after 2–3 years (*570*). Treponemal antibody titers do not predict treatment response and therefore should not be used for this purpose.

Clinical laboratories sometimes screen syphilis serologic samples by using automated treponemal immunoassays, typically by EIA or CIA (*571–573*). This reverse sequence algorithm for syphilis testing can identify persons previously treated for syphilis, those with untreated or incompletely treated syphilis, and those with false-positive results that can occur with a low likelihood of infection (*574*). Persons with a positive treponemal screening test should have a standard quantitative nontreponemal test with titer performed reflexively by the laboratory to guide patient management decisions. If the nontreponemal test is negative, the laboratory should perform a treponemal test different from the one used for initial testing, preferably TP-PA or treponemal assay based on different antigens than the original test, to adjudicate the results of the initial test.

If a second treponemal test is positive (e.g., EIA reactive, RPR nonreactive, or TP-PA reactive), persons with a history of previous treatment will require no further management unless sexual history indicates a reexposure. In this instance, a repeat nontreponemal test 2–4 weeks after a confirmed medical history and physical examination is recommended to evaluate for early infection. Those without a history of treatment for syphilis should be offered treatment. Unless a medical history or results of a physical examination indicate a recent infection, previously untreated persons should be treated for syphilis of unknown duration or late latent syphilis.

If the second treponemal test is negative (e.g., EIA reactive, RPR nonreactive, TP-PA nonreactive) and the epidemiologic risk and clinical probability for syphilis are low, further evaluation or treatment is not indicated.

Multiple studies demonstrate that high quantitative index values or high signal-to-cutoff ratio from treponemal EIA or CIA tests correlate with TP-PA positivity, which might eliminate the need for additional confirmatory testing; however, the range of index values varies among different treponemal immunoassays, and the values that correspond to high levels of reactivity with confirmatory testing might differ by immunoassay (*567*,*575–582*).

Cerebrospinal Fluid Evaluation

Further testing with CSF evaluation is warranted for persons with clinical signs of neurosyphilis (e.g., cranial nerve dysfunction, meningitis, stroke, acute or chronic altered mental status, or loss of vibration sense). All patients with ocular symptoms and reactive syphilis serology need a full ocular examination, including cranial nerve evaluation. If cranial nerve dysfunction is present, a CSF evaluation is needed. Among persons with isolated ocular symptoms (i.e., no cranial nerve dysfunction or other neurologic abnormalities), confirmed ocular abnormalities on examination, and reactive syphilis serology, a CSF examination is unnecessary before treatment. CSF analysis can be helpful in evaluating persons with ocular symptoms and reactive syphilis serology who do not have ocular findings or cranial nerve dysfunction on examination. Among patients with isolated auditory abnormalities and reactive syphilis serology, CSF evaluation is likely to be normal and is unnecessary before treatment (*583*,*584*).

Laboratory testing is helpful in supporting the diagnosis of neurosyphilis; however, no single test can be used to diagnose neurosyphilis in all instances. Diagnosis of neurosyphilis depends on a combination of CSF tests (e.g., CSF cell count, protein, or reactive CSF-VDRL) in the presence of reactive serologic test (nontreponemal and treponemal) results and neurologic signs and symptoms. CSF laboratory abnormalities are common for persons with early syphilis and are of unknown medical significance in the absence of neurologic signs or symptoms (*585*). CSF-VDRL is highly specific but insensitive. For a person with neurologic signs or symptoms, a reactive CSF-VDRL (in the absence of blood contamination) is considered diagnostic of neurosyphilis.

When CSF-VDRL is negative despite clinical signs of neurosyphilis, reactive serologic tests results, lymphocytic pleocytosis, or protein, neurosyphilis should be considered. In that instance, additional evaluation by using fluorescent treponemal-antibody absorption (FTA-ABS) or TP-PA testing on CSF might be warranted. The CSF FTA-ABS test is less specific for neurosyphilis than the CSF-VDRL but is highly sensitive. Fewer data are available regarding CSF TP-PA;

可持续较长时间。非典型非密螺旋体血清学试验结果(如异常升高、异常降低或波动的滴度)无论HIV状态如何均可能出现。当血清学试验与提示一期、二期或潜伏梅毒的临床表现不符时，对于有梅毒危险因素者建议进行推定治疗，并应考虑使用其他检测(如活检进行组织学和免疫染色以及皮损PCR)。对于大多数HIV感染者，血清学试验对于诊断梅毒和评估治疗反应是准确可靠的。

梅毒螺旋体试验与反向序列算法

大多数密螺旋体试验呈反应性的患者将在其余生中保持试验反应性，无论治疗是否充分或疾病活动性如何。然而，在primary stage期间接受治疗的患者中，15%-25%在2-3年后转为血清学无反应性(570)。密螺旋体抗体滴度不能预测治疗应答，因此不应为此目的使用。

临床实验室有时使用自动化密螺旋体免疫测定法筛查梅毒血清学样本，通常采用EIA或CIA(*571 - 573*)。这种梅毒检测的反向序列算法可以识别既往接受过梅毒治疗者、未治疗或治疗不彻底的梅毒患者，以及因感染可能性低而出现假阳性结果者(574)。密螺旋体筛查试验阳性者应由实验室反射性进行标准定量非密螺旋体试验并测定滴度，以指导患者管理决策。若非密螺旋体试验阴性，实验室应进行与初始检测不同的密螺旋体试验，最好采用TP-PA或基于与原检测不同抗原的密螺旋体检测，以裁定初始检测结果。

若第二项密螺旋体试验阳性(如EIA反应性、RPR无反应性或TP-PA反应性)，有既往治疗史者无需进一步处理，除非性史提示再暴露。在此情况下，建议在确认病史和体格检查后2-4周复查非密螺旋体试验以评估早期感染。无梅毒治疗史者应给予治疗。除非病史或体格检查结果提示近期感染，既往未治疗者应按未知病程梅毒或晚期潜伏梅毒治疗。

如果第二项密螺旋体试验为阴性(例如EIA反应性、RPR无反应性、TP-PA无反应性)且流行病学风险和梅毒的临床概率低，则无需进一步评估或治疗。

多项研究表明，密螺旋体EIA或CIA试验的高定量指数值或高信号-临界比值与TP-PA阳性相关，这可能消除额外确认检测的需要；然而，指数值的范围在不同密螺旋体免疫测定之间有所不同，且与确认检测高水平反应性相对应的值可能因免疫测定而异(*567*, *575 - 582*)。

脑脊液评估

对于有神经梅毒临床体征者(如颅神经功能障碍、脑膜炎、卒中、急性或慢性精神状态改变或振动觉丧失)，有必要进一步进行CSF评估。所有有眼部症状且梅毒血清学反应性的患者需要进行全面眼部检查，包括颅神经评估。若存在颅神经功能障碍，则需要进行CSF评估。对于仅有眼部症状(即无颅神经功能障碍或其他神经系统异常)、检查确认眼部异常且梅毒血清学反应性者，治疗前无需进行CSF检查。CSF分析有助于评估有眼部症状且梅毒血清学反应性、但检查无眼部发现或颅神经功能障碍者。对于仅有听觉异常且梅毒血清学反应性的患者，CSF评估很可能正常，治疗前无需进行(*583*, *584*)。

实验室检测有助于支持神经梅毒的诊断；然而，没有任何单一检测可在所有情况下用于诊断神经梅毒。神经梅毒的诊断取决于在血清学试验(非密螺旋体和密螺旋体)反应性结果以及神经系统体征和症状存在的情况下，结合CSF检测(如CSF细胞计数、蛋白或反应性CSF-VDRL)。CSF实验室异常在早期梅毒患者中常见，在无神经系统体征或症状时其医学意义未知(585)。CSF-VDRL特异性高但敏感性低。对于有神经系统体征或症状者，反应性CSF-VDRL(无血液污染)被视为神经梅毒的诊断依据。

当CSF-VDRL为阴性但存在神经梅毒的临床体征、反应性血清学试验结果、淋巴细胞增多或蛋白时，应考虑神经梅毒。在这种情况下，可能需要对CSF进行荧光密螺旋体抗体吸收(FTA-ABS)或TP-PA检测以进行额外评估。CSF FTA-ABS试验对神经梅毒的特异性低于CSF-VDRL，但敏感性高。关于CSF TP-PA的数据较少；

however, the sensitivity and specificity appear similar to the CSF FTA-ABS (*586*). Neurosyphilis is highly unlikely with a negative CSF FTA-ABS or TP-PA test, especially among persons with nonspecific neurologic signs and symptoms (*587*).

Among persons with HIV infection, CSF leukocyte count can be elevated (>5 WBCs/mm^3); the association with CSF leukocyte count and plasma HIV viral suppression has not been well characterized. Using a higher cutoff (>20 WBCs/mm^3) might improve the specificity of neurosyphilis diagnosis among this population (*588*).

Treatment

Penicillin G, administered parenterally, is the preferred drug for treating patients in all stages of syphilis. The preparation used (i.e., benzathine, aqueous procaine, or aqueous crystalline), dosage, and length of treatment depend on the stage and clinical manifestations of the disease. Treatment for late latent syphilis (>1 years' duration) and tertiary syphilis requires a longer duration of therapy because organisms theoretically might be dividing more slowly (the validity of this rationale has not been assessed). Longer treatment duration is required for persons with latent syphilis of unknown duration to ensure that those who did not acquire syphilis within the preceding year are adequately treated.

Selection of the appropriate penicillin preparation is important because *T. pallidum* can reside in sequestered sites (e.g., the CNS and aqueous humor) that are poorly accessed by certain forms of penicillin. Combinations of benzathine penicillin, procaine penicillin, and oral penicillin preparations are not considered appropriate for syphilis treatment. Reports have indicated that practitioners have inadvertently prescribed combination long- and short-acting benzathine-procaine penicillin (Bicillin C-R) instead of the standard benzathine penicillin product (Bicillin L-A) recommended in the United States for treating primary, secondary, and latent syphilis. Practitioners, pharmacists, and purchasing agents should be aware of the similar names of these two products to avoid using the incorrect combination therapy agent for treating syphilis (*589*).

Penicillin's effectiveness for treating syphilis was well established through clinical experience even before the value of randomized controlled clinical trials was recognized. Therefore, approximately all recommendations for treating syphilis are based not only on clinical trials and observational studies, but on many decades of clinical experience.

Special Considerations

Pregnancy

Parenteral penicillin G is the only therapy with documented efficacy for syphilis during pregnancy. Pregnant women with syphilis at any stage who report penicillin allergy should be desensitized and treated with penicillin (see Management of Persons Who Have a History of Penicillin Allergy).

Jarisch-Herxheimer Reaction

The Jarisch-Herxheimer reaction is an acute febrile reaction frequently accompanied by headache, myalgia, and fever that can occur within the first 24 hours after the initiation of any syphilis therapy; it is a reaction to treatment and not an allergic reaction to penicillin. Patients should be informed about this possible adverse reaction and how to manage it if it occurs. The Jarisch-Herxheimer reaction occurs most frequently among persons who have early syphilis, presumably because bacterial loads are higher during these stages. Antipyretics can be used to manage symptoms; however, they have not been proven to prevent this reaction. The Jarisch-Herxheimer reaction might induce early labor or cause fetal distress in pregnant women; however, this should not prevent or delay therapy (*590*) (see Syphilis During Pregnancy).

Management of Sex Partners

Sexual transmission of *T. pallidum* is thought to occur only when mucocutaneous syphilitic lesions are present. Such manifestations are uncommon after the first year of infection. Persons exposed through sexual contact with a person who has primary, secondary, or early latent syphilis should be evaluated clinically and serologically and treated according to the following recommendations:

- Persons who have had sexual contact with a person who receives a diagnosis of primary, secondary, or early latent syphilis <90 days before the diagnosis should be treated presumptively for early syphilis, even if serologic test results are negative.
- Persons who have had sexual contact with a person who receives a diagnosis of primary, secondary, or early latent syphilis >90 days before the diagnosis should be treated presumptively for early syphilis if serologic test results are not immediately available and the opportunity for follow-up is uncertain. If serologic tests are negative, no treatment is needed. If serologic tests are positive, treatment should be based on clinical and serologic evaluation and syphilis stage.
- In certain areas or among populations with high syphilis infection rates, health departments recommend notification and presumptive treatment of sex partners of persons with

然而，敏感性和特异性似乎与CSF FTA-ABS相似(586)。CSF FTA-ABS或TP-PA试验阴性时神经梅毒极不可能，尤其是在具有非特异性神经体征和症状的人群中(587)。

在HIV感染者中，CSF白细胞计数可升高(>5 WBCs/mm^3);CSF白细胞计数与血浆HIV病毒抑制之间的关联尚未得到充分表征。使用更高的临界值(>20 WBCs/mm^3)可能提高该人群中神经梅毒诊断的特异性(588)。

治疗

青霉素G经胃肠外给药是治疗各期梅毒患者的首选药物。所用制剂(即苄星青霉素、普鲁卡因水剂或结晶水剂)、剂量和疗程取决于疾病的分期和临床表现。晚期潜伏梅毒(病程>1年)和三期梅毒的治疗需要更长的疗程，因为理论上病原体可能分裂得更慢(该原理的有效性尚未评估)。对于潜伏期不明的潜伏梅毒患者，需要更长的治疗疗程，以确保那些在前一年内未感染梅毒的人得到充分治疗。

选择适当的青霉素制剂很重要，因为*T.pallidum*可存在于某些青霉素难以到达的隔离部位(如CNS和房水)。苄星青霉素、普鲁卡因青霉素和口服青霉素制剂的联合用药不认为适合用于梅毒治疗。报告指出，执业医师曾无意中开具长效和短效苄星-普鲁卡因青霉素联合制剂(Bicillin C-R)，而非美国推荐用于治疗一期、二期和潜伏梅毒的标准苄星青霉素产品(Bicillin L-A)。执业医师、药师和采购人员应了解这两种产品名称相似，以避免使用错误的联合治疗药物来治疗梅毒(589)。

即使在随机对照临床试验的价值得到认可之前，青霉素治疗梅毒的有效性就已通过临床经验充分确立。因此，几乎所有梅毒治疗建议不仅基于临床试验和观察性研究，还基于数十年的临床经验。

特殊考虑

妊娠

胃肠外青霉素G是唯一被证实对妊娠期梅毒有效的疗法。任何阶段患有梅毒的孕妇如报告青霉素过敏，应进行脱敏并以青霉素治疗(见青霉素过敏史者的管理)。

吉海反应

Jarisch-Herxheimer反应是一种急性发热反应，常伴有头痛、肌痛和发热，可在任何梅毒治疗开始后24小时内发生；它是对治疗的反应，而非对青霉素的过敏反应。应告知患者这种可能的不良反应以及发生时如何处理。Jarisch-Herxheimer反应最常发生于早期梅毒患者，推测是因为这些阶段的细菌载量较高。可使用退热药来控制症状；然而，尚未证实其能预防该反应。Jarisch-Herxheimer反应可能诱发妊娠女性早产或导致胎儿窘迫；然而，这不应阻止或延迟治疗(590)(见妊娠期梅毒)。

性伴侣的管理

一般认为，*T.pallidum*的性传播仅发生在存在黏膜皮肤梅毒病变时。此类表现在感染第一年后不常见。与一期、二期或早期潜伏梅毒患者有性接触者应进行临床和血清学评估，并按以下建议治疗：

- 与患有以下疾病的人发生过性接触者
  在诊断前<90天被诊断为一期、二期或早期潜伏梅毒者，即使血清学检测结果为阴性,也应推定按早期梅毒治疗。

- 与患有以下疾病的人发生过性接触者
  在诊断前>90天被诊断为一期、二期或早期潜伏梅毒者，如血清学检测结果不能立即获得且随访机会不确定，应推定按早期梅毒治疗。如血清学检测为阴性，无需治疗。如血清学检测为阳性，治疗应基于临床和血清学评估及梅毒分期。

- 在某些地区或梅毒高发人群中
  感染率，卫生部门建议对以下人群的性伴侣进行通知和推定治疗：

syphilis of unknown duration who have high nontreponemal serologic test titers (i.e., >1:32) because high titers might be indicative of early syphilis. These partners should be managed as if the index patient had early syphilis.
- Long-term sex partners of persons who have late latent syphilis should be evaluated clinically and serologically for syphilis and treated on the basis of the evaluation's findings.
- The following sex partners of persons with syphilis are considered at risk for infection and should be confidentially notified of the exposure and need for evaluation: partners who have had sexual contact within 3 months plus the duration of symptoms for persons who receive a diagnosis of primary syphilis, within 6 months plus duration of symptoms for those with secondary syphilis, and within 1 year for persons with early latent syphilis.

Primary and Secondary Syphilis

Treatment

Parenteral penicillin G has been used effectively for achieving clinical resolution (i.e., the healing of lesions and prevention of sexual transmission) and for preventing late sequelae. However, no comparative trials have been conducted to guide selection of an optimal penicillin regimen. Substantially fewer data are available for nonpenicillin regimens.

Recommended Regimen for Primary and Secondary Syphilis* Among Adults
Benzathine penicillin G 2.4 million units IM in a single dose

* Recommendations for treating syphilis among persons with HIV infection and pregnant women are discussed elsewhere in this report (see Syphilis Among Persons with HIV Infection; Syphilis During Pregnancy).

Available data demonstrate that use of additional doses of benzathine penicillin G, amoxicillin, or other antibiotics do not enhance efficacy of this recommended regimen when used to treat primary and secondary syphilis, regardless of HIV status (*591*–*593*).

Recommended Regimen for Syphilis Among Infants and Children
Benzathine penicillin G 50,000 units/kg body weight IM, up to the adult dose of 2.4 million units in a single dose

Infants and children aged ≥1 month who receive a syphilis diagnosis should have birth and maternal medical records reviewed to assess whether they have congenital or acquired syphilis (see Congenital Syphilis). Infants and children aged ≥1 month with primary and secondary syphilis should be managed by a pediatric infectious disease specialist and evaluated for sexual abuse (e.g., through consultation with child protective services) (see Sexual Assault or Abuse of Children).

Other Management Considerations

All persons who have primary and secondary syphilis should be tested for HIV at the time of diagnosis and treatment. Those persons whose HIV test results are negative should be offered HIV PrEP. In geographic areas in which HIV prevalence is high, persons who have primary or secondary syphilis should be offered PrEP and retested for HIV in 3 months if the initial HIV test result was negative.

Persons who have syphilis and symptoms or signs indicating neurologic disease (e.g., cranial nerve dysfunction, meningitis, stroke, or altered mental state) should have an evaluation that includes CSF analysis. Persons with syphilis who have symptoms or signs of ocular syphilis (e.g., uveitis, iritis, neuroretinitis, or optic neuritis) should have a thorough cranial nerve examination and ocular slit-lamp and ophthalmologic examinations. CSF evaluation is not always needed for persons with ocular syphilis if no evidence of cranial nerves 2, 3, 4, 5, and 6 dysfunction or other evidence of neurologic disease exists. If symptoms and signs of otic syphilis are present then an otologic examination is needed; CSF evaluation in persons with otic syphilis does not aid in the clinical management and therefore is not recommended (see Cerebrospinal Fluid Evaluation). Treatment should be guided by the results of these evaluations. Invasion of CSF by *T. pallidum* accompanied by CSF laboratory abnormalities is common among adults who have primary or secondary syphilis but has unknown medical significance (*585*). In the absence of clinical neurologic findings, no evidence supports variation from the recommended treatment regimen for primary or secondary syphilis. Symptomatic neurosyphilis after treatment with the penicillin regimens recommended for primary and secondary syphilis is rare. Therefore, unless clinical signs or symptoms of neurologic or ophthalmic involvement are present, routine CSF analysis is not recommended for persons who have primary or secondary syphilis.

Follow-Up

Clinical and serologic evaluation should be performed at 6 and 12 months after treatment; more frequent evaluation might be prudent if opportunity for follow-up is uncertain or if repeat infection is a clinical concern. Serologic response (i.e., titer) should be compared with the titer at the time of treatment. However, assessing serologic response to treatment can be difficult, and definitive criteria for cure or failure by serologic criteria have not been well established. In addition, nontreponemal test titers might decrease more slowly for persons previously treated for syphilis (*594*,*595*).

Persons who have signs or symptoms that persist or recur and those with at least a fourfold increase in nontreponemal

病期不明的梅毒患者，其非密螺旋体血清学试验滴度高(即>1:32)，因为高滴度可能提示早期梅毒。这些伴侣应按指示病例患有早期梅毒进行管理。

- 晚期潜伏期感染者的长期性伴侣
  梅毒患者应进行临床和血清学评估，并根据评估结果进行治疗。
- 梅毒患者的以下性伴侣是
  被认为有感染风险，应保密通知其暴露情况及评估需求：一期梅毒诊断患者的性伴侣在3个月加症状持续时间内有性接触者，二期梅毒患者在6个月加症状持续时间内有性接触者，早期潜伏梅毒患者在1年内有性接触者。

一期和二期梅毒

治疗

胃肠外青霉素G已有效用于实现临床消退(即病变愈合和预防性传播)及预防晚期后遗症。然而，尚无比较试验指导最佳青霉素方案的选择。非青霉素方案的数据明显较少。

成人一期和二期梅毒*的推荐治疗方案
苄星青霉素G 240万单位，单次肌内注射

* 关于HIV感染者梅毒治疗的建议和孕妇在本报告其他部分讨论(见HIV感染者中的梅毒；妊娠期梅毒)。

现有数据表明，使用额外剂量的苄星青霉素G、amoxicillin或其他抗生素在治疗一期和二期梅毒时并不能增强该推荐方案的疗效，无论HIV状态如何(*591* - *593*)。

婴儿和儿童梅毒推荐治疗方案
苄星青霉素G 50,000 units/kg体重IM，单次剂量最高至成人剂量2.4 million units

被诊断为梅毒的≥1月龄婴儿和儿童应审查出生和母亲医疗记录，以评估其患有先天性或获得性梅毒(见先天性梅毒)。≥1月龄的一期和二期梅毒婴儿和儿童应由儿科感染病专家管理并评估性虐待(例如，通过咨询儿童保护服务机构)(见儿童性侵犯或虐待)。

其他管理考虑

所有一期和二期梅毒患者应在诊断和治疗时进行HIV检测。HIV检测结果为阴性者应接受HIV PrEP。在HIV流行率高的地理区域，一期或二期梅毒患者应接受PrEP，如初始HIV检测结果为阴性，应在3个月后重新检测HIV。

有梅毒且有提示神经系统疾病的症状或体征(如颅神经功能障碍、脑膜炎、卒中或精神状态改变)者，应进行评估，包括CSF分析。有梅毒且有眼梅毒症状或体征(如葡萄膜炎、虹膜炎、神经视网膜炎或视神经炎)者，应进行全面的颅神经检查以及眼部裂隙灯和眼科检查。如果无第2、3、4、5和6对颅神经功能障碍的证据或其他神经系统疾病的证据，眼梅毒患者并不总是需要CSF评估。如果存在耳梅毒的症状和体征，则需要进行耳科检查；耳梅毒患者的CSF评估无助于临床管理，因此不推荐(见脑脊液评估)。治疗应依据这些评估结果进行指导。*T.pallidum*侵入CSF并伴有CSF实验室异常，在一期或二期梅毒成人中很常见，但其医学意义未知(585)。在缺乏临床神经系统发现的情况下，没有证据支持偏离一期或二期梅毒的推荐治疗方案。接受一期和二期梅毒推荐青霉素方案治疗后出现症状性神经梅毒的情况罕见。因此，除非存在神经系统或眼科受累的临床体征或症状，否则不推荐对一期或二期梅毒患者进行常规CSF分析。

随访

应在治疗后6个月和12个月进行临床和血清学评估；如果随访机会不确定或重复感染是临床关注的问题，更频繁的评估可能是审慎的。应将血清学反应(即滴度)与治疗时的滴度进行比较。然而，评估治疗的血清学反应可能很困难，且血清学治愈或失败的确切标准尚未很好建立。此外，既往接受过梅毒治疗者的非密螺旋体试验滴度可能下降更慢(*594*,*595*)。

体征或症状持续或复发者，以及非梅毒螺旋体抗体滴度至少升高四倍者

test titer persisting for >2 weeks likely were reinfected or experienced treatment failure. Among persons who have neurologic findings or persons with no neurologic findings without any reported sexual exposure during the previous 3–6 months indicating that treatment failure might be possible, a CSF examination is recommended with treatment guided by CSF findings. These persons should also be reevaluated for HIV infection.

Among persons with no neurologic findings after a thorough neurologic examination and who are sexually active, reinfection is likely and repeat treatment for early syphilis is recommended. These persons should also be reevaluated for HIV infection.

Failure of nontreponemal test titers to decrease fourfold within 12 months after therapy for primary or secondary syphilis (inadequate serologic response) might be indicative of treatment failure. However, clinical trial data have demonstrated that 10%–20% of persons with primary and secondary syphilis treated with the recommended therapy will not achieve the fourfold decrease in nontreponemal titer within 12 months after treatment (*591*,*596*,*597*). Serologic response to treatment appears to be associated with multiple factors, including the person's syphilis stage (earlier stages are more likely to decrease fourfold and become nonreactive), initial nontreponemal antibody titers (titers <1:8 are less likely to decline fourfold than higher titers), and age (titers among older patients might be less likely to decrease fourfold than those of younger patients) (*596*–*598*). Optimal management of persons who have an inadequate serologic response after syphilis treatment is unclear. At a minimum, these persons should receive additional neurologic examinations, clinical and serologic follow-up annually, and reevaluation for HIV infection. If neurologic symptoms or signs are identified, a CSF evaluation is recommended, with findings guiding management. If additional follow-up cannot be ensured, retreatment is recommended. Because treatment failure might be the result of unrecognized CNS infection, CSF examination can be considered in situations in which follow-up is uncertain.

For retreatment, weekly injections of benzathine penicillin G 2.4 million units intramuscularly (IM) for 3 weeks is recommended, unless CSF examination indicates that neurosyphilis is present (see Neurosyphilis, Ocular Syphilis, and Otosyphilis). Serologic titers might not decrease, despite a negative CSF examination and a repeated 3-week therapy course (*599*). In these circumstances, the benefit of additional therapy or repeated CSF examinations is unclear, and it is not typically recommended. Serologic and clinical monitoring at least annually should continue to monitor for any sustained increases in nontreponemal titer.

Management of Sex Partners

See Syphilis, Management of Sex Partners.

Special Considerations

Penicillin Allergy

Data to support use of alternatives to penicillin in treating primary and secondary syphilis are limited. However, multiple therapies might be effective for nonpregnant persons with penicillin allergy who have primary or secondary syphilis. Doxycycline (100 mg orally 2 times/day for 14 days) (*600*,*601*) and tetracycline (500 mg orally 4 times/day for 14 days) have been used for years and can be effective. Compliance is likely to be better with doxycycline than tetracycline because tetracycline can cause more gastrointestinal side effects and requires more frequent dosing. Limited clinical studies, along with biologic and pharmacologic evidence, indicate that ceftriaxone (1 g daily either IM or IV for 10 days) is effective for treating primary and secondary syphilis; however, the optimal dose and duration of ceftriaxone therapy have not been defined (*602*,*603*). Azithromycin as a single 2-g oral dose has been effective for treating primary and secondary syphilis among certain populations (*602*,*604*,*605*). However, because of *T. pallidum* chromosomal mutations associated with azithromycin and other macrolide resistance and documented treatment failures in multiple U.S. geographic areas, azithromycin should not be used as treatment for syphilis (*606*–*608*). Thorough clinical and serologic follow-up of persons receiving any alternative therapy is essential.

Persons with a penicillin allergy whose compliance with therapy or follow-up cannot be ensured should be desensitized and treated with benzathine penicillin G. Skin testing for penicillin allergy might be useful in circumstances in which the reagents and expertise are available for performing the test adequately (see Management of Persons Who Have a History of Penicillin Allergy).

Pregnancy

Pregnant women with primary or secondary syphilis who are allergic to penicillin should be desensitized and treated with penicillin G. Skin testing or oral graded penicillin dose challenge might be helpful in identifying women at risk for acute allergic reactions (see Management of Persons Who Have a History of Penicillin Allergy; Syphilis During Pregnancy).

HIV Infection

Persons with HIV infection who have primary or secondary syphilis should be treated similarly to those without HIV (see Syphilis Among Persons with HIV Infection).

试验滴度至少增加四倍且持续>2周者，可能为再感染或治疗失败。对于有神经系统发现者，或无神经系统发现但既往3-6个月内无任何报告的性暴露提示可能存在治疗失败者，建议进行CSF检查并根据CSF发现指导治疗。这些人还应重新评估HIV感染。

在全面神经系统检查后无神经系统发现且有性活动者，再感染可能性大，建议重复治疗早期梅毒。这些人还应重新评估HIV感染。

一期或二期梅毒治疗后12个月内非密螺旋体试验滴度未能下降四倍(血清学反应不足)可能提示治疗失败。然而，临床试验数据已表明，接受推荐治疗的一期和二期梅毒患者中，10%-20%在治疗后12个月内不会达到非密螺旋体滴度下降四倍(*591*,*596*,*597*)。治疗的血清学反应似乎与多种因素相关，包括患者的梅毒分期(较早阶段更可能下降四倍并转为无反应性)、初始非密螺旋体抗体滴度(滴度<1:8者较滴度较高者更不可能下降四倍)以及年龄(老年患者的滴度可能较年轻患者更不可能下降四倍)(*596* - *598*)。梅毒治疗后血清学反应不足者的最佳管理尚不清楚。至少，这些患者应接受额外的神经系统检查、每年临床和血清学随访，以及HIV感染再评估。如果发现神经系统症状或体征，推荐进行CSF评估，并根据结果指导管理。如果无法确保额外随访，推荐再治疗。由于治疗失败可能是未被识别的CNS感染所致，在随访不确定的情况下可考虑CSF检查。

对于再治疗，推荐每周肌内注射苄星青霉素G 240万单位，连续3周，除非脑脊液检查表明存在神经梅毒(见神经梅毒、眼梅毒和耳梅毒)。尽管脑脊液检查阴性并重复了3周疗程，血清学滴度可能不会下降(599)。在这些情况下，额外治疗或重复脑脊液检查的益处尚不明确，通常不推荐。应至少每年继续进行血清学和临床监测，以监测非密螺旋体滴度的任何持续升高。

性伴侣的管理

参见梅毒，性伴侣的管理。

特殊考虑

青霉素过敏

支持使用青霉素替代药物治疗一期和二期梅毒的数据有限。然而，对于青霉素过敏且患有一期或二期梅毒的非妊娠期患者，多种疗法可能有效。多西环素(100 mg口服，每日2次，共14天)(*600*,*601*)和四环素(500 mg口服，每日4次，共14天)已使用多年且可能有效。多西环素的依从性可能优于四环素，因为四环素可引起更多胃肠道副作用且需要更频繁给药。有限的临床研究以及生物学和药理学证据表明，头孢曲松(1 g每日IM或IV，共10天)对治疗一期和二期梅毒有效；然而，头孢曲松治疗的最佳剂量和疗程尚未确定(*602*,*603*)。阿奇霉素单次2 g口服剂量在特定人群中对治疗一期和二期梅毒有效(*602*,*604*,*605*)。然而，由于*T.pallidum*染色体突变与阿奇霉素及其他大环内酯类耐药相关，且在美国多个地理区域已记录治疗失败，阿奇霉素不应作为梅毒的治疗药物(*606* - *608*)。对接受任何替代疗法的患者进行全面的临床和血清学随访至关重要。

青霉素过敏且无法确保治疗依从性或随访者应进行脱敏并以苄星青霉素G治疗。在具备充分进行试验的试剂和专业知识的情况下，青霉素过敏皮肤试验可能有用(见青霉素过敏史者的管理)。

妊娠

对青霉素过敏的一期或二期梅毒孕妇应进行脱敏并以青霉素G治疗。皮肤试验或口服梯度青霉素剂量激发试验可能有助于识别有急性过敏反应风险的女性(见青霉素过敏史者的管理；妊娠期梅毒)。

HIV感染

HIV感染合并一期或二期梅毒者应与无HIV者类似治疗(见HIV感染者中的梅毒)。

Latent Syphilis

Latent syphilis is defined as syphilis characterized by seroreactivity without other evidence of primary, secondary, or tertiary disease. Persons who have latent syphilis and who acquired syphilis during the preceding year are classified as having early latent syphilis (early nonprimary, nonsecondary). Persons can receive a diagnosis of early latent syphilis if, during the year preceding the diagnosis, they had a documented seroconversion or a sustained (>2 weeks) fourfold or greater increase in nontreponemal test titers in a previously treated person; unequivocal symptoms of primary or secondary syphilis; or a sex partner documented to have primary, secondary, or early latent syphilis. In addition, for persons with reactive nontreponemal and treponemal tests whose only possible exposure occurred during the previous 12 months, early latent syphilis can be assumed.

In the absence of these conditions associated with latent syphilis, an asymptomatic person should be considered to have latent syphilis of unknown duration or late latent syphilis (>1 year's duration). Nontreponemal serologic titers usually are higher early in the course of syphilis infection. However, early latent syphilis cannot be reliably diagnosed solely on the basis of nontreponemal titers. All persons with latent syphilis should have careful examination of all accessible mucosal surfaces to evaluate for mucosal lesions (primary or secondary syphilis) before making a latent syphilis diagnosis. Physical examination should include the oral cavity, perianal area, perineum, rectum, and genitals (vagina and cervix for women; scrotum, penis, and underneath the foreskin for uncircumcised men).

Treatment

Because latent syphilis is not transmitted sexually, the objective of treating persons in this disease stage is to prevent medical complications of syphilis. Latent syphilis can also be vertically transmitted to a fetus; therefore, the goal of treating a pregnant woman is to prevent congenital syphilis. Although clinical experience supports the effectiveness of penicillin in achieving this goal, limited evidence is available for guiding choice of specific regimens or duration. Available data demonstrate that additional doses of benzathine penicillin G, amoxicillin, or other antibiotics in early latent syphilis do not enhance efficacy, regardless of HIV status (*592*,*593*,*609*).

Recommended Regimens for Latent Syphilis* Among Adults

Early latent syphilis: Benzathine penicillin G 2.4 million units IM in a single dose

Late latent syphilis: Benzathine penicillin G 7.2 million units total, administered as 3 doses of 2.4 million units IM each at 1-week intervals

* Recommendations for treating syphilis in persons with HIV and pregnant women are discussed elsewhere in this report (see Syphilis Among Persons with HIV Infection; Syphilis During Pregnancy).

Infants and children aged ≥1 month with diagnosed latent syphilis should be managed by a pediatric infectious disease specialist and receive a CSF examination. In addition, birth and maternal medical records should be reviewed to assess whether these infants and children have congenital or acquired syphilis. For those with congenital syphilis, treatment should be undertaken as described (see Congenital Syphilis). Those with acquired syphilis should be evaluated for sexual abuse (e.g., through consultation with child protection services) (see Sexual Assault or Abuse of Children). These regimens are for children who are not allergic to penicillin who have acquired syphilis and who have normal CSF examinations.

Other Management Considerations

All persons who have latent syphilis should be tested for HIV at the time of diagnosis or treatment. Those persons whose HIV test results are negative should be offered HIV PrEP. In geographic areas in which the prevalence of HIV infection is high or among populations vulnerable to HIV acquisition, persons who have early latent or late latent syphilis should be offered PrEP and retested for HIV in 3 months if the first HIV test result was negative.

Persons who receive a diagnosis of latent syphilis and have neurologic or ocular signs and symptoms (e.g., cognitive dysfunction, motor or sensory deficits, ophthalmic or auditory symptoms, cranial nerve palsies, or symptoms or signs of meningitis or stroke) should be evaluated for neurosyphilis, ocular syphilis, or otosyphilis according to their clinical presentation (see Neurosyphilis, Ocular Syphilis, and Otosyphilis).

If a person receives a delayed dose of penicillin in a course of weekly therapy for late latent syphilis or syphilis of unknown duration, the course of action that should be recommended is unclear. Clinical experience indicates that an interval of 10–14 days between doses of benzathine penicillin for latent syphilis might be acceptable before restarting the sequence of injections (i.e., if dose 1 is administered on day 0, dose 2 is administered on days 10–14). Pharmacologic considerations indicate that an interval of 7–9 days between doses, if feasible, might be preferred (*610*–*612*). Delayed doses are not optimal for pregnant women receiving therapy for latent syphilis (*613*). Pregnant women who have delays in any therapy dose >9 days between doses should repeat the full course of therapy.

Follow-Up

Quantitative nontreponemal serologic tests should be repeated at 6, 12, and 24 months. These serologic titers should be compared with the titer at the time of treatment. Persons with at least a fourfold sustained increase in nontreponemal test titer persisting for >2 weeks or who experienced signs or symptoms attributable to primary or secondary syphilis

潜伏期梅毒

潜伏梅毒定义为以血清反应性为特征、无其他一期、二期或三期疾病证据的梅毒。患有潜伏梅毒且在过去一年内感染梅毒者被归类为早期潜伏梅毒(早期非原发、非二期)。如果患者在诊断前一年内记录到血清阳转或在既往治疗过的患者中非密螺旋体试验滴度持续(>2周)升高四倍或以上；有一期或二期梅毒的明确症状；或性伴侣被记录患有一期、二期或早期潜伏梅毒，则可诊断为早期潜伏梅毒。此外，对于非密螺旋体和密螺旋体试验均反应性、其唯一可能的暴露发生在前12个月内的患者，可假定为早期潜伏梅毒。

在缺乏这些与潜伏梅毒相关的条件时，无症状患者应被视为病程不明的潜伏梅毒或晚期潜伏梅毒(病程>1年)。非密螺旋体血清学滴度通常在梅毒感染早期较高。然而，仅凭非密螺旋体滴度无法可靠地诊断早期潜伏梅毒。所有潜伏梅毒患者在作出潜伏梅毒诊断前，应仔细检查所有可及黏膜表面以评估黏膜病变(一期或二期梅毒)。体格检查应包括口腔、肛周区域、会阴、直肠和生殖器(女性为阴道和宫颈；未行包皮环切术的男性为阴囊、阴茎和包皮下方)。

治疗

由于潜伏梅毒不通过性途径传播，治疗该疾病阶段患者的目标是预防梅毒的医学并发症。潜伏梅毒也可垂直传播给胎儿；因此，治疗妊娠女性的目标是预防先天性梅毒。尽管临床经验支持青霉素在实现该目标方面的有效性，但指导选择具体方案或疗程的证据有限。现有数据表明，在早期潜伏梅毒中，额外剂量的苄星青霉素G、阿莫西林或其他抗生素不会增强疗效，无论HIV状态如何(*592*,*593*,*609*)。

成人潜伏梅毒*的推荐治疗方案

早期潜伏梅毒：苄星青霉素G 2.4 million units IM，单次剂量

晚期潜伏梅毒：苄星青霉素G总量7.2 million units，以2.4 million units IM每剂、间

* 对HIV感染者和孕妇梅毒治疗的建议
女性在本报告其他部分讨论(见HIV感染者中的梅毒；妊娠期梅毒)。

年龄≥1个月且诊断为潜伏梅毒的婴儿和儿童应由儿科感染病专家管理，并接受脑脊液检查。此外，应审查出生和母亲医疗记录，以评估这些婴儿和儿童是否患有先天性或获得性梅毒。对于先天性梅毒患者，应按所述进行治疗(见先天性梅毒)。获得性梅毒患者应评估性虐待(例如，通过咨询儿童保护服务机构)(见儿童性侵犯或虐待)。这些方案适用于对青霉素不过敏、患有获得性梅毒且脑脊液检查正常的儿童。

其他管理考虑

所有潜伏梅毒患者应在诊断或治疗时进行HIV检测。HIV检测结果为阴性者应接受HIV PrEP。在HIV感染流行率高的地理区域或HIV易感人群中，早期潜伏或晚期潜伏梅毒患者应接受PrEP，如首次HIV检测结果为阴性，应在3个月后重新检测HIV。

被诊断为潜伏梅毒且有神经或眼部体征和症状者(例如，认知功能障碍、运动或感觉缺陷、眼部或听觉症状、颅神经麻痹，或脑膜炎或卒中的症状或体征)应根据其临床表现评估神经梅毒、眼梅毒或耳梅毒(见神经梅毒、眼梅毒和耳梅毒)。

如果一个人在晚期潜伏梅毒或病期不明的梅毒每周治疗方案中接受了延迟剂量的青霉素，应推荐采取的行动尚不明确。临床经验表明，潜伏梅毒在重新开始注射序列之前，苄星青霉素G剂量之间间隔10-14天可能是可接受的(即，如果第1剂在第0天给药，第2剂在第10-14天给药)。药理学考虑表明，如果可行，剂量之间间隔7-9天可能更可取(*610 - 612*)。延迟剂量对于接受潜伏梅毒治疗的孕妇并非最佳(613)。任何治疗剂量之间延迟>9天的孕妇应重复整个疗程。

随访

定量非密螺旋体血清学试验应在6、12和24个月时重复。这些血清学滴度应与治疗时的滴度进行比较。非密螺旋体试验滴度至少持续增加四倍且持续>2周者，或出现可归因于一期或二期梅毒的体征或症状者

were likely reinfected or experienced treatment failure. These persons should be retreated and reevaluated for HIV infection. Among persons who have neurologic findings after a thorough neurologic examination or among persons with no neurologic findings and no sexual exposure during the previous year, a CSF examination is recommended. Treatment should be guided by CSF findings. Among persons with no neurologic findings after neurologic examination and who are sexually active, treatment with weekly injections of benzathine penicillin G 2.4 million units IM for 3 weeks is recommended.

Optimal management of persons who have less than a fourfold decrease in titers 24 months after treatment (i.e., an inadequate serologic response) is unclear, especially if the initial titer was <1:8. At a minimum, these persons should receive additional clinical and serologic follow-up and be evaluated for HIV infection. If neurologic symptoms or signs are identified, a CSF evaluation is recommended, with the findings guiding management. If additional follow-up cannot be ensured or if an initially high titer (>1:32) does not decrease at least fourfold 24 months after treatment, retreatment with weekly injections of benzathine penicillin G 2.4 million units IM for 3 weeks is recommended. Because treatment failure might be the result of unrecognized CNS infection, CSF examination can be considered in such situations where follow-up is uncertain or initial high titers do not decrease after 24 months.

If the CSF examination is negative, repeat treatment for latent syphilis is recommended. Serologic titers might not decrease despite a negative CSF examination and a repeated course of therapy, especially if the initial nontreponemal titer is low (<1:8); in these circumstances, the need for additional therapy or repeated CSF examinations is unclear but is usually not recommended. Serologic and clinical monitoring at least annually should continue to monitor for any sustained increases in nontreponemal titer.

Management of Sex Partners

See Syphilis, Management of Sex Partners.

Special Considerations

Penicillin Allergy

The effectiveness of alternatives to penicillin in treating latent syphilis has not been well documented. Nonpregnant patients allergic to penicillin who have clearly defined early latent syphilis should respond to antibiotics recommended as alternatives to penicillin for treating primary and secondary syphilis (see Primary and Secondary Syphilis). The only acceptable alternatives for treating late latent syphilis or syphilis of unknown duration are doxycycline (100 mg orally 2 times/day) or tetracycline (500 mg orally 4 times/day), each for 28 days. The efficacy of these alternative regimens among persons with HIV infection has not been well studied. These therapies should be used only in conjunction with close serologic and clinical follow-up, especially among persons with HIV infection. On the basis of biologic plausibility and pharmacologic properties, ceftriaxone might be effective for treating latent syphilis. However, the optimal dose and duration of ceftriaxone therapy have not been defined; treatment decisions should be discussed in consultation with a specialist. Persons with a penicillin allergy whose compliance with therapy or follow-up cannot be ensured should be desensitized and treated with benzathine penicillin G. Skin testing for penicillin allergy might be useful in circumstances in which the reagents and expertise are available for performing the test adequately (see Management of Persons Who Have a History of Penicillin Allergy).

Pregnancy

Pregnant women who are allergic to penicillin should be desensitized and treated with penicillin G. Skin testing for penicillin allergy might be useful in circumstances in which the reagents and expertise are available for performing the test adequately (see Management of Persons Who Have a History of Penicillin Allergy; Syphilis During Pregnancy).

HIV Infection

Persons with HIV infection who have latent syphilis should be treated similarly to persons who do not have HIV (see Syphilis Among Persons with HIV Infection).

Tertiary Syphilis

Tertiary syphilis refers to gummas, cardiovascular syphilis, psychiatric manifestations (e.g., memory loss or personality changes), or late neurosyphilis. Guidelines for all forms of neurosyphilis (e.g., early or late neurosyphilis) are discussed elsewhere in these recommendations (see Neurosyphilis, Ocular Syphilis, and Otosyphilis). Persons with gummas and cardiovascular syphilis who are not allergic to penicillin and have no evidence of neurosyphilis by clinical and CSF examination should be treated with the following regimen.

Recommended Regimen for Tertiary Syphilis Among Adults
Tertiary syphilis with normal CSF examination: Benzathine penicillin G 7.2 million units total, administered as 3 doses of 2.4 million units IM each at 1-week intervals

Other Management Considerations

All persons who have tertiary syphilis should receive a CSF examination before therapy is initiated and have an HIV test.

可能再次感染或经历治疗失败。这些人应重新治疗并重新评估HIV感染。在全面神经系统检查后有神经系统发现的人中，或在没有神经系统发现且过去一年内没有性暴露的人中，建议进行脑脊液检查。治疗应以脑脊液发现为指导。在神经系统检查后没有神经系统发现且有性活动的人中，建议每周注射苄星青霉素G 2.4 million units IM，共3周。

治疗后24个月滴度下降不足四倍(即血清学反应不足)的人的最佳管理尚不明确，特别是如果初始滴度<1:8。至少,这些人应接受额外的临床和血清学随访,并评估HIV感染。如果发现神经系统症状或体征,建议进行脑脊液评估,并以发现指导管理。如果无法确保额外随访,或初始高滴度(>1:32)在治疗后24个月未至少下降四倍，建议每周注射苄星青霉素G 2.4 million units IM，共3周重新治疗。由于治疗失败可能是未识别CNS感染的结果，在随访不确定或初始高滴度在24个月后未下降的情况下，可考虑脑脊液检查。

如果脑脊液检查为阴性，建议重复潜伏梅毒治疗。尽管脑脊液检查阴性且重复疗程治疗，血清学滴度可能不会下降，特别是如果初始非密螺旋体滴度较低(<1:8);在这些情况下,额外治疗或重复脑脊液检查的需要尚不明确,但通常不建议。应继续至少每年进行血清学和临床监测,以监测非密螺旋体滴度的任何持续升高。

性伴侣的管理

参见梅毒，性伴侣的管理。

特殊考虑

青霉素过敏

青霉素替代方案治疗潜伏梅毒的有效性尚未得到充分证实。对青霉素过敏且明确诊断为早期潜伏梅毒的非妊娠患者，应对推荐用于治疗一期和二期梅毒的青霉素替代抗生素有应答(见一期和二期梅毒)。治疗晚期潜伏梅毒或病期不明的梅毒唯一可接受的替代方案是多西环素(100 mg 口服，2 次/日)或四环素(500 mg 口服，4 次/日)，各用 28 天。这些替代方案在 HIV 感染者中的疗效尚未得到充分研究。这些疗法应仅在密切的血清学和临床随访下使用，尤其是在 HIV 感染者中。基于生物学合理性和药理学特性，头孢曲松可能对治疗潜伏梅毒有效。然而，头孢曲松治疗的最佳剂量和疗程尚未确定；治疗决策应与专科医生会诊讨论。对青霉素过敏且无法确保治疗依从性或随访的患者应进行脱敏，并使用苄星青霉素G治疗。在具备充分执行该试验所需试剂和专业技能的情况下，青霉素过敏皮肤试验可能有用(见有青霉素过敏史者的管理)。

妊娠

对青霉素过敏的孕妇应进行脱敏并以青霉素G治疗。在具备充分进行试验的试剂和专业知识的情况下，青霉素过敏皮肤试验可能有用(见青霉素过敏史者的管理；妊娠期梅毒)。

HIV感染

HIV感染合并潜伏梅毒者应与无HIV者类似治疗(见HIV感染者中的梅毒)。

三期梅毒

三期梅毒是指树胶肿、心血管梅毒、精神表现(如记忆丧失或人格改变)或晚期神经梅毒。所有形式神经梅毒(如早期或晚期神经梅毒)的指南在这些建议的其他部分讨论(见神经梅毒、眼梅毒和耳梅毒)。对青霉素不过敏且经临床和CSF检查无神经梅毒证据的树胶肿和心血管梅毒患者，应使用以下方案治疗。

成人三期梅毒推荐治疗方案
CSF检查正常的三期梅毒：苄星青霉素G总量7.2 million units，以2.4 million units IM每剂、间隔1周给药3剂

其他管理考虑

所有三期梅毒患者应在开始治疗前接受脑脊液检查，并进行HIV检测。

Those persons whose HIV test results are negative should be offered HIV PrEP. Persons with CSF abnormalities should be treated with a neurosyphilis regimen. Certain providers treat all persons who have cardiovascular syphilis with a neurosyphilis regimen. These persons should be managed in consultation with an infectious disease specialist. Limited information is available concerning clinical response and follow-up of persons who have tertiary syphilis.

Management of Sex Partners

See Syphilis, Management of Sex Partners.

Special Considerations

Penicillin Allergy

Any person allergic to penicillin should be treated in consultation with an infectious disease specialist.

Pregnancy

Pregnant women who are allergic to penicillin should be desensitized and treated with penicillin G. Skin testing or oral graded penicillin dose challenge might be helpful in identifying women at risk for acute allergic reactions (see Management of Persons Who Have a History of Penicillin Allergy; Syphilis During Pregnancy).

HIV Infection

Persons with HIV infection who have tertiary syphilis should be treated as described for persons without HIV (see Syphilis Among Persons with HIV Infection).

Neurosyphilis, Ocular Syphilis, and Otosyphilis

Treatment

CNS involvement can occur during any stage of syphilis, and CSF laboratory abnormalities are common among persons with early syphilis, even in the absence of clinical neurologic findings. No evidence exists to support variation from recommended diagnosis and treatment for syphilis at any stage for persons without clinical neurologic findings, except tertiary syphilis. If clinical evidence of neurologic involvement is observed (e.g., cognitive dysfunction, motor or sensory deficits, cranial nerve palsies, or symptoms or signs of meningitis or stroke), a CSF examination should be performed before treatment.

Syphilitic uveitis or other ocular syphilis manifestations (e.g., neuroretinitis and optic neuritis) can occur at any stage of syphilis and can be isolated abnormalities or associated with neurosyphilis. All persons with ocular symptoms and reactive syphilis serology need a full ocular examination, including cranial nerve evaluation. If cranial nerve dysfunction is present, a CSF evaluation is needed. Among persons with isolated ocular symptoms (no cranial nerve dysfunction or other neurologic abnormalities), reactive syphilis serology, and confirmed ocular abnormalities on examination, CSF examination is unnecessary before treatment. CSF analysis might be helpful in evaluating persons with ocular symptoms and reactive syphilis serology who do not have ocular findings on examination. If ocular syphilis is suspected, immediate referral to and management in collaboration with an ophthalmologist is crucial. Ocular syphilis should be treated similarly to neurosyphilis, even if a CSF examination is normal.

Hearing loss and other otologic symptoms can occur at any stage of syphilis and can be isolated abnormalities or associated with neurosyphilis, especially of cranial nerve 8. However, among persons with isolated auditory symptoms, normal neurologic examination, and reactive syphilis serology, CSF examination is likely to be normal and is not recommended before treatment. Otosyphilis should be managed in collaboration with an otolaryngologist and treated by using the same regimen as for neurosyphilis.

Recommended Regimen for Neurosyphilis, Ocular Syphilis, or Otosyphilis Among Adults
Aqueous crystalline penicillin G 18–24 million units per day, administered as 3–4 million units IV every 4 hours or continuous infusion for 10–14 days

If compliance with therapy can be ensured, the following alternative regimen might be considered.

Alternative Regimen
Procaine penicillin G 2.4 million units IM once daily *plus* **Probenecid** 500 mg orally 4 times/day, both for 10–14 days

The durations of the recommended and alternative regimens for neurosyphilis are shorter than the duration of the regimen used for latent syphilis. Therefore, benzathine penicillin, 2.4 million units IM once per week for 1–3 weeks, can be considered after completion of these neurosyphilis treatment regimens to provide a comparable total duration of therapy.

Other Management Considerations

The following are other considerations in the management of persons who have neurosyphilis:

- All persons who have neurosyphilis, ocular syphilis, or otosyphilis should be tested for HIV at the time of diagnosis. Those whose HIV test results are negative should be offered HIV PrEP.

HIV检测结果为阴性者应接受HIV PrEP。脑脊液异常者应采用神经梅毒方案治疗。部分医生对所有心血管梅毒患者采用神经梅毒方案治疗。这些患者应在感染病专科医生会诊下进行管理。关于三期梅毒患者临床反应和随访的信息有限。

性伴侣的管理

参见梅毒，性伴侣的管理。

特殊考虑

青霉素过敏

任何对青霉素过敏者应在感染病专科医生会诊下接受治疗。

妊娠

对青霉素过敏的妊娠妇女应进行脱敏，并使用青霉素G治疗。皮肤试验或口服梯度青霉素剂量激发试验可能有助于识别有急性过敏反应风险的妇女(见青霉素过敏史者的管理；妊娠期梅毒)。

HIV感染

合并HIV感染的三期梅毒患者应按无HIV感染者的所述方法治疗(见HIV感染者中的梅毒)。

神经梅毒、眼部梅毒及耳梅毒

治疗

CNS受累可发生在梅毒的任何阶段，且早期梅毒患者中CSF实验室异常常见，即使无临床神经系统表现。除三期梅毒外，无证据支持对无临床神经系统表现的患者在任何阶段偏离推荐的梅毒诊断和治疗。如观察到神经系统受累的临床证据(如认知功能障碍、运动或感觉缺损、脑神经麻痹，或脑膜炎或卒中的症状或体征)，应在治疗前进行CSF检查。

梅毒性葡萄膜炎或其他眼部梅毒表现(如神经视网膜炎和视神经炎)可发生于梅毒的任何阶段，可为孤立性异常或与神经梅毒相关。所有有眼部症状且反应性梅毒血清学需要完整的眼部检查，包括脑神经评估。如存在脑神经功能障碍，需要进行CSF评估。对于仅有眼部症状(无脑神经功能障碍或其他神经系统异常)、梅毒血清学反应性且检查确认眼部异常的患者，治疗前无需进行CSF检查。CSF分析可能有助于评估有眼部症状和梅毒血清学反应性但检查无眼部发现的患者。如怀疑眼梅毒，立即转诊至眼科医生并与其协作管理至关重要。眼梅毒应按神经梅毒类似治疗，即使CSF检查正常。

听力损失和其他耳科症状可发生于梅毒的任何阶段，可为孤立性异常或与神经梅毒相关，尤其是第8对脑神经受累。然而，对于仅有听觉症状、神经系统检查正常且梅毒血清学反应阳性的患者，脑脊液检查结果可能正常，不推荐在治疗前进行。耳梅毒应与耳鼻喉科医生协作管理，并采用与神经梅毒相同的治疗方案进行治疗。

成人神经梅毒、眼部梅毒或耳梅毒的推荐方案
水剂结晶青霉素G 18-24 million units/日，以3-4 million units IV每4小时一次或持续输注给药，共10-14天

如能确保治疗依从性，可考虑以下替代方案。

替代方案
普鲁卡因青霉素G 240万单位 IM 每日一次 加 **Probenecid** 500 mg 口服，每日4次，两者均用10-14天

神经梅毒的推荐方案和替代方案疗程短于潜伏梅毒所用方案的疗程。因此，在完成这些神经梅毒治疗方案后，可考虑苄星青霉素2.4 million units IM每周一次，共1-3周，以提供相当的总治疗时长。

其他管理考虑

以下是神经梅毒患者管理中的其他考虑事项：

- 所有患有神经梅毒、眼梅毒或耳梅毒应在诊断时进行HIV检测。HIV检测结果为阴性者应接受HIV PrEP

- Although systemic steroids are used frequently as adjunctive therapy for otosyphilis and for ocular syphilis, such drugs have not been proven to be beneficial.

Follow-Up

Data from two studies indicate that, among immunocompetent persons and persons with HIV infection who are on effective ART, normalization of the serum RPR titer predicts normalization of abnormal CSF parameters after neurosyphilis treatment (*614*,*615*). Therefore, repeated CSF examinations are unnecessary for persons without HIV infection or persons with HIV infection who are on ART and who exhibit serologic and clinical responses after treatment.

Management of Sex Partners

See Syphilis, Management of Sex Partners.

Special Considerations

Penicillin Allergy

Limited data indicate that ceftriaxone 1–2 g daily either IM or IV for 10–14 days can be used as an alternative treatment for persons with neurosyphilis (*603*,*616*,*617*). Cross-sensitivity between ceftriaxone and penicillin can occur; however, the risk for penicillin cross-reactivity between third-generation cephalosporins is negligible (*618*–*621*) (see Management of Persons Who Have a History of Penicillin Allergy). If concern exists regarding ceftriaxone safety for a patient with neurosyphilis, skin testing should be performed to confirm penicillin allergy and, if necessary, penicillin desensitization in consultation with a specialist is recommended. Other regimens have not been adequately evaluated for treatment of neurosyphilis.

Pregnancy

Pregnant women who are allergic to penicillin should be desensitized and treated with penicillin G. Skin testing or oral graded penicillin dose challenge might be helpful in identifying women at risk for acute allergic reactions (see Management of Persons Who Have a History of Penicillin Allergy).

HIV Infection

Persons with HIV infection who have neurosyphilis should be treated as described for persons without HIV (see Syphilis Among Persons with HIV Infection).

Syphilis Among Persons with HIV Infection

Diagnostic Considerations

Interpretation of treponemal and nontreponemal serologic tests for persons with HIV infection is the same as for persons without HIV. Although rare, unusual serologic responses have been observed among persons with HIV infection who have syphilis. The majority of reports have involved posttreatment serologic titers that were higher than expected (i.e., high serofast) or fluctuated, and false-negative serologic test results and delayed appearance of seroreactivity have also been reported (*622*).

When clinical findings are indicative of syphilis, but serologic tests are nonreactive or their interpretation is unclear, alternative tests (e.g., biopsy of a lesion, darkfield examination, or PCR of lesion material) might be useful for diagnosis. Neurosyphilis, ocular syphilis, and otosyphilis should be considered in the differential diagnosis of neurologic, ocular, and other signs and symptoms among persons with HIV infection.

Treatment

Persons with HIV infection who have early syphilis might be at increased risk for neurologic complications (*623*) and might have higher rates of inadequate serologic response with recommended regimens. The magnitude of these risks is not defined precisely but is likely small. Although long-term (>1 year) comparative data are lacking, no treatment regimens for syphilis have been demonstrated to be more effective in preventing neurosyphilis among persons with HIV infection than the syphilis regimens recommended for persons without HIV (*609*). Careful follow-up after therapy is essential. Using ART per current HIV guidelines might improve clinical outcomes among persons coinfected with HIV and syphilis; concerns regarding adequate treatment of syphilis among persons with HIV infection might not apply to those with HIV virologic suppression (*624*,*625*).

Primary and Secondary Syphilis Among Persons with HIV Infection

Recommended Regimen for Primary and Secondary Syphilis Among Persons with HIV Infection
Benzathine penicillin G 2.4 million units IM in a single dose

Available data demonstrate that additional doses of benzathine penicillin G, amoxicillin, or other antibiotics in primary and secondary syphilis among persons with HIV infection do not result in enhanced efficacy (*592*,*593*,*609*).

Other Management Considerations

The majority of persons with HIV infection respond appropriately to the recommended benzathine penicillin G treatment regimen for primary and secondary syphilis (*626*). CSF abnormalities (e.g., mononuclear pleocytosis and elevated protein levels) can be common among persons with HIV, even those without syphilis. The clinical and prognostic significance of such CSF laboratory abnormalities among persons with primary and secondary syphilis who lack neurologic symptoms

- 尽管全身性类固醇常被用作
  对于耳梅毒和眼梅毒，辅助治疗中此类药物尚未被证实有益。

随访

两项研究的数据表明，在免疫功能正常者和正在接受有效ART的HIV感染者中，血清RPR滴度的正常化可预测神经梅毒治疗后异常CSF参数的正常化(*614*, *615*)。因此，对于无HIV感染者或正在接受ART且在治疗后表现出血清学和临床应答的HIV感染者，无需重复进行CSF检查。

性伴侣的管理

参见梅毒，性伴侣的管理。

特殊考虑

青霉素过敏

有限的数据表明，头孢曲松1-2 g每日IM或IV，持续10-14天，可作为神经梅毒患者的替代治疗方案(*603*, *616*, *617*)。头孢曲松与青霉素之间可能发生交叉过敏；然而，第三代头孢菌素与青霉素之间交叉反应的风险可忽略不计(*618 - 621*)(见青霉素过敏史者的管理)。如果对神经梅毒患者使用头孢曲松的安全性存在顾虑，应进行皮肤试验以确认青霉素过敏，如有必要，建议在专科医生会诊下进行青霉素脱敏。其他方案尚未针对神经梅毒的治疗进行充分评估。

妊娠

对青霉素过敏的孕妇应进行脱敏并以青霉素G治疗。皮肤试验或口服梯度青霉素剂量激发试验可能有助于识别有急性过敏反应风险的女性(见青霉素过敏史者的管理)。

HIV感染

合并神经梅毒的HIV感染者应按照无HIV感染者的方案进行治疗(见HIV感染者中的梅毒)。

梅毒在HIV感染者中

诊断考虑

对HIV感染者进行密螺旋体和非密螺旋体血清学检测的解释与无HIV感染者相同。尽管罕见，但在合并梅毒的HIV感染者中已观察到不寻常的血清学反应。大多数报告涉及治疗后血清学滴度高于预期(即高血清固定)或出现波动，也有假阴性血清学检测结果和血清反应性延迟出现的报告(622)。

当临床表现提示梅毒，但血清学检测无反应性或结果解释不明确时，替代检测(如病灶活检、暗视野检查或病灶材料PCR)可能有助于诊断。在HIV感染者的神经系统、眼部及其他体征和症状的鉴别诊断中，应考虑神经梅毒、眼梅毒和耳梅毒。

治疗

HIV感染者若患有早期梅毒，其神经系统并发症的风险可能增加(623)，且采用推荐方案的血清学应答不足率可能更高。这些风险的程度尚未精确界定，但可能较小。尽管缺乏长期(>1年)的比较数据，但尚无证据表明任何梅毒治疗方案在预防HIV感染者神经梅毒方面比推荐用于无HIV感染者的梅毒方案更有效(609)。治疗后仔细随访至关重要。按照当前HIV指南使用ART可能改善HIV与梅毒合并感染者的临床结局；关于HIV感染者梅毒充分治疗的顾虑可能不适用于HIV病毒学抑制者(*624*, *625*)。

HIV感染者的早期与二期梅毒

HIV感染者中原发性和二期梅毒的推荐方案
苄星青霉素G 240万单位，单次肌内注射

现有数据表明，在HIV感染者的原发性和二期梅毒中，额外剂量的苄星青霉素G、阿莫西林或其他抗生素并不会增强疗效(*592*, *593*, *609*)。

其他管理考虑

大多数HIV感染者对原发性和二期梅毒的推荐苄星青霉素G治疗方案应答适当(626)。CSF异常(如单核细胞增多和蛋白水平升高)在HIV感染者中可能常见，即使在没有梅毒者中也是如此。在无神经系统症状的原发性和二期梅毒患者中，此类CSF实验室异常的临床和预后意义

is unknown. Certain studies have demonstrated that among persons with HIV infection and syphilis, CSF abnormalities are associated with a CD4+ T-cell count of ≤350 cells/mL or an RPR titer of ≥1:32 (*614*,*627*). However, CSF examination followed by treatment for neurosyphilis on the basis of laboratory abnormalities has not been associated with improved clinical outcomes in the absence of neurologic signs and symptoms. All persons with HIV infection and primary and secondary syphilis should have a thorough neurologic, ocular, and otic examination (*614*,*622*,*625*). CSF examination should be reserved for those with an abnormal neurologic examination.

Follow-Up

Persons with HIV infection and primary or secondary syphilis should be evaluated clinically and serologically for possible treatment failure at 3, 6, 9, 12, and 24 months after therapy; those who meet the criteria for treatment failure (i.e., signs or symptoms that persist or recur or a sustained [>2 weeks] fourfold or greater increase in titer) should be managed in the same manner as persons without HIV infection (i.e., depending on history of sexual activity and on findings of neurologic examination, either repeat treatment with weekly injections of benzathine penicillin G 2.4 million units IM for 3 weeks or CSF examination and repeat treatment guided by CSF findings) (see Primary and Secondary Syphilis).

In addition, CSF examination and retreatment can be considered for persons whose nontreponemal test titers do not decrease fourfold within 24 months of therapy. If CSF examination is normal, treatment with benzathine penicillin G administered as 2.4 million units IM at weekly intervals for 3 weeks is recommended. Serologic titers might not decrease despite a negative CSF examination and a repeated 3-week course of therapy (*599*). Especially if the initial nontreponemal titer is low (<1:8) in these circumstances, the benefit of additional therapy or repeated CSF examinations is unclear but is not usually recommended. Serologic and clinical monitoring at least annually should continue to monitor for any sustained increases in nontreponemal titer.

Management of Sex Partners

See Syphilis, Management of Sex Partners.

Special Considerations

Penicillin Allergy

Persons with HIV infection who are allergic to penicillin and have primary or secondary syphilis should be managed according to the recommendations for persons without HIV who are allergic to penicillin (see Primary and Secondary Syphilis). Persons with penicillin allergy whose compliance with alternative therapy or follow-up cannot be ensured should be desensitized and treated with penicillin G (see Management of Persons Who Have a History of Penicillin Allergy). Using penicillin alternatives has not been well studied among persons with HIV infection; azithromycin is not recommended for persons with HIV and primary or secondary syphilis infection. Alternative therapies should be used only in conjunction with close serologic and clinical follow-up. Persons with HIV and latent syphilis should be treated similarly to persons who do not have HIV (see Latent Syphilis).

Latent Syphilis Among Persons with HIV Infection

Recommended Regimen for Early Latent Syphilis Among Persons with HIV Infection

Benzathine penicillin G 2.4 million units IM in a single dose

Recommended Regimen for Late Latent Syphilis or Latent Syphilis of Unknown Duration Among Persons with HIV Infection

Benzathine penicillin G 7.2 million units total, administered as 3 doses of 2.4 million units IM at 1-week intervals

Other Management Considerations

All persons with HIV and latent syphilis infection should undergo a thorough neurologic, ocular, and otic examination; those with neurologic symptoms or signs should undergo immediate CSF examination. In the absence of neurologic symptoms or signs, CSF examination has not been associated with improved clinical outcomes and therefore is not recommended. Those with ocular or otic symptoms or signs should be evaluated for ocular syphilis and otosyphilis according to those clinical presentations (see Neurosyphilis, Ocular Syphilis, and Otosyphilis).

Follow-Up

Patients with HIV and latent syphilis infection should be evaluated clinically and serologically at 6, 12, 18, and 24 months after therapy. Those persons who meet the criteria for treatment failure (i.e., signs or symptoms that persist or recur or a sustained [>2 weeks] fourfold or greater increase in titer) should be managed in the same manner as persons without HIV (i.e., depending on history of sexual activity and on findings of neurologic examination, either repeat treatment with weekly injections of benzathine penicillin G 2.4 million units IM for 3 weeks or CSF examination and repeat treatment guided by CSF findings) (see Latent Syphilis).

In addition, CSF examination and retreatment can be considered for persons whose nontreponemal test titers do not decrease fourfold within 24 months of therapy. If CSF examination is normal, treatment with benzathine penicillin G administered as 2.4 million units IM at weekly intervals for

尚不清楚。某些研究表明，在HIV感染合并梅毒的患者中，CSF异常与CD4 + T细胞计数≤350 cells/mL或RPR滴度≥1:32相关(*614*, *627*)。然而，在无神经系统体征和症状的情况下，基于实验室异常进行CSF检查继而治疗神经梅毒，并未与改善的临床结局相关。所有HIV感染合并一期和二期梅毒的患者均应进行全面的神经系统、眼部和耳部检查(*614*, *622*, *625*)。CSF检查应保留用于神经系统检查异常者。

随访

HIV感染合并一期或二期梅毒的患者应在治疗后3、6、9、12和24个月进行临床和血清学评估，以判断是否存在可能的治疗失败；符合治疗失败标准者(即体征或症状持续存在或复发，或滴度持续[>2周]升高四倍或以上)应按无HIV感染者的相同方式管理(即根据性活动史和神经系统检查结果，要么重复治疗，采用苄星青霉素G 2.4 million units IM每周注射，共3周，要么进行CSF检查并根据CSF结果指导重复治疗)(见一期和二期梅毒)。

此外，对于非密螺旋体试验滴度在治疗后24个月内未下降四倍者，可考虑进行CSF检查和重复治疗。如果CSF检查正常，推荐使用苄星青霉素G 2.4 million units IM，每周间隔给药，共3周。尽管CSF检查阴性且重复了3周疗程的治疗，血清学滴度仍可能不下降(599)。特别是在这些情况下，如果初始非密螺旋体滴度较低(<1:8),额外治疗或重复CSF检查的获益尚不明确,但通常不推荐。应继续至少每年进行血清学和临床监测,以监测非密螺旋体滴度的任何持续升高。

性伴侣的管理

参见梅毒，性伴侣的管理。

特殊考虑

青霉素过敏

对青霉素过敏且患有原发性或二期梅毒的HIV感染者应按照对青霉素过敏的无HIV感染者的建议进行管理(见原发性和二期梅毒)。对青霉素过敏且无法确保其依从替代治疗或随访的患者应应进行脱敏并使用青霉素G治疗(参见青霉素过敏史者的管理)。在HIV感染者中，青霉素替代方案尚未得到充分研究；阿奇霉素不推荐用于HIV合并一期或二期梅毒感染者。替代疗法仅应在密切的血清学和临床随访下使用。HIV合并潜伏梅毒者的治疗应与无HIV感染者相似(参见潜伏梅毒)。

HIV感染者中的潜伏梅毒

HIV感染者中早期潜伏梅毒的推荐方案

苄星青霉素G 240万单位，单次肌内注射

HIV感染者中晚期潜伏梅毒或病期不明的潜伏梅毒的推荐方案

感染

苄星青霉素G总剂量7.2 million units，分3次给药，每次2.4 million units IM，间隔1周

其他管理考虑

所有HIV合并潜伏梅毒感染者均应接受全面的神经、眼和耳部检查；有神经系统症状或体征者应立即进行CSF检查。在无神经系统症状或体征的情况下，CSF检查与临床结局改善无关，因此不推荐进行。有眼部或耳部症状或体征者应根据相应临床表现评估眼梅毒和耳梅毒(参见神经梅毒、眼梅毒和耳梅毒)。

随访

HIV合并潜伏梅毒感染患者应在治疗后6、12、18和24个月进行临床和血清学评估。符合治疗失败标准者(即体征或症状持续存在或复发，或滴度持续[>2周]升高四倍或以上)应按无HIV感染者的相同方式管理(即根据性活动史和神经系统检查结果，要么重复治疗，每周注射苄星青霉素G 2.4 million units IM，共3周，要么进行CSF检查并根据CSF结果指导重复治疗)(参见潜伏梅毒)。

此外，对于非密螺旋体试验滴度在治疗后24个月内未下降四倍者，可考虑进行CSF检查和再治疗。如果CSF检查正常，推荐以苄星青霉素G 2.4 million units IM、每周间隔给药，持续

3 weeks is recommended. Serologic titers might not decrease despite a negative CSF examination and a repeated 3-week course of therapy (*599*). Especially if the initial nontreponemal titer is low (<1:8) in these circumstances, the benefit of additional therapy or repeated CSF examinations is unclear but is not usually recommended. Serologic and clinical monitoring at least annually should continue to ensure nontreponemal titers remain stable without any sustained titer increases.

Management of Sex Partners

See Syphilis, Management of Sex Partners.

Special Considerations

Penicillin Allergy

The efficacy of alternative nonpenicillin regimens for latent syphilis for persons living with HIV infection has not been well studied, and these therapies should be used only in conjunction with close serologic and clinical follow-up. Patients with penicillin allergy whose compliance with alternative therapy or follow-up cannot be ensured should be desensitized and treated with penicillin G (see Management of Persons Who Have a History of Penicillin Allergy).

Neurosyphilis, Ocular Syphilis, and Otic Syphilis Among Persons with HIV Infection

All persons with HIV and syphilis infection should receive a careful neurologic ocular and otic examination. Persons with HIV infection and neurosyphilis should be treated according to the recommendations for persons with neurosyphilis and without HIV infection (see Neurosyphilis, Ocular Syphilis, and Otosyphilis).

Follow-Up

Persons with HIV and neurosyphilis infection should be managed according to the recommendations for persons without HIV infection. Serum RPR can be followed for necessary treatment success rather than following CSF parameters (see Neurosyphilis, Ocular Syphilis, and Otosyphilis). Limited data indicate that changes in CSF parameters might occur more slowly among persons with HIV infection, especially those with more advanced immunosuppression (*588*,*624*).

Management of Sex Partners

See Syphilis, Management of Sex Partners.

Special Considerations

Penicillin Allergy

Persons with HIV who are allergic to penicillin and have neurosyphilis infection should be managed according to the recommendations for persons without HIV infection with neurosyphilis who are allergic to penicillin (see Neurosyphilis, Ocular Syphilis, and Otosyphilis). Small observational studies conducted among persons with HIV and neurosyphilis report that ceftriaxone 1–2 g IV daily for 10–14 days might be effective as an alternative agent (*628*–*630*). The possibility of cross-sensitivity between ceftriaxone and penicillin exists; however, the risk for penicillin cross-reactivity between third-generation cephalosporins is negligible (*619*–*621*,*631*) (see Management of Persons Who Have a History of Penicillin Allergy). If concern exists regarding the safety of ceftriaxone for a person with HIV and neurosyphilis, skin testing should be performed to confirm penicillin allergy and, if necessary, penicillin desensitization in consultation with a specialist is recommended. Other regimens have not been adequately evaluated for treatment of neurosyphilis.

Syphilis During Pregnancy

All women should be screened serologically for syphilis at the first prenatal care visit (*174*), which is mandated by the majority of states (*142*). Among populations for whom receipt of prenatal care is not optimal, serologic screening and treatment (if serologic test is reactive) should be performed at the time of pregnancy testing (*632*). Antepartum screening can be performed by manual nontreponemal antibody testing (e.g., RPR) by using the traditional syphilis screening algorithm or by treponemal antibody testing (e.g., immunoassays) using the reverse sequence algorithm.

Pregnant women with positive treponemal screening tests (e.g., EIA, CIA, or immunoblot) should have additional quantitative nontreponemal testing because titers are essential for monitoring treatment response. Serologic testing should also be performed twice during the third trimester: at 28 weeks' gestation and at delivery for pregnant women who live in communities with high rates of syphilis and for women who have been at risk for syphilis acquisition during pregnancy.

Maternal risk factors for syphilis during pregnancy include sex with multiple partners, sex in conjunction with drug use or transactional sex, late entry to prenatal care (i.e., first visit during the second trimester or later) or no prenatal care, methamphetamine or heroin use, incarceration of the woman or her partner, and unstable housing or homelessness (*174*,*633*–*636*). Moreover, as part of the management of pregnant women who have syphilis, providers should obtain information concerning ongoing risk behaviors and treatment of sex partners to assess the risk for reinfection.

Any woman who has a fetal death after 20 weeks' gestation should be tested for syphilis. No mother or neonate should leave the hospital without maternal serologic status having been

3周。尽管CSF检查阴性并重复了3周疗程的治疗，血清学滴度仍可能不下降(599)。特别是在这些情况下初始非密螺旋体滴度较低(<1:8)时,额外治疗或重复CSF检查的获益尚不明确,但通常不推荐。应继续至少每年进行血清学和临床监测,以确保非密螺旋体滴度保持稳定,无任何持续性的滴度升高。

性伴侣的管理

参见梅毒，性伴侣的管理。

特殊考虑

青霉素过敏

替代非青霉素方案治疗HIV感染者潜伏梅毒的疗效尚未得到充分研究，这些疗法仅应在密切的血清学和临床随访下使用。对青霉素过敏且无法确保其依从替代治疗或随访的患者应进行脱敏并以青霉素G治疗(见青霉素过敏史者的管理)。

HIV感染者中的神经梅毒、眼梅毒和耳梅毒

所有合并梅毒感染的HIV感染者均应接受仔细的神经系统、眼部和耳部检查。合并神经梅毒的HIV感染者应按照无HIV感染的神经梅毒患者的建议进行治疗(见神经梅毒、眼梅毒和耳梅毒)。

随访

合并神经梅毒感染的HIV感染者应按照无HIV感染者的建议进行管理。可随访血清RPR以评估必要的治疗成功，而非随访CSF参数(见神经梅毒、眼梅毒和耳梅毒)。有限的数据表明，HIV感染者中CSF参数的变化可能发生得更慢，尤其是免疫抑制更严重者(*588*, *624*)。

性伴侣的管理

参见梅毒，性伴侣的管理。

特殊考虑

青霉素过敏

对青霉素过敏且合并神经梅毒感染的HIV感染者应按照对青霉素过敏的无HIV感染神经梅毒患者的推荐(参见神经梅毒、眼梅毒和耳梅毒)。在HIV合并神经梅毒患者中开展的小型观察性研究报告，头孢曲松1-2 g IV每日一次，共10-14天，可能作为替代药物有效(*628 - 630*)。头孢曲松与青霉素之间存在交叉过敏的可能性；然而，第三代头孢菌素与青霉素发生交叉反应的风险可忽略不计(*619 - 621*, *631*)(参见青霉素过敏史者的管理)。如果对HIV合并神经梅毒患者使用头孢曲松的安全性存在担忧，应进行皮肤试验以确认青霉素过敏，如有必要，建议在专科医生会诊下进行青霉素脱敏。其他方案尚未在神经梅毒治疗中得到充分评估。

梅毒妊娠期

所有女性应在首次产前保健就诊时接受梅毒血清学筛查(174)，这是大多数州强制要求的(142)。在产前保健接受情况不理想的人群中，应在妊娠检测时进行血清学筛查和治疗(如果血清学试验呈反应性)(632)。产前筛查可通过使用传统梅毒筛查算法的手工非密螺旋体抗体检测(如RPR)或使用反向序列算法的密螺旋体抗体检测(如免疫测定)进行。

密螺旋体筛查试验(如EIA、CIA或免疫印迹)阳性的孕妇应进行额外的定量非密螺旋体检测，因为滴度对于监测治疗应答至关重要。对于居住在梅毒高发社区的孕妇以及在妊娠期间有梅毒感染风险的女性，还应在妊娠晚期进行两次血清学检测：妊娠28周时和分娩时。

妊娠期梅毒的孕产妇危险因素包括多性伴、性行为合并药物使用或性交易、晚进入产前保健(即首次就诊在妊娠中期或之后)或无产前保健、甲基苯丙胺或海洛因使用、妇女或其伴侣被监禁，以及住房不稳定或无家可归(*174*,*633 - 636*)。此外，作为梅毒孕妇管理的一部分，提供者应获取有关持续危险行为和性伴侣治疗的信息，以评估再感染风险。

任何在妊娠20周后发生胎儿死亡的女性均应进行梅毒检测。任何母亲或新生儿不应在妊娠期间至少一次记录母体血清学状态之前出院。

documented at least once during pregnancy. Any woman who at the time of delivery has no prenatal care history or has been at risk for syphilis acquisition during pregnancy (e.g., misuses drugs; has had another STI during pregnancy; or has had multiple sex partners, a new partner, or a partner with an STI) should have the results of a syphilis serologic test documented before discharge.

Diagnostic Considerations

Pregnant women seropositive for syphilis should be considered infected unless an adequate treatment history is clearly documented in the medical records and sequential serologic antibody titers have decreased as recommended for the syphilis stage. The risk for antepartum fetal infection or congenital syphilis at delivery is related to the syphilis stage during pregnancy, with the highest risk occurring during the primary and secondary stages. Quantitative maternal nontreponemal titer, especially if >1:8, might be a marker of early infection and bacteremia. However, risk for fetal infection is still substantial among pregnant women with late latent syphilis and low titers. Pregnant women with stable, serofast low nontreponemal titers who have previously been treated for syphilis might not require additional treatment; however, increasing or high antibody titers in a pregnant woman previously treated might indicate reinfection or treatment failure, and treatment should be offered.

If an automated treponemal test (e.g., EIA or CIA) is used for antepartum syphilis screening, all positive tests should be reflexed to a quantitative nontreponemal test (e.g., RPR or VDRL). If the nontreponemal test is negative, the results are considered discrepant and a second treponemal test (TP-PA is preferred) should be performed, preferably on the same specimen.

If the second treponemal test is positive (e.g., EIA positive, RPR negative, or TP-PA positive), current or previous syphilis infection can be confirmed. For women with a history of adequately treated syphilis who do not have ongoing risk, no further treatment is necessary. Women without a history of treatment should have the syphilis stage determined and should be treated accordingly with a recommended penicillin regimen.

If the second treponemal test is negative (e.g., EIA positive, RPR negative, or TP-PA negative), the positive EIA or CIA is more likely to represent a false-positive test result for women who are living in communities with low rates of syphilis, have a partner who is uninfected, and have no history of treated syphilis (*637*,*638*). If the woman is at low risk for syphilis, lacks signs or symptoms of primary syphilis, has a partner with no clinical or serologic evidence of syphilis, and is likely to follow up with clinical care, repeat serologic testing within 4 weeks can be considered to determine whether the EIA or CIA remains positive or if the RPR, VDRL, or TP-PA result becomes positive. If both the RPR and TP-PA remain negative, no further treatment is necessary. If follow-up is not likely, women with an isolated reactive treponemal test and without a history of treated syphilis should be treated according to the syphilis stage.

Treatment

Penicillin G is the only known effective antimicrobial for treating fetal infection and preventing congenital syphilis (*639*). Evidence is insufficient to determine the optimal penicillin regimen during pregnancy (*640*).

Recommended Regimen for Syphilis During Pregnancy
Pregnant women should be treated with the recommended penicillin regimen for their stage of infection

Other Management Considerations

The following recommendations should be considered for pregnant women with syphilis infection:

- Certain evidence indicates that additional therapy is beneficial for pregnant women to prevent congenital syphilis. For women who have primary, secondary, or early latent syphilis, a second dose of benzathine penicillin G 2.4 million units IM can be administered 1 week after the initial dose (*641*–*643*).
- When syphilis is diagnosed during the second half of pregnancy, management should include a sonographic fetal evaluation for congenital syphilis. However, this evaluation should not delay therapy. Sonographic signs of fetal or placental syphilis (e.g., hepatomegaly, ascites, hydrops, fetal anemia, or a thickened placenta) indicate a greater risk for fetal treatment failure (*644*); cases accompanied by these signs should be managed in consultation with obstetric specialists. A second dose of benzathine penicillin G 2.4 million units IM after the initial dose might be beneficial for fetal treatment in these situations.
- Women treated for syphilis during the second half of pregnancy are at risk for premature labor or fetal distress if the treatment precipitates the Jarisch-Herxheimer reaction (*590*). These women should be advised to seek obstetric attention after treatment if they notice any fever, contractions, or decrease in fetal movements. Stillbirth is a rare complication of treatment; however, concern for this complication should not delay necessary treatment. No data are available to support that corticosteroid treatment alters the risk for treatment-related complications during pregnancy.
- Missed doses >9 days between doses are not acceptable for pregnant women receiving therapy for late latent syphilis (*613*). An optimal interval between doses is 7 days for pregnant women. If a pregnant woman does not return for the next dose on day 7, every effort should be made

任何在分娩时无产前保健史或在妊娠期间有梅毒感染风险(如滥用药物；妊娠期间患有其他STI；或有多个性伴侣、新性伴侣或患有STI的性伴侣)的女性，应在出院前记录梅毒血清学检测结果。

诊断考虑

梅毒血清学阳性的孕妇应被视为感染，除非病历中明确记录了充分的治疗史，且连续血清学抗体滴度已按梅毒分期建议下降。产前胎儿感染或分娩时先天性梅毒的风险与妊娠期梅毒分期相关，最高风险发生在一期和二期。母亲非密螺旋体定量滴度，尤其是>1:8时，可能是早期感染和菌血症的标志。然而，晚期潜伏梅毒且滴度低的孕妇胎儿感染风险仍然很大。既往接受过梅毒治疗、非密螺旋体滴度稳定且血清固定低的孕妇可能不需要额外治疗；然而，既往接受过治疗的孕妇抗体滴度升高或高滴度可能提示再感染或治疗失败，应提供治疗。

如果使用自动化密螺旋体检测(如EIA或CIA)进行产前梅毒筛查，所有阳性检测均应反射至定量非密螺旋体检测(如RPR或VDRL)。如果非密螺旋体检测为阴性，则结果被视为不一致，应进行第二种密螺旋体检测(首选TP-PA)，最好在同一标本上进行。

如果第二种密螺旋体检测为阳性(如EIA阳性、RPR阴性或TP-PA阳性)，则可确认当前或既往梅毒感染。对于有充分治疗梅毒史且无持续风险的女性，无需进一步治疗。无治疗史的女性应确定梅毒分期，并相应地以推荐青霉素方案进行治疗。

如果第二种密螺旋体试验为阴性(例如，EIA阳性、RPR阴性或TP-PA阴性)，对于居住在梅毒低流行社区、伴侣未感染且无治疗梅毒史的妇女，阳性EIA或CIA更可能代表假阳性试验结果(*637*,*638*)。如果妇女梅毒风险低、无一期梅毒体征或症状、伴侣无梅毒临床或血清学证据，且可能随访临床护理，可考虑在4周内重复血清学检测，以确定EIA或CIA是否仍阳性或RPR、VDRL或TP-PA结果是否转为阳性。如果RPR和TP-PA均仍阴性，则无需进一步

需要进行治疗。如果不太可能进行随访，对于孤立性密螺旋体试验反应性且无治疗梅毒史的女性，应根据梅毒分期进行治疗。

治疗

青霉素G是唯一已知对治疗胎儿感染和预防先天性梅毒有效的抗菌药物(639)。证据不足以确定妊娠期间的最佳青霉素方案(640)。

妊娠期梅毒推荐治疗方案
孕妇应按照其感染分期接受推荐的青霉素方案治疗

其他管理考虑

对于感染梅毒的孕妇，应考虑以下建议：

- 某些证据表明，额外的治疗是
  对孕妇预防先天性梅毒有益。对于患有早期梅毒、二期梅毒或早期潜伏梅毒的妇女，可在初始剂量后1周给予第二剂苄星青霉素G 2.4 million units IM(641-643)。

- 当梅毒在妊娠后半期被诊断时
  妊娠期，管理应包括针对先天性梅毒的超声胎儿评估。然而，该评估不应延迟治疗。胎儿或胎盘梅毒的超声征象(如肝大、腹水、水肿、胎儿贫血或胎盘增厚)提示胎儿治疗失败的风险更高(644)；伴有这些征象的病例应与产科专家协商管理。第二剂苄星青霉素G

- 在妊娠后半期接受梅毒治疗的女性
  如果治疗诱发吉海反应，妊娠有早产或胎儿窘迫风险(590)。应建议这些妇女在治疗后如发现任何发热、宫缩或胎动减少，应寻求产科关注。死胎是治疗的罕见并发症；然而，对该并发症的担忧不应延迟必要治疗。尚无数据支持皮质类固醇治疗会改变妊娠期治疗相关并发症的风险。

- 两剂之间错过超过9天是不可接受的
  孕妇接受晚期潜伏梅毒治疗
  (613)。对于孕妇，剂量之间的最佳间隔为7天。如果孕妇在第7天未返回接受下一剂，应尽一切努力

to contact her and link her to immediate treatment within 2 days to avoid retreatment. Pregnant women who miss a dose of therapy should repeat the full course of therapy.
- All women who have syphilis should be offered testing for HIV at the time of diagnosis.

Follow-Up

Coordinated prenatal care and treatment are vital because providers should document that women are adequately treated for the syphilis stage and ensure that the clinical and antibody responses are appropriate for the patient's disease stage. If syphilis is diagnosed and treated at or before 24 weeks' gestation, serologic titers should not be repeated before 8 weeks after treatment (e.g., at 32 weeks' gestation) but should be repeated again at delivery. Titers should be repeated sooner if reinfection or treatment failure is suspected. For syphilis diagnosed and treated after 24 weeks' gestation, serologic titers should be repeated at delivery.

A majority of women will not achieve a fourfold decrease in titers before delivery, although this does not indicate treatment failure (*645*). However, a fourfold increase in titer after treatment (e.g., from 1:8 to 1:32) that is sustained for >2 weeks is concerning for reinfection or treatment failure. Nontreponemal titers can increase immediately after treatment, presumably related to the treatment response. Therefore, unless symptoms and signs exist of primary or secondary syphilis, follow-up titer should not be repeated until approximately 8 weeks after treatment. Inadequate maternal treatment is likely if delivery occurs within 30 days of therapy, clinical signs of infection are present at delivery, or the maternal antibody titer at delivery is fourfold higher than the pretreatment titer.

Management of Sex Partners

See Syphilis, Management of Sex Partners.

Special Considerations

Penicillin Allergy

No proven alternatives to penicillin are available for treatment of syphilis during pregnancy. Pregnant women who have a history of penicillin allergy should be desensitized and treated with penicillin G. Skin testing or oral graded penicillin dose challenge might be helpful in identifying women at risk for acute allergic reactions (see Management of Persons Who Have a History of Penicillin Allergy).

Tetracycline and doxycycline are to be avoided in the second and third trimesters of pregnancy (*431*). Erythromycin and azithromycin should not be used because neither reliably cures maternal infection nor treats an infected fetus (*640*). Data are insufficient to recommend ceftriaxone or other cephalosporins for treatment of maternal infection and prevention of congenital syphilis (*646*,*647*).

HIV Infection

Placental inflammation from congenital syphilis infection might increase the risk for perinatal transmission of HIV. All women with HIV infection should be evaluated for syphilis and receive a penicillin regimen appropriate for the syphilis stage. Data are insufficient to recommend any alternative regimens for pregnant women with syphilis and HIV infection (see Syphilis Among Persons with HIV).

Congenital Syphilis

The rate of reported congenital syphilis in the United States has increased dramatically since 2012. During 2019, a total of 1,870 cases of congenital syphilis were reported, including 94 stillbirths and 34 infant deaths (*141*). The 2019 national rate of 48.5 cases per 100,000 live births represents a 41% increase relative to 2018 (34.3 cases per 100,000 live births) and a 477% increase relative to 2012 (8.4 cases per 100,000 live births). During 2015–2019, the rate of congenital syphilis increased 291.1% (12.4 to 48.5 per 100,000 live births), which mirrors increases in the rate of primary and secondary syphilis among females aged 15–44 years (a 171.9% increase, from 3.2 to 8.7 per 100,000 females).

Effective prevention and detection of congenital syphilis depend on identifying syphilis among pregnant women and, therefore, on the routine serologic screening of pregnant women during the first prenatal visit and at 28 weeks' gestation and at delivery for women who live in communities with high rates of syphilis, women with HIV infection, or those who are at increased risk for syphilis acquisition. Certain states have recommended screening three times during pregnancy for all women; clinicians should screen according to their state's guidelines.

Maternal risk factors for syphilis during pregnancy include sex with multiple partners, sex in conjunction with drug use or transactional sex, late entry to prenatal care (i.e., first visit during the second trimester or later) or no prenatal care, methamphetamine or heroin use, incarceration of the woman or her partner, and unstable housing or homelessness (*174*,*633*–*636*). Moreover, as part of the management of pregnant women who have syphilis, providers should obtain information concerning ongoing risk behaviors and treatment of sex partners to assess the risk for reinfection.

Routine screening of neonatal sera or umbilical cord blood is not recommended because diagnosis at that time does not prevent congenital syphilis in certain newborns. No mother or newborn infant should leave the hospital without maternal

联系她并在2天内将她链接到立即治疗，以避免重新治疗。错过一剂治疗的孕妇应重复完整疗程的治疗。

- 所有患有梅毒的女性都应接受以下检测：诊断时感染HIV。

随访

协调的产前保健和治疗至关重要，因为提供者应记录妇女针对梅毒分期接受了充分治疗，并确保临床和抗体反应适合患者疾病分期。如果在妊娠24周或之前诊断并治疗梅毒，血清学滴度不应在治疗后8周前重复(例如，妊娠32周时)，但应在分娩时再次重复。如果怀疑再感染或治疗失败，应更早重复滴度。对于妊娠24周后诊断并治疗的梅毒，应在分娩时重复血清学滴度。

大多数女性在分娩前不会实现滴度四倍下降，尽管这并不表明治疗失败(645)。然而，治疗后滴度四倍升高(例如，从1:8升至1:32)并持续>2周，提示再感染或治疗失败，值得关注。非密螺旋体滴度可在治疗后立即升高，推测与治疗反应有关。因此，除非存在一期或二期梅毒的症状和体征，否则在治疗后约8周之前不应重复随访滴度。如果分娩发生在治疗30天内、分娩时存在感染的临床体征，或分娩时母体抗体滴度比治疗前滴度高四倍，则母体治疗可能不充分。

性伴侣的管理

参见梅毒，性伴侣的管理。

特殊考虑

青霉素过敏

妊娠期梅毒治疗没有经验证的青霉素替代方案。有青霉素过敏史的孕妇应脱敏并接受青霉素G治疗。皮肤试验或口服分级青霉素剂量激发试验可能有助于识别有急性过敏反应风险的妇女(见有青霉素过敏史者的管理)。

妊娠第二和第三个三月期应避免使用四环素和多西环素(431)。不应使用红霉素和阿奇霉素，因为二者均不能可靠治愈母体感染，也不能治疗感染的胎儿(640)。数据不足以推荐头孢曲松或其他头孢菌素

用于治疗母体感染和预防先天性梅毒(*646*,*647*)。

HIV感染

先天性梅毒感染引起的胎盘炎症可能增加HIV围产期传播的风险。所有HIV感染妇女均应接受梅毒评估，并接受适合其梅毒分期的青霉素方案。数据不足以推荐对感染梅毒和HIV的孕妇使用任何替代方案(见HIV感染者中的梅毒)。

先天性梅毒

自2012年以来，美国报告的先天性梅毒发病率急剧上升。2019年期间，共报告1,870例先天性梅毒病例，包括94例死产和34例婴儿死亡(141)。2019年全国发病率为每100,000活产48.5例，较2018年(每100,000活产34.3例)增加41%，较2012年(每100,000活产8.4例)增加477%。2015-2019年期间，先天性梅毒发病率增加291.1%(从每100,000活产12.4例增至48.5例)，这与15-44岁女性一期和二期梅毒发病率的上升相呼应(增加171.9%，从每100,000女性3.2例增至8.7例)。

先天性梅毒的有效预防和检测取决于识别妊娠女性中的梅毒，因此取决于在首次产前检查时、妊娠28周时以及分娩时对妊娠女性进行常规血清学筛查，筛查对象包括居住在梅毒高发病率社区的女性、HIV感染女性或梅毒感染风险增加的女性。某些州已建议对所有女性在妊娠期间筛查三次；临床医生应根据其所在州的指南进行筛查。

妊娠期梅毒的孕产妇危险因素包括多性伴、性行为合并药物使用或性交易、晚进入产前保健(即首次就诊在妊娠中期或之后)或无产前保健、甲基苯丙胺或海洛因使用、妇女或其伴侣被监禁，以及住房不稳定或无家可归(*174*,*633 - 636*)。此外，作为梅毒孕妇管理的一部分，提供者应获取有关持续危险行为和性伴侣治疗的信息，以评估再感染风险。

不推荐对新生儿血清或脐带血进行常规筛查，因为此时诊断不能预防某些新生儿的先天性梅毒。任何母亲或新生儿都不应在未进行母亲

serologic status having been documented at least once during pregnancy. Any woman who had no prenatal care before delivery or is considered at increased risk for syphilis acquisition during pregnancy should have the results of a syphilis serologic test documented before she or her neonate is discharged. A quantitative RPR is needed at the time of delivery to compare with the neonate's nontreponemal test result. If a stat RPR is unavailable and a rapid treponemal test is performed at delivery, the results should be confirmed by using standard syphilis serologic laboratory tests (e.g., RPR and treponemal test) and algorithms.

Evaluation and Treatment of Neonates

Diagnosis of congenital syphilis can be difficult because maternal nontreponemal and treponemal immunoglobulin G (IgG) antibodies can be transferred through the placenta to the fetus, complicating the interpretation of reactive serologic tests for syphilis among neonates (infants aged <30 days). Therefore, treatment decisions frequently must be made on the basis of identification of syphilis in the mother; adequacy of maternal treatment; presence of clinical, laboratory, or radiographic evidence of syphilis in the neonate; and comparison of maternal (at delivery) and neonatal nontreponemal serologic titers (e.g., RPR or VDRL) by using the same test, preferably conducted by the same laboratory. Any neonate at risk for congenital syphilis should receive a full evaluation and testing for HIV.

All neonates born to mothers who have reactive nontreponemal and treponemal test results should be evaluated with a quantitative nontreponemal serologic test (RPR or VDRL) performed on the neonate's serum because umbilical cord blood can become contaminated with maternal blood and yield a false-positive result, and Wharton's jelly within the umbilical cord can yield a false-negative result. The nontreponemal test performed on the neonate should be the same type of nontreponemal test performed on the mother.

Conducting a treponemal test (e.g., TP-PA, immunoassay-EIA, CIA, or microbead immunoassay) on neonatal serum is not recommended because it is difficult to interpret, as passively transferred maternal antibodies can persist for >15 months. Commercially available IgM tests are not recommended.

All neonates born to women who have reactive nontreponemal serologic tests for syphilis at delivery should be examined thoroughly for evidence of congenital syphilis (e.g., nonimmune hydrops, conjugated or direct hyperbilirubinemia† or cholestatic jaundice or cholestasis, hepatosplenomegaly, rhinitis, skin rash, or pseudoparalysis of an extremity). Pathologic examination of the placenta or umbilical cord using specific staining (e.g., silver) or a *T. pallidum* PCR test using a CLIA-validated test should be considered; direct fluorescence antibody (DFA-TP) reagents are unavailable (*565*). Darkfield microscopic examination or PCR testing of suspicious lesions or body fluids (e.g., bullous rash or nasal discharge) also should be performed. In addition to these tests, for stillborn infants, skeletal survey demonstrating typical osseous lesions might aid in the diagnosis of congenital syphilis because these abnormalities are not detected on fetal ultrasound.

The following scenarios describe the recommended congenital syphilis evaluation and treatment of neonates born to women who had reactive nontreponemal and treponemal serologic tests for syphilis during pregnancy (e.g., RPR reactive, TP-PA reactive or EIA reactive, RPR reactive) and have a reactive nontreponemal test at delivery (e.g., RPR reactive). Maternal history of infection with *T. pallidum* and treatment for syphilis should be considered when evaluating and treating the neonate for congenital syphilis in most scenarios, except when congenital syphilis is proven or highly probable.

Scenario 1: Confirmed Proven or Highly Probable Congenital Syphilis

Any neonate with

- an abnormal physical examination that is consistent with congenital syphilis;
- a serum quantitative nontreponemal serologic titer that is fourfold§ (or greater) higher than the mother's titer at delivery (e.g., maternal titer = 1:2, neonatal titer ≥1:8 or maternal titer = 1:8, neonatal titer ≥1:32)¶; or
- a positive darkfield test or PCR of placenta, cord, lesions, or body fluids or a positive silver stain of the placenta or cord.

Recommended Evaluation

- CSF analysis for VDRL, cell count, and protein**

† Direct hyperbilirubinemia is direct bilirubin level >2 mg/dL (34 umol/L) or 20% of the total bilirubin level.

§ One dilution is within the test performance of nontreponemal tests and is not a significant change.

¶ The absence of a fourfold or greater titer for a neonate does not exclude congenital syphilis.

** Interpretation of CSF test results requires a nontraumatic lumbar puncture (i.e., a CSF sample that is not contaminated with blood). CSF test results obtained during the neonatal period can be difficult to interpret; normal values differ by gestational age and are higher among preterm infants. Studies indicate that 95% of healthy neonates have values of ≤16–19 WBCs/mm^3 or protein levels of ≤115–118 mg/dL on CSF examination. During the second month of life, 95% of healthy infants have ≤9–11 WBCs/mm^3 or protein levels of ≤89–91 mg/dL. Lower values (i.e., 5 WBCs/mm^3 and protein level of 40 mg/dL) might be considered the upper limits of normal for older infants. Other causes of elevated values should be considered when an infant is being evaluated for congenital syphilis (**Sources:** Kestenbaum LA, Ebberson J, Zorc JJ, Hodinka RL, Shah SS. Defining cerebrospinal fluid white blood cell count reference values in neonates and young infants. Pediatrics 2010;125:257–64; Shah SS, Ebberson J, Kestenbaum LA, Hodinka RL, Zorc JJ. Age-specific reference values for cerebrospinal fluid protein concentration in neonates and young infants. J Hosp Med 2011;6:22–7; Thomson J, Sucharew H, Cruz AT, et al.; Pediatric Emergency Medicine Collaborative Research Committee [PEM CRC] HSV Study Group. Cerebrospinal fluid reference values for young infants undergoing lumbar puncture. Pediatrics 2018;141:e20173405.)

血清学状态已在妊娠期间至少记录一次。任何在分娩前未接受产前保健或在妊娠期间被认为梅毒感染风险增加的女性，应在其本人或新生儿出院前记录梅毒血清学检测结果。分娩时需要定量RPR，以与新生儿的非密螺旋体检测结果进行比较。如果无法获得即时RPR而在分娩时进行了快速密螺旋体检测，则应使用标准梅毒血清学实验室检测(例如，RPR和密螺旋体检测)及算法确认结果。

新生儿的评估与治疗

先天性梅毒的诊断可能较为困难，因为母体非密螺旋体和密螺旋体免疫球蛋白G(IgG)抗体可通过胎盘转移至胎儿，使新生儿(年龄<30天的婴儿)梅毒反应性血清学检测结果的解读复杂化。因此,治疗决策常常必须基于以下方面:母体梅毒的识别;母体治疗的充分性;新生儿是否存在梅毒的临床、实验室或影像学证据;以及使用相同检测(最好由同一实验室进行)比较母体(分娩时)和新生儿非密螺旋体血清学滴度(例如,RPR或VDRL)。任何有先天性梅毒风险的新生儿都应接受全面评估和HIV检测。

所有母亲非密螺旋体试验和密螺旋体试验结果呈反应性的新生儿，均应使用新生儿的血清进行定量非密螺旋体血清学试验(RPR或VDRL)以进行评估，因为脐带血可能被母血污染而产生假阳性结果，而脐带内的华通胶可产生假阴性结果。对新生儿进行的非密螺旋体试验应与对母亲进行的非密螺旋体试验为同一类型。

不推荐对新生儿血清进行密螺旋体试验(如TP-PA、免疫测定-EIA、CIA或微珠免疫测定)，因为难以解释，被动转移的母体抗体可持续>15个月。不推荐市售IgM检测。

所有在分娩时梅毒非密螺旋体血清学试验呈反应性的妇女所生的新生儿，均应进行全面检查以寻找先天性梅毒的证据(例如，非免疫性水肿、结合性或直接高胆红素血症†或胆汁淤积性黄疸或胆汁淤积、肝脾肿大、鼻炎、皮疹或肢体假性瘫痪)。使用特异性染色(例如银染)或使用*T.pallidum* PCR检测对胎盘或脐带进行病理学检查

† 直接高胆红素血症为直接胆红素水平>2 mg/dL(34 umol/L)或总胆红素水平的20%。

应考虑CLIA验证的检测；直接荧光抗体(DFA-TP)试剂不可用(565)。还应对可疑病变或体液(如大疱性皮疹或鼻分泌物)进行暗视野显微镜检查或PCR检测。除这些检测外，对于死产婴儿，显示典型骨病变的骨骼检查可能有助于先天性梅毒的诊断，因为这些异常在胎儿超声上检测不到。

以下情形描述了对于在妊娠期间梅毒非密螺旋体试验和密螺旋体血清学试验呈反应性(例如，RPR反应性、TP-PA反应性或EIA反应性、RPR反应性)且在分娩时非密螺旋体试验呈反应性(例如，RPR反应性)的妇女所生新生儿，推荐的先天性梅毒评估和治疗。在大多数情形下，在评估和治疗新生儿先天性梅毒时，应考虑母亲*T.pallidum*感染史及梅毒治疗史，但先天性梅毒已确诊或高度可能时除外。

情景1：确诊为确诊或高度可能的先天性梅毒

任何新生儿，若•体格检查异常且符合

先天性梅毒；

- 血清定量非密螺旋体血清学滴度，即四倍(或更高)高于母亲分娩时的滴度(例如，母亲滴度=1:2，新生儿滴度≥1:8或母亲滴度=1:8，新生儿滴度≥1:32)¶；或•胎盘、脐带、病变或

体液或胎盘或脐带银染色阳性。

推荐评估

- 脑脊液分析：VDRL、细胞计数和蛋白质**

一个稀释度处于非密螺旋体试验的检测性能范围内，且不一个显著的变化。

¶ 新生儿缺乏四倍或更高滴度并不排除先天性梅毒。

* 解读CSF检测结果需要非创伤性腰椎穿刺(即未被血液污染的CSF样本)。新生儿期获得的CSF检测结果可能难以解读；正常值因胎龄而异，早产儿中更高。研究表明，95%的健康新生儿CSF检查值≤16-19个WBC/mm^{3}或蛋白水平≤115-118 mg/dL。在出生后第二个月，95%的健康婴儿≤9-11个WBC/mm^{3}或蛋白水平≤89-91 mg/dL。较低的值(即5个WBC/mm^{3}和蛋白水平40 mg/dL)可被视为较大婴儿的正常上限。在评估婴儿先天性梅毒时，应考虑数值升高的其他原因(**来源：** Kestenbaum LA, Ebberson J, Zorc JJ, Hodinka RL, Shah SS.Defining cerebrospinal fluid white blood cell count reference values in neonates and young infants.Pediatrics 2010;125:257-64; Shah SS, Ebberson J, Kestenbaum LA, Hodinka RL, Zorc JJ.Age-specific reference values for cerebrospinal fluid protein concentration in neonates and young infants.J Hosp Med 2011;6:22-7; Thomson J, Sucharew H, Cruz AT, et al.; Pediatric Emergency Medicine Collaborative Research Committee[PEM CRC] HSV Study Group.cerebrospinal fluid reference values for young infants undergoing lumbar puncture.Pediatrics 2018;141:e20173405.)

- Complete blood count (CBC) and differential and platelet count
- Long-bone radiographs
- Other tests as clinically indicated (e.g., chest radiograph, liver function tests, neuroimaging, ophthalmologic examination, and auditory brain stem response)

Recommended Regimens, Confirmed or Highly Probable Congenital Syphilis

Aqueous crystalline penicillin G 100,000–150,000 units/kg body weight/day, administered as 50,000 units/kg body weight/dose IV every 12 hours during the first 7 days of life and every 8 hours thereafter for a total of 10 days
or
Procaine penicillin G 50,000 units/kg body weight/dose IM in a single daily dose for 10 days

If >1 day of therapy is missed, the entire course should be restarted. Data are insufficient regarding use of other antimicrobial agents (e.g., ampicillin). When possible, a full 10-day course of penicillin is preferred, even if ampicillin was initially provided for possible sepsis (*648–650*). Using agents other than penicillin requires close serologic follow-up for assessing therapy adequacy.

Scenario 2: Possible Congenital Syphilis

Any neonate who has a normal physical examination and a serum quantitative nontreponemal serologic titer equal to or less than fourfold of the maternal titer at delivery (e.g., maternal titer = 1:8, neonatal titer ≤1:16) and one of the following:

- The mother was not treated, was inadequately treated, or has no documentation of having received treatment.
- The mother was treated with erythromycin or a regimen other than those recommended in these guidelines (i.e., a nonpenicillin G regimen).††
- The mother received the recommended regimen but treatment was initiated <30 days before delivery.

Recommended Evaluation

- CSF analysis for VDRL, cell count, and protein**
- CBC, differential, and platelet count
- Long-bone radiographs

This evaluation is not necessary if a 10-day course of parenteral therapy is administered, although such evaluations might be useful. For instance, a lumbar puncture might document CSF abnormalities that would prompt close follow-up. Other tests (e.g., CBC, platelet count, and long-bone radiographs) can be performed to further support a diagnosis of congenital syphilis.

†† A women treated with a regimen other than recommended in these guidelines should be considered untreated.

Recommended Regimens, Possible Congenital Syphilis

Aqueous crystalline penicillin G 100,000–150,000 units/kg body weight/day, administered as 50,000 units/kg body weight/dose IV every 12 hours during the first 7 days of life and every 8 hours thereafter for a total of 10 days
or
Procaine penicillin G 50,000 units/kg body weight/dose IM in a single daily dose for 10 days
or
Benzathine penicillin G 50,000 units/kg body weight/dose IM in a single dose

Before using the single-dose benzathine penicillin G regimen, the recommended evaluation (i.e., CSF examination, long-bone radiographs, and CBC with platelets) should be normal, and follow-up should be certain. If any part of the neonate's evaluation is abnormal or not performed, if the CSF analysis is uninterpretable because of contamination with blood, or if follow-up is uncertain, a 10-day course of penicillin G is required.

If the neonate's nontreponemal test is nonreactive and the provider determines that the mother's risk for untreated syphilis is low, treatment of the neonate with a single IM dose of benzathine penicillin G 50,000 units/kg body weight for possible incubating syphilis can be considered without an evaluation. Neonates born to mothers with untreated early syphilis at the time of delivery are at increased risk for congenital syphilis, and the 10-day course of penicillin G should be considered even if the neonate's nontreponemal test is nonreactive, the complete evaluation is normal, and follow-up is certain.

Scenario 3: Congenital Syphilis Less Likely

Any neonate who has a normal physical examination and a serum quantitative nontreponemal serologic titer equal or less than fourfold of the maternal titer at delivery (e.g., maternal titer = 1:8, neonatal titer ≤1:16) and both of the following are true:

- The mother was treated during pregnancy, treatment was appropriate for the infection stage, and the treatment regimen was initiated ≥30 days before delivery.
- The mother has no evidence of reinfection or relapse.

Recommended Evaluation

No evaluation is recommended.

Recommended Regimen, Congenital Syphilis Less Likely

Benzathine penicillin G 50,000 units/kg body weight/dose IM in a single dose*

* Another approach involves not treating the newborn if follow-up is certain but providing close serologic follow-up every 2–3 months for 6 months for infants whose mothers' nontreponemal titers decreased at least fourfold after therapy for early syphilis or remained stable for low-titer, latent syphilis (e.g., VDRL <1:2 or RPR <1:4).

- 全血细胞计数(CBC)及分类计数和血小板计数
- 长骨X线片
- 根据临床指征进行其他检查(例如，胸部X光片，肝功能检查、神经影像学、眼科检查和听觉脑干反应)

推荐方案，确诊或高度可能的先天性梅毒

水剂结晶青霉素G100,000-150,000 units/kg体重/天，在出生后前7天每12小时以50,000 units/kg体重/剂IV给药，此后每8小时给药一次，共10天

或
普鲁卡因青霉素G50,000 units/kg体重/剂IM，每日单次给药，共10天

如果错过>1天治疗，应重新开始整个疗程。关于使用其他抗菌药物(如氨苄西林)的数据不足。在可能的情况下，首选完整10天青霉素疗程，即使最初因可能的脓毒症而给予了氨苄西林(*648-650*)。使用青霉素以外的药物需要密切的血清学随访以评估治疗充分性。

情景2：可能的先天性梅毒

任何体格检查正常且分娩时血清定量非密螺旋体血清学滴度等于或低于母亲滴度四倍(例如，母亲滴度=1:8，新生儿滴度≤1:16)并具有以下一项的新生儿：

- 母亲未接受治疗、治疗不充分，或无接受治疗的记录。
- 母亲接受了erythromycin或一种治疗方案除本指南推荐以外(即非青霉素G方案)。††
- 母亲接受了推荐方案，但治疗在分娩前<30天开始。

推荐评估

- 脑脊液分析：VDRL、细胞计数和蛋白质**
- 全血细胞计数、分类及血小板计数
- 长骨X线片

如果给予10天胃肠外治疗疗程，则不需要该评估，尽管此类评估可能有用。例如，腰椎穿刺可能记录到会促使密切随访的CSF异常。可进行其他检测(如CBC、血小板计数和长骨X线片)以进一步支持先天性梅毒的诊断。

†† 接受非本指南推荐方案治疗的女性应视为未治疗。

推荐方案，可能先天性梅毒

水剂结晶青霉素G100,000-150,000 units/kg体重/天，在出生后前7天每12小时以50,000 units/kg体重/剂IV给药，此后每8小时给药一次，共10天

或
普鲁卡因青霉素G50,000 units/kg体重/剂IM，每日单次给药，共10天

或
苄星青霉素G50,000 units/kg体重/剂IM，单次给药

在使用单剂苄星青霉素G方案之前，推荐的评估(即CSF检查、长骨X线片和带血小板的CBC)应正常，且随访应确定。如果新生儿评估的任何部分异常或未进行，如果CSF分析因血液污染而无法解释，或如果随访不确定，则需要10天青霉素G疗程。

如果新生儿的非密螺旋体试验无反应性，且提供者判定母亲未治疗梅毒的风险较低，可考虑在不进行评估的情况下，对新生儿给予单次IM剂量苄星青霉素G 50,000 units/kg体重治疗可能的潜伏梅毒。分娩时母亲患有未治疗早期梅毒的新生儿发生先天性梅毒的风险增加，即使新生儿的非密螺旋体试验无反应性、完整评估正常且随访确定，也应考虑10天疗程的青霉素G。

情景3：先天性梅毒可能性较低

任何体格检查正常且分娩时血清定量非密螺旋体血清学滴度等于或低于母亲滴度四倍(例如，母亲滴度=1:8，新生儿滴度≤1:16)且以下两项均成立的新生儿：

- 母亲在孕期接受了治疗，治疗是适合感染分期，且治疗方案在分娩前≥30天开始。
- 母亲没有再次感染或复发的证据。

推荐评估

不建议进行评估。

推荐方案：先天性梅毒可能性较低

苄星青霉素G50,000 units/kg体重/剂IM，单次给药*

* 另一种方法包括：如果随访确定，则不治疗新生儿，但对母亲非密螺旋体滴度在早期梅毒治疗后至少下降四倍或低滴度潜伏梅毒保持稳定(例如，VDRL<1:2或RPR<1:4)的婴儿,每2-3个月进行密切血清学随访,持续6个月。

Scenario 4: Congenital Syphilis Unlikely

Any neonate who has a normal physical examination and a serum quantitative nontreponemal serologic titer equal to or less than fourfold of the maternal titer at delivery[§] and both of the following are true:

- The mother's treatment was adequate before pregnancy.
- The mother's nontreponemal serologic titer remained low and stable (i.e., serofast) before and during pregnancy and at delivery (e.g., VDRL ≤1:2 or RPR ≤1:4).

Recommended Evaluation

No evaluation is recommended.

Recommended Regimen, Congenital Syphilis Unlikely

No treatment is required. However, any neonate with reactive nontreponemal tests should be followed serologically to ensure the nontreponemal test returns to negative (see Follow-Up). Benzathine penicillin G 50,000 units/kg body weight as a single IM injection might be considered, particularly if follow-up is uncertain and the neonate has a reactive nontreponemal test.

The following situations describe management of neonates born to women screened during pregnancy by using the reverse sequence algorithm with reactive treponemal serologic tests and a nonreactive nontreponemal serologic test.

Reactive maternal treponemal serologies with a nonreactive nontreponemal serology (e.g., EIA reactive, RPR nonreactive, or TP-PA reactive) during pregnancy. Syphilis is highly unlikely for neonates born to mothers with a nonreactive nontreponemal test after adequate treatment for syphilis during pregnancy or documentation of adequate treatment before pregnancy (with no evidence of reinfection of relapse). If testing is performed again at delivery and 1) the maternal nontreponemal test remains nonreactive and 2) the neonate has a normal physical examination and nonreactive nontreponemal test (e.g., RPR nonreactive), the provider should consider managing similarly to Scenario 4 without a laboratory evaluation and with no treatment required. Benzathine penicillin G 50,000 units/kg body weight as a single IM injection might be considered if syphilis exposure is possible within 1 month of delivery and follow-up of the mother and infant is uncertain.

Isolated reactive maternal treponemal serology (e.g., EIA reactive, RPR nonreactive, or TP-PA nonreactive) during pregnancy. Syphilis is unlikely for neonates born to mothers screened with the reverse sequence algorithm with isolated reactive maternal treponemal serology. Among low-prevalence populations, these are likely false-positive results and might become nonreactive with repeat testing (*638*). If these neonates have a normal physical examination and the risk for syphilis is low in the mother, no evaluation and treatment are recommended for the neonate. If syphilis exposure is possible or unknown in the mother or the mother desires further evaluation to definitively rule out syphilis, repeat serology within 4 weeks is recommended to evaluate for early infection (see Syphilis During Pregnancy).

Isolated reactive maternal treponemal serology (e.g., rapid treponemal test) at delivery. For mothers with late or no prenatal care with a reactive rapid treponemal test at delivery, confirmatory laboratory-based testing should be performed; however, results should not delay evaluation and treatment of the neonate. These neonates should be evaluated and treated with a 10-day course of penicillin as recommended in Scenario 1, and consultation with a specialist is recommended.

Follow-Up

All neonates with reactive nontreponemal tests should receive thorough follow-up examinations and serologic testing (i.e., RPR or VDRL) every 2–3 months until the test becomes nonreactive.

For a neonate who was not treated because congenital syphilis was considered less likely or unlikely, nontreponemal antibody titers should decrease by age 3 months and be nonreactive by age 6 months, indicating that the reactive test result was caused by passive transfer of maternal IgG antibody. At age 6 months, if the nontreponemal test is nonreactive, no further evaluation or treatment is needed; if the nontreponemal test is still reactive, the infant is likely infected and should be treated.

Treated neonates who exhibit persistent nontreponemal test titers by age 6–12 months should be reevaluated through CSF examination and managed in consultation with an expert. Retreatment with a 10-day course of a penicillin G regimen might be indicated.

Neonates with a negative nontreponemal test at birth and whose mothers were seroreactive at delivery should be retested at age 3 months to rule out serologically negative incubating congenital syphilis at the time of birth. Treponemal tests should not be used to evaluate treatment response because the results are qualitative, and passive transfer of maternal IgG treponemal antibody might persist for >15 months.

Neonates whose initial CSF evaluations are abnormal do not need repeat lumbar puncture unless they exhibit persistent nontreponemal serologic test titers at age 6–12 months. Persistent nontreponemal titers and CSF abnormalities should be managed in consultation with an expert.

Special Considerations

Penicillin Allergy

Neonates who require treatment for congenital syphilis but who have a history of penicillin allergy or develop an allergic reaction presumed secondary to penicillin should

情景4：先天性梅毒可能性低

任何体格检查正常且分娩时血清定量非密螺旋体血清学滴度等于或低于母亲滴度四倍且以下两项均成立的新生儿：

- 母亲在妊娠前已接受充分治疗。
- 母亲的非密螺旋体血清学滴度保持低水平且在妊娠前、妊娠期间和分娩时稳定(即血清固定)(例如，VDRL ≤1:2 或 RPR ≤1:4)。

推荐评估

不建议进行评估。

推荐方案，先天性梅毒可能性低

无需治疗。然而，任何非梅毒螺旋体试验反应性的新生儿都应进行血清学随访，以确保非梅毒螺旋体试验转为阴性(见随访)。可考虑苄星青霉素G 50,000 units/kg 体重单次IM注射，特别是当随访不确定且新生儿非梅毒螺旋体试验为反应性时。

以下情况描述了通过反向序列算法筛查、梅毒螺旋体血清学试验反应性且非梅毒螺旋体血清学试验无反应性的孕妇所生新生儿的处理。

妊娠期间母体密螺旋体血清学呈反应性而非密螺旋体血清学呈无反应性(例如EIA反应性、RPR无反应性，或TP-PA反应性)。对于母亲在妊娠期间接受充分梅毒治疗后或记录显示妊娠前已接受充分治疗(无再感染或复发证据)且非密螺旋体试验呈无反应性的新生儿，梅毒的可能性极低。如果在分娩时再次检测且1)母体非密螺旋体试验仍呈无反应性，且2)新生儿体格检查正常且非密螺旋体试验呈无反应性(例如RPR无反应性)，则提供者应考虑按情景4管理，不进行实验室评估且无需治疗。如果分娩后1个月内可能存在梅毒暴露且母亲和婴儿的随访不确定，可考虑苄星青霉素G 50,000 units/kg体重单次IM注射。

妊娠期间孤立的母体密螺旋体血清学呈反应性(例如EIA反应性、RPR无反应性，或TP-PA无反应性)。对于采用反向序列算法筛查且母体密螺旋体血清学呈孤立反应性的母亲所生的新生儿，梅毒的可能性不大。在低患病率人群中，这些很可能是假阳性结果，重复检测后可能变为无反应性(638)。如果这些新生儿体格检查正常且母亲梅毒风险低，则无需评估和治疗推荐用于新生儿。如果母亲可能存在或不确定有梅毒暴露，或母亲希望进一步评估以明确排除梅毒，建议在4周内重复血清学检查以评估早期感染(见妊娠期梅毒)。

孤立的反应性母体梅毒螺旋体血清学(例如，快速梅毒螺旋体试验)在分娩时。对于晚孕期或无产前保健、分娩时快速梅毒螺旋体试验反应性的母亲，应进行实验室确认试验；但结果不应延迟新生儿的评估和治疗。这些新生儿应按情景1所述进行评估并接受10天青霉素疗程治疗，并建议咨询专家。

随访

所有非梅毒螺旋体试验反应性的新生儿都应接受全面的随访检查，并每2-3个月进行一次血清学检测(即RPR或VDRL)，直至试验转为无反应性。

对于因先天性梅毒被认为可能性较小或不太可能而未接受治疗的新生儿，非密螺旋体抗体滴度应在3月龄时下降，并在6月龄时呈无反应性，表明反应性检测结果是由母体IgG抗体的被动转移所致。在6月龄时，若非密螺旋体试验呈无反应性，则无需进一步评估或治疗；若非密螺旋体试验仍呈反应性，则该婴儿很可能已感染，应接受治疗。

接受治疗的新生儿若在6-12月龄时非梅毒螺旋体试验滴度持续存在，应通过CSF检查重新评估，并在专家咨询下进行管理。可能需要以10天青霉素G方案重新治疗。

出生时非梅毒螺旋体试验阴性且母亲在分娩时血清反应性的新生儿，应在3月龄时重新检测，以排除出生时血清学阴性的潜伏先天性梅毒。梅毒螺旋体试验不应用于评估治疗反应，因为结果为定性，且母体IgG梅毒螺旋体抗体的被动转移可能持续>15个月。

初始CSF评估异常的新生儿无需重复腰椎穿刺，除非在6-12月龄时非梅毒螺旋体血清学试验滴度持续存在。持续性非梅毒螺旋体滴度和CSF异常应在专家咨询下进行管理。

特殊考虑

青霉素过敏

需要治疗先天性梅毒但有青霉素过敏史或出现推测继发于青霉素的过敏反应的新生儿应

be desensitized and then treated with penicillin G (see Management of Persons Who Have a History of Penicillin Allergy). Skin testing remains unavailable for neonates because the procedure has not been standardized for this age group. Data are insufficient regarding use of other antimicrobial agents (e.g., ceftriaxone) for congenital syphilis among neonates. If a nonpenicillin G agent is used, close clinical and serologic follow-up is required in consultation with an expert. Repeat CSF examination should be performed if the initial CSF examination was abnormal.

Penicillin Shortage

During periods when the availability of aqueous crystalline penicillin G is compromised, the following is recommended (https://www.cdc.gov/std/treatment/drug-notices.htm):

- For neonates with clinical evidence of congenital syphilis (see Scenario 1), check local sources for aqueous crystalline penicillin G (potassium or sodium) and notify CDC and FDA of limited supply. If IV penicillin G is limited, substitute some or all daily doses with procaine penicillin G (50,000 units/kg body weight/dose IM/day in a single daily dose for 10 days).
- If aqueous or procaine penicillin G is unavailable, ceftriaxone (50–75 mg/kg body weight/day IV every 24 hours) can be considered with thorough clinical and serologic follow-up and in consultation with an expert because evidence is insufficient to support using ceftriaxone for treating congenital syphilis. Ceftriaxone should be used with caution in neonates with jaundice.
- For neonates without any clinical evidence of congenital syphilis (see Scenario 2 and Scenario 3), use
  - procaine penicillin G 50,000 units/kg body weight/dose/day IM in a single dose for 10 days, or
  - benzathine penicillin G 50,000 units/kg body weight IM as a single dose.
- If any part of the evaluation for congenital syphilis is abnormal or was not performed, CSF examination is not interpretable, or follow-up is uncertain, procaine penicillin G is recommended. A single dose of ceftriaxone is inadequate therapy.
- For premature neonates who have no clinical evidence of congenital syphilis (see Scenario 2 and Scenario 3) and might not tolerate IM injections because of decreased muscle mass, IV ceftriaxone can be considered with thorough clinical and serologic follow-up and in consultation with an expert. Ceftriaxone dosing should be adjusted according to birthweight.

HIV Infection

Evidence is insufficient to determine whether neonates who have congenital syphilis and HIV infection or whose mothers have HIV require different therapy or clinical management than is recommended for all neonates. All neonates with congenital syphilis should be managed similarly, regardless of HIV status.

Evaluation and Treatment of Infants and Children with Congenital Syphilis

Infants and children aged ≥1 month who are identified as having reactive serologic tests for syphilis (e.g., RPR reactive, TP-PA reactive or EIA reactive, RPR reactive) should be examined thoroughly and have maternal serology and records reviewed to assess whether they have congenital or acquired syphilis (see Primary and Secondary Syphilis; Latent Syphilis; Sexual Assault or Abuse of Children). In the case of extremely early or incubating syphilis at the time of delivery, all maternal serologic tests might have been negative; thus, infection might be undetected until a diagnosis is made later in the infant or child. Any infant or child at risk for congenital syphilis should receive a full evaluation and testing for HIV infection.

International adoptee, immigrant, or refugee children from countries where treponemal infections (e.g., yaws or pinta) are endemic might have reactive nontreponemal and treponemal serologic tests, which cannot distinguish between syphilis and other subspecies of *T. pallidum* (*651*). These children might also have syphilis (*T. pallidum* subspecies *pallidum*) and should be evaluated for congenital syphilis.

Recommended Evaluation

The following evaluations should be performed:

- CSF analysis for VDRL, cell count, and protein
- CBC, differential, and platelet count
- Other tests as clinically indicated (e.g., long-bone radiographs, chest radiograph, liver function tests, abdominal ultrasound, ophthalmologic examination, neuroimaging, and auditory brain-stem response)

Recommended Regimen for Congenital Syphilis Among Infants and Children

Aqueous crystalline penicillin G 200,000–300,000 units/kg body weight/day IV, administered as 50,000 units/kg body weight every 4–6 hours for 10 days

If the infant or child has no clinical manifestations of congenital syphilis and the evaluation (including the CSF examination) is normal, treatment with <3 weekly doses of benzathine penicillin G 50,000 units/kg body weight IM can be considered. A single dose of benzathine penicillin G 50,000 units/kg body weight IM up to the adult dose of

进行脱敏，然后使用青霉素G治疗(见青霉素过敏史者的管理)。新生儿仍无法进行皮肤试验，因为该操作尚未在该年龄组标准化。关于新生儿先天性梅毒使用其他抗菌药物(例如头孢曲松)的数据不足。如果使用非青霉素G药物，需要在专家会诊下进行密切的临床和血清学随访。如果初始CSF检查异常，应重复进行CSF检查。

青霉素短缺

在水溶性结晶青霉素G供应受限期间，推荐以下方案(https://www.cdc.gov/std/treatment/drug-notices.htm):

- 对于有先天性梅毒临床证据的新生儿
  (见情景1)，检查当地水溶性结晶青霉素G(钾盐或钠盐)来源，并通知CDC和FDA供应有限。如果IV青霉素G有限，可用普鲁卡因青霉素G替代部分或全部每日剂量(50,000 units/kg 体重/剂 IM/日，单次每日剂量，共10天)。
- 如果水性青霉素G或普鲁卡因青霉素G不可用，
  可考虑头孢曲松(50-75 mg/kg 体重/日 IV 每24小时)，并进行全面的临床和血清学随访及专家咨询，因为证据不足以支持使用头孢曲松治疗先天性梅毒。黄疸新生儿应慎用头孢曲松。
- 对于无任何先天性临床证据的新生儿
  梅毒(见情景2和情景3)，使用
  - 普鲁卡因青霉素G 50,000单位/kg体重/剂量/日 IM，单次给药，持续10天，或
  - 苄星青霉素G 50,000单位/kg体重 IM，单次给药。
- 如果先天性梅毒评估的任何部分
  异常或未进行，CSF检查无法解释，或随访不确定，推荐普鲁卡因青霉素G。单剂头孢曲松不足以治疗。
- 对于无临床证据表明存在
  先天性梅毒(见情景2和情景3)，且可能因肌肉量减少而不能耐受IM注射，可考虑IV头孢曲松，并进行全面的临床和血清学随访及专家咨询。头孢曲松剂量应根据出生体重调整。

HIV感染

证据不足以确定患有先天性梅毒且合并HIV感染的新生儿或其母亲感染HIV的新生儿是否需要与所有新生儿推荐不同的治疗或临床管理。所有先天性梅毒新生儿无论HIV状态如何都应进行类似管理。

婴幼儿和儿童先天性梅毒的评估与治疗

年龄≥1个月且被确定梅毒血清学试验呈反应性(例如RPR反应性、TP-PA反应性或EIA反应性、RPR反应性)的婴儿和儿童应接受全面检查，并审查母体血清学和记录，以评估其患有先天性或获得性梅毒(见一期和二期梅毒；潜伏梅毒；儿童性侵犯或虐待)。如果在分娩时处于极早期或潜伏期梅毒，所有母体血清学试验可能均为阴性；因此，感染可能在婴儿或儿童后期确诊前未被发现。任何有先天性梅毒风险的婴儿或儿童都应接受全面评估和HIV感染检测。

来自梅毒螺旋体感染(例如，雅司病或品他病)流行国家的国际收养、移民或难民儿童可能非梅毒螺旋体试验和梅毒螺旋体血清学试验均为反应性，这无法区分梅毒与*T.pallidum*的其他亚种(651)。这些儿童也可能患有梅毒(T.pallidum subspecies pallidum)，应评估先天性梅毒。

推荐评估

应进行以下评估：

- 进行脑脊液分析，检测VDRL、细胞计数和蛋白质
- 全血细胞计数、分类及血小板计数
- 根据临床指征的其他检查(例如，长骨X线片、胸部X线片、肝功能检查、腹部超声、眼科检查、神经影像学和听觉脑干反应)

婴幼儿和儿童先天性梅毒的推荐方案

水溶性结晶青霉素G 200,000-300,000 units/kg 体重/日 IV，以50,000 units/kg 体重每4-6小时给药，共10天

如果婴幼儿无先天性梅毒临床表现且评估(包括CSF检查)正常，可考虑以<3周剂量的苄星青霉素G 50,000 units/kg 体重 IM治疗。单剂苄星青霉素G 50,000 units/kg 体重 IM,最高至成人剂量

2.4 million units in a single dose can be considered after the 10-day course of IV aqueous penicillin G to provide more comparable duration for treatment in those who have no clinical manifestations and normal CSF. All of these treatment regimens should also be adequate for children who might have other treponemal infections.

Follow-Up

Thorough follow-up examinations and serologic testing (i.e., RPR or VDRL) of infants and children treated for congenital syphilis after the neonatal period (aged >30 days) should be performed every 3 months until the test becomes nonreactive or the titer has decreased fourfold. The serologic response after therapy might be slower for infants and children than neonates. If these titers increase at any point >2 weeks or do not decrease fourfold after 12–18 months, the infant or child should be evaluated (e.g., CSF examination), treated with a 10-day course of parenteral penicillin G, and managed in consultation with an expert. Treponemal tests (e.g., EIA, CIA, or TP-PA) should not be used to evaluate treatment response because the results are qualitative and persist after treatment, and passive transfer of maternal IgG treponemal antibody might persist for >15 months after delivery. Infants or children whose initial CSF evaluations are abnormal do not need repeat lumbar puncture unless their serologic titers do not decrease fourfold after 12–18 months. After 18 months of follow-up, abnormal CSF indices that persist and cannot be attributed to other ongoing illness indicate that retreatment is needed for possible neurosyphilis and should be managed in consultation with an expert.

Special Considerations

Penicillin Allergy

Infants and children who require treatment for congenital syphilis but who have a history of penicillin allergy or develop an allergic reaction presumed secondary to penicillin should be desensitized and treated with penicillin G (see Management of Persons Who Have a History of Penicillin Allergy). Skin testing remains unavailable for infants and children because the procedure has not been standardized for this age group. Data are insufficient regarding use of other antimicrobial agents (e.g., ceftriaxone) for congenital syphilis among infants and children. If a nonpenicillin G agent is used, close clinical, serologic, and CSF follow-up is required in consultation with an expert.

Penicillin Shortage

During periods when availability of penicillin G is compromised, management options are similar to options for the neonate (see Evaluation and Treatment of Neonates).

- For infants and children with clinical evidence of congenital syphilis, if IV penicillin is limited after checking local sources and notifying CDC and FDA about limited supplies, procaine penicillin G (50,000 units/kg body weight/dose IM up to the adult dose of 2.4 million units a day in a single daily dose for 10 days) is recommended.
- If procaine penicillin G is not available, ceftriaxone (in doses for age and weight) can be considered with thorough clinical and serologic follow-up. Infants and children receiving ceftriaxone should be managed in consultation with an expert because evidence is insufficient to support use of ceftriaxone for treatment of congenital syphilis among infants or children. For infants aged ≥30 days, use ceftriaxone 75 mg/kg body weight/day IV or IM in a single daily dose for 10–14 days (dose adjustment might be necessary on the basis of current weight). For children, ceftriaxone 100 mg/kg body weight/day in a single daily dose is recommended.
- For infants and children without any clinical evidence of infection (see Scenario 2 and Scenario 3), use
  - procaine penicillin G 50,000 units/kg body weight/dose IM up to the adult dose of 2.4 million units a day in a single dose for 10 days, or
  - benzathine penicillin G 50,000 units/kg body weight IM up to the adult dose of 2.4 million units as a single dose.
- If any part of the evaluation for congenital syphilis is abnormal or not performed, CSF examination is not interpretable, or follow-up is uncertain, procaine penicillin G is recommended. In these scenarios, a single dose of ceftriaxone is inadequate therapy.

HIV Infection

Evidence is insufficient to determine whether infants and children who have congenital syphilis and HIV infection or whose mothers have HIV require different therapy or clinical management than what is recommended for all infants and children. All infants and children with congenital syphilis should be managed similarly, regardless of HIV status.

Management of Persons Who Have a History of Penicillin Allergy

Penicillin and other ß-lactam antibiotics have a crucial role in treating STIs. Penicillin is recommended for all clinical stages of syphilis, and no proven alternatives exist for treating neurosyphilis, congenital syphilis, or syphilis during pregnancy. Ceftriaxone, a third-generation cephalosporin, is recommended for gonorrhea treatment. For extragenital site infections, especially pharyngeal, failure rates of nonceftriaxone

2.4 可在之后考虑单次给药100万单位
10天IV水溶性青霉素G疗程，为无临床表现且CSF正常者提供更可比的治疗持续时间。所有这些治疗方案对于可能患有其他梅毒螺旋体感染的儿童也应足够。

随访

对新生儿期后(年龄>30天)接受先天性梅毒治疗的婴儿和儿童，应每3个月进行一次全面随访检查和血清学检测(即RPR或VDRL)，直至检测转为无反应性或滴度下降四倍。婴儿和儿童治疗后的血清学反应可能比新生儿更慢。如果这些滴度在任何时间点>2周时升高，或在12-18个月后未下降四倍，则应对该婴儿或儿童进行评估(例如CSF检查)，给予10天疗程的胃肠外青霉素G治疗，并在专家会诊下进行管理。密螺旋体试验(例如EIA、CIA或TP-PA)不应用于评估治疗反应，因为结果为定性且治疗后持续存在，并且母体IgG密螺旋体抗体的被动转移可能在分娩后持续>15个月。初始CSF评估异常的婴儿或儿童不需要重复腰椎穿刺，除非其血清学滴度在12-18个月后未下降四倍。随访18个月后，持续存在且不能归因于其他持续疾病的异常CSF指标表明需要针对可能的神经梅毒进行再治疗，并应在专家会诊下进行管理。

特殊考虑

青霉素过敏

需要接受先天性梅毒治疗但有青霉素过敏史或出现推测继发于青霉素的过敏反应的婴儿和儿童，应进行脱敏并使用青霉素G治疗(见青霉素过敏史者的管理)。皮肤试验对婴儿和儿童仍不可用，因为该操作尚未针对该年龄组进行标准化。关于其他抗菌药物(例如头孢曲松)用于婴儿和儿童先天性梅毒的数据不足。如果使用非青霉素G药物，需要在专家会诊下进行密切的临床、血清学和CSF随访。

青霉素短缺

在青霉素G供应受限期间，管理选择与新生儿的选择相似(见新生儿评估与治疗)。

• 对于有先天性梅毒临床证据的婴幼儿和儿童，如果在检查当地来源并通知CDC和FDA供应有限后IV青霉素仍有限，推荐普鲁卡因青霉素G(50,000 units/kg 体重/剂 IM，最高至成人剂量2.4 million units/日，单次每日剂量，共10天)。• 如果普鲁卡因青霉素G不可用，头孢曲松(剂量

对于年龄和体重)可在全面的临床和血清学随访下考虑。接受头孢曲松的婴儿和儿童应在专家会诊下管理，因为证据不足以支持使用头孢曲松治疗婴儿或儿童的先天性梅毒。对于年龄≥30天的婴儿，使用头孢曲松75 mg/kg体重/天IV或IM，单次每日剂量，持续10-14天(可能需要根据当前体重调整剂量)。对于儿童，推荐头孢曲松100 mg/kg体重/天，单次每日剂量。

• 对于无任何临床证据表明感染的婴儿和儿童感染(见情景2和情景3)，使用
  • 普鲁卡因青霉素G 50,000单位/kg体重/剂
    肌内注射，成人剂量最高为每日240万单位，单次给药，疗程10天，或
  • 苄星青霉素G 50,000单位/kg体重
    肌内注射，单次剂量最高可达成人剂量240万单位。

• 如果先天性梅毒评估的任何部分
  异常或未进行，脑脊液检查结果无法解读，或随访不确定时，推荐使用普鲁卡因青霉素G。在这些情况下，单剂头孢曲松不足以作为治疗。

HIV感染

证据不足以确定患有先天性梅毒和HIV感染或母亲患有HIV的婴幼儿是否需要与所有婴幼儿推荐不同的治疗或临床管理。所有患有先天性梅毒的婴幼儿应接受相同的管理，无论HIV状态如何。

管理of人员谁有a 病史of青霉素过敏

青霉素和其他β-内酰胺类抗生素在治疗STI中具有关键作用。青霉素推荐用于梅毒的所有临床阶段，对于神经梅毒、先天性梅毒或妊娠期梅毒的治疗，尚无经过验证的替代方案。头孢曲松，一种第三代头孢菌素，推荐用于淋病治疗。对于生殖器外部位感染，尤其是咽部，非头孢曲松方案的失败率可能很高。在大多数临床环境中，报告青霉素过敏的患者不使用β-内酰胺类抗菌药物治疗。对于诊断为淋病且同时报告青霉素过敏的患者，通常避免使用头孢曲松，尽管青霉素过敏与第三代头孢菌素之间的交叉反应性较低(-)。

regimens can be substantial. In most clinical settings, patients who report a penicillin allergy are not treated with ß-lactam antimicrobials. For patients with a diagnosis of gonorrhea and a concomitant reported allergy to penicillin, ceftriaxone is often avoided, even though the cross-reactivity between penicillin allergy and third-generation cephalosporins is low (*652*–*654*).

Prevalence of reported allergy to penicillin is approximately 10% among the U.S. population and higher among hospital inpatients and residents in health care–related facilities (*655*–*658*). One large study in an STI clinic revealed that 8.3% of patients reported penicillin or another ß-lactam antibiotic allergy (*659*). Penicillin allergy is often overreported, with the majority of patients who report penicillin allergy able to tolerate the medication (*660*). The prevalence of reported penicillin allergy in low-income countries is unknown; however, limited data indicate that penicillin is one of the most frequently reported antibiotic allergies (*661*).

Patients often are incorrectly labeled as allergic to penicillin and are therefore denied the benefit of a ß-lactam therapy. The presence of a penicillin allergy label considerably reduces prescribing options for affected patients. Moreover, penicillin allergy labels lead to the use of more expensive and less effective drugs and can result in adverse consequences, including longer length of hospital stay and increased risk for infection. Multiple studies have described that persons with reported penicillin or another ß-lactam antibiotic allergy have higher rates of surgical-site infections, methicillin-resistant *Staphylococcus aureus* infections, and higher medical care usage (*653*,*662*–*664*).

The overreported prevalence of penicillin allergy is secondary to imprecise use of the term "allergy" by families and clinicians and lack of clarity to differentiate between immunoglobulin E (IgE)-mediated hypersensitivity reactions, drug intolerances, and other idiosyncratic reactions that can occur days after exposure. Approximately 80% of patients with a true IgE-mediated allergic reaction to penicillin have lost the sensitivity after 10 years (*658*). Thus, patients with recent reactions are more likely to be allergic than patients with remote reactions, and patients who had allergic reactions in the distant past might no longer be reactive.

In a Baltimore, Maryland, STI clinic study, only 7.1% of the patients who reported allergy to penicillin or to another ß-lactam antibiotic had an objective positive test for penicillin allergy (*659*). Moreover, in studies that have incorporated penicillin skin testing and graded oral challenge among persons with reported penicillin allergy, the true rates of allergy are low, ranging from 1.5% to 6.1% (*665*–*667*). Studies in preoperative surgical patients with reported penicillin allergy, evaluated for cardiovascular surgery (*668*) or orthopedics (*669*), have rates of skin test positivity <8.5%. However, when patients with high-risk penicillin allergy histories are excluded, 99% of patients could receive ß-lactams. In hospitalized patients and other populations with comorbidities, the typical rates of validated penicillin allergy among patients who report a history of penicillin allergy are 2.5%–9.0% (*670*–*673*).

Cross-Reactivity with Cephalosporins

Penicillin and cephalosporins both contain a ß-lactam ring. This structural similarity has led to considerable confusion regarding cross-reactivity of these drugs and the risks for allergic reactions from cephalosporins among penicillin-allergic patients. In most clinical settings, patients with reported penicillin allergy are precluded from treatment with such cephalosporin antibiotics as ceftriaxone. Third-generation cephalosporins (e.g., ceftriaxone and cefixime) have lower cross-reactivity with IgE-mediated penicillin-allergic patients (<1%) compared with first- and second-generation cephalosporins (range: 1%–8%). Moreover, anaphylaxis secondary to cephalosporins is extremely rare among persons who report a penicillin allergy and is estimated to occur at a rate of one per 52,000 persons (*652*). Data from the Kaiser health care system reported that among 3,313 patients with self-reported cephalosporin allergy who received a cephalosporin (mostly first generation), no cases of anaphylaxis were reported (*652*). Use of third- and fourth-generation cephalosporins and carbapenems is safe for patients without a history of any IgE-mediated symptoms (e.g., anaphylaxis or urticaria) from penicillin during the preceding 10 years.

Validating Penicillin or Another ß-Lactam Antibiotic Allergy

Evaluating a patient who reports a penicillin or another ß-lactam antibiotic allergy involves three steps: 1) obtaining a thorough medical history, including previous exposures to penicillin or other ß-lactam antibiotics (*658*); 2) performing a skin test evaluation by using the penicillin major and minor determinants; and 3) among those who have a negative penicillin skin test, performing an observed oral challenge with 250 mg amoxicillin before proceeding directly to treatment with the indicated ß-lactam therapy (*667*,*675*).

For persons who have a positive skin test reactive to penicillin (either to the major or minor determinants), treatment with a ß-lactam antibiotic is not usually advised, and other effective antimicrobials should be used (*656*,*658*). For persons among whom the only therapy option is a penicillin antibiotic (e.g., a patient with neurosyphilis or a pregnant woman with syphilis) and among whom a penicillin skin test is positive, induction of penicillin tolerance (also referred to as desensitization) is required (*675*). Desensitization protocols to penicillin should

方案可能相当可观。在大多数临床环境中，报告青霉素过敏的患者不会接受β-内酰胺类抗菌药物治疗。对于诊断为淋病且同时报告青霉素过敏的患者，通常避免使用头孢曲松，尽管青霉素过敏与第三代头孢菌素之间的交叉反应性较低(*652* - *654*)。

在美国人群中，报告的青霉素过敏患病率约为10%，在住院患者和医疗保健相关设施的居民中更高(*655* - *658*)。一项在STI诊所进行的大型研究显示，8.3%的患者报告对青霉素或其他β-内酰胺类抗生素过敏(659)。青霉素过敏常被过度报告，大多数报告青霉素过敏的患者能够耐受该药物(660)。低收入国家报告的青霉素过敏患病率未知；然而，有限的数据表明青霉素是最常报告的抗生素过敏之一(661)。

患者常被错误标记为对青霉素过敏，因此被剥夺了β-内酰胺治疗的好处。青霉素过敏标签的存在大大减少了受影响患者的处方选择。此外，青霉素过敏标签导致使用更昂贵且效果较差的药物，并可能导致不良后果，包括住院时间延长和感染风险增加。多项研究描述，报告对青霉素或其他β-内酰胺类抗生素过敏的人有更高的手术部位感染率、耐甲氧西林金黄色葡萄球菌感染率，以及更高的医疗保健使用率(*653*, *662* - *664*)。

青霉素过敏患病率的过度报告继发于家庭和临床医生对"过敏"一词的不精确使用，以及缺乏明确区分免疫球蛋白E(IgE)介导的超敏反应、药物不耐受和其他可能在暴露后数天发生的特发性反应。大约80%对青霉素有真正IgE介导过敏反应的患者在10年后失去敏感性(658)。因此，近期有反应的患者比远期有反应的患者更可能过敏，而过去远期有过敏反应的患者可能不再有反应性。

在马里兰州巴尔的摩的一项STI诊所研究中，只有7.1%报告对青霉素或其他β-内酰胺类抗生素过敏的患者有客观阳性的青霉素过敏测试(659)。此外，在纳入青霉素皮肤测试和分级口服挑战的研究中，报告青霉素过敏者的真实过敏率较低，范围为1.5%至6.1%(*665* - *667*)。在报告青霉素过敏的术前手术患者中，评估心血管手术(668)或骨科(669)的研究显示皮肤测试阳性率<8.5%。然而,当排除有高风险青霉素过敏史的患者时,99%的患者可以接受β-内酰胺类药物。在住院患者和其他有合并症的人群中，报告有青霉素过敏史的患者中经证实的青霉素过敏的典型发生率为2.5%-9.0%(*670* - *673*)。

交叉反应与头孢菌素类

青霉素和头孢菌素均含有β-内酰胺环。这种结构相似性导致了对这些药物交叉反应性以及青霉素过敏患者使用头孢菌素发生过敏反应风险的相当大混淆。在大多数临床环境中，报告有青霉素过敏的患者被排除使用此类头孢菌素抗生素如头孢曲松。与第一代和第二代头孢菌素(范围：1%-8%)相比，第三代头孢菌素(如头孢曲松和头孢克肟)与IgE介导的青霉素过敏患者的交叉反应性较低(<1%)。此外,在报告青霉素过敏的人群中,继发于头孢菌素的过敏反应极为罕见,估计发生率为每52,000人一例(652)。来自Kaiser医疗系统的数据报告称,在3,313名自报头孢菌素过敏并接受头孢菌素(主要为第一代)的患者中,未报告过敏反应病例(652)。对于过去10年内无青霉素IgE介导症状(如过敏反应或荨麻疹)病史的患者,使用第三和第四代头孢菌素及碳青霉烯类是安全的。

验证青霉素或另一种β-内酰胺抗生素过敏

评估报告青霉素或其他β-内酰胺类抗生素过敏的患者涉及三个步骤：1)获取详尽的病史，包括既往接触青霉素或其他β-内酰胺类抗生素的情况(658);2)使用青霉素主要和次要决定簇进行皮肤试验评估；3)在青霉素皮肤试验阴性的患者中，在进行指示的β-内酰胺治疗之前，进行观察下的250 mg阿莫西林口服激发试验(*667*,*675*)。

对于青霉素皮肤试验阳性(对主要或次要决定簇)的患者，通常不建议使用β-内酰胺类抗生素治疗，应使用其他有效的抗菌药物(*656*,*658*)。对于唯一治疗选择为青霉素类抗生素的患者(如神经梅毒患者或患有梅毒的孕妇)且青霉素皮肤试验阳性者，需要进行青霉素耐受诱导(也称为脱敏)(675)。青霉素脱敏方案应

be performed by allergists, and they require a monitored inpatient environment.

Penicillin Skin Testing

Penicillin skin testing with a major determinant analog (penicilloyl-polylysine) and minor determinants (benzylpenicilloate, benzylpenilloate, or benzylpenicillin isomers of penicillin) are used for skin test evaluation for IgE-dependent penicillin allergy and can reliably identify persons at high risk for IgE-mediated reactions to penicillin (*658*,*660*,*676*). Until recently, penicillin skin testing in the United States only included the major determinant benzyl penicillin poly-L-lysine (Pre-Pen) in addition to penicillin G. This test identifies approximately 90%–99% of the IgE-mediated penicillin-allergic patients. Because the remaining 1%–10% of penicillin-allergic patients who are not captured by this penicillin skin test are due to minor determinants IgE antibodies, the standard practice is to follow skin testing with an observed oral challenge of amoxicillin 250 mg with 1 hour of observation. If the skin test and oral challenge are both negative, the risk for IgE-mediated anaphylaxis approaches zero and is equivalent to that of a person who has never reported an allergy to penicillin.

A revised version of the penicillin skin test kit, which includes the major determinant reagent Pre-Pen, minor determinants, and amoxicillin, is being evaluated by FDA. This penicillin skin test kit has been evaluated among 455 patients (*677*) with previous allergy history and has a negative predictive value of 98%. If approved, this kit might eliminate the need for oral challenge.

Penicillin skin testing has become a clinically significant element in antibiotic stewardship programs, and the procedure has been increasingly used by hospital-based pharmacists, hospitalists, and infectious disease physicians (*670*,*672*,*673*,*678*,*679*) as part of overall antibiotic stewardship interventions. When integrated into stewardship, the rates of ß-lactam antibiotic use increased substantially (*670*).

Recommendations

Persons with a history of severe adverse cutaneous reaction (e.g., Stevens-Johnson syndrome or toxic epidermal necrolysis) and other severe non–IgE-mediated reactions (e.g., interstitial nephritis or hemolytic anemia) are not candidates for penicillin skin testing or challenge. Penicillin and any other ß-lactam antibiotics should be avoided indefinitely among these patients, who should be referred to an allergy center for further evaluation. Similarly, patients who deny penicillin allergy, but who report previous IgE-type reactions to cephalosporins, should be referred to an allergist for specific cephalosporin testing.

In a time of increasing antimicrobial resistance, following recommended use of antibiotic treatments is crucial. STI programs and clinicians should promote increased access to penicillin allergy testing. Allergy testing is being provided by clinicians in primary care and hospital settings. If appropriate, STI programs and ambulatory settings should consider developing expanded access to penicillin or ß-lactam allergy assessment.

Persons with high-risk symptom histories (e.g., anaphylaxis within the previous 10 years) should not be administered penicillin or a ß-lactam antibiotic in an ambulatory setting. Furthermore, these persons with high-risk symptoms should not receive penicillin skin testing or amoxicillin oral challenge in an ambulatory STI setting and should be referred to an allergist for further evaluation.

High-risk symptom histories include development of the following after penicillin or ß-lactam administration: anaphylaxis within 6 hours or severe adverse cutaneous reaction (e.g., eosinophilia and systemic symptoms, Stevens-Johnson syndrome, toxic epidermal necrolysis, or acute generalized exanthematous pustulosis) and other severe non–IgE-mediated reactions (e.g., kidney or hepatic injury, hemolytic anemia, or thrombocytopenia).

Direct Treatment Approach for Ceftriaxone

Among persons with confirmed IgE-mediated penicillin allergy, the level of cross-reactivity with third-generation cephalosporins is low (*652*,*680*,*681*). If a patient has a low-risk history for an IgE-mediated penicillin allergy, ambulatory settings often treat with third-generation cephalosporins without further testing. Low-risk history includes one nonspecific symptom (e.g., gastrointestinal intolerance, headache, fatigue, or nonurticarial rash) (Box 2). In addition, a family history of penicillin or ß-lactam allergy alone is not a contraindication for treatment with ß-lactam antibiotics. This practice is increasingly being used in ambulatory settings and for preoperative prophylaxis (*658*,*663*,*680*,*682–684*).

BOX 2. Low-risk history in patients who report penicillin allergy

Gastrointestinal symptoms
Headache
Pruritis without rash
Localized rash
Delayed onset rash (>24 hours)
Symptoms unknown
Family history of penicillin or another drug allergy
Patient denies allergy but it is on the medical record

由过敏专科医生执行，并且需要监护下的住院环境。

青霉素皮肤试验

使用主要决定簇类似物(青霉噻唑多赖氨酸)和次要决定簇(青霉吡唑酸、青霉噻唑酸或青霉素的苄青霉素异构体)进行青霉素皮肤试验，用于IgE依赖性青霉素过敏的皮肤试验评估，可可靠地识别对青霉素发生IgE介导反应的高风险人群(*658*,*660*,*676*)。直到最近，美国的青霉素皮肤试验仅包括主要决定簇苄青霉素多-L-赖氨酸(Pre-Pen)以及青霉素G。该试验可识别约90%-99%的IgE介导的青霉素过敏患者。由于该青霉素皮肤试验未捕获的剩余1%-10%青霉素过敏患者是由于次要决定簇IgE抗体，标准做法是在皮肤试验后进行观察下的250 mg阿莫西林口服激发试验并观察1小时。如果皮肤试验和口服激发试验均为阴性，IgE介导的过敏反应风险接近于零，等同于从未报告青霉素过敏的人。

青霉素皮肤试验试剂盒的修订版本，包括主要决定簇试剂Pre-Pen、次要决定簇和阿莫西林，正在由FDA评估。该青霉素皮肤试验试剂盒已在455名有既往过敏史的患者中进行了评估(677)，阴性预测值为98%。如果获得批准，该试剂盒可能消除口服激发试验的需要。

青霉素皮肤试验已成为抗生素管理计划中具有临床意义的要素，该程序越来越多地被医院药师、住院医师和感染病医师使用(*670*,*672*,*673*,*678*,*679*)，作为整体抗生素管理干预的一部分。当整合到管理中时，ß-内酰胺类抗生素的使用率大幅增加(670)。

建议

有严重不良皮肤反应史(如Stevens-Johnson综合征或中毒性表皮坏死松解症)和其他严重非IgE介导反应(如间质性肾炎或溶血性贫血)的患者不是青霉素皮肤试验或激发试验的候选者。这些患者应无限期避免使用青霉素和任何其他ß-内酰胺类抗生素，并应转诊至过敏中心进行进一步评估。同样，否认青霉素过敏但报告既往对头孢菌素有过IgE型反应的患者，应转诊至过敏专科医生进行特定的头孢菌素检测。

在抗菌药物耐药日益增加的时代，遵循推荐的抗生素治疗方法至关重要。STI项目和临床医生应促进增加青霉素过敏检测的可及性。过敏检测由初级保健和医院环境中的临床医生提供。如果适当，STI项目和门诊环境应考虑扩大青霉素或ß-内酰胺过敏评估的可及性。

有高风险症状史的人员(例如，过去10年内发生过敏反应)不应在门诊环境中接受青霉素或ß-内酰胺类抗生素。此外，这些有高风险症状的人员不应在门诊STI环境中接受青霉素皮肤试验或阿莫西林口服激发试验，应转诊至过敏专科医生进行进一步评估。

高风险症状史包括在给予青霉素或ß-内酰胺后出现以下情况：6小时内发生过敏反应或严重不良皮肤反应(例如，嗜酸性粒细胞增多和全身症状、Stevens-Johnson综合征、中毒性表皮坏死松解症或急性泛发性发疹性脓疱病)以及其他严重的非IgE介导的反应(例如，肾或肝损伤、溶血性贫血或血小板减少症)。

头孢曲松的直接治疗方案

在确诊为IgE介导的青霉素过敏者中，与第三代头孢菌素的交叉反应水平较低(*652*, *680*, *681*)。如果患者有IgE介导的青霉素过敏的低风险病史，门诊环境通常使用第三代头孢菌素治疗而无需进一步检测。低风险病史包括一种非特异性症状(例如胃肠道不耐受、头痛、乏力或非荨麻疹性皮疹)(Box 2)。此外，仅有青霉素或ß-内酰胺类过敏家族史并不是使用ß-内酰胺类抗生素治疗的禁忌证。这种做法越来越多地用于门诊环境和术前预防(*658*, *663*, *680*, *682 - 684*)。

框 2. 报告青霉素过敏患者的低风险病史

胃肠道症状
头痛
无皮疹的瘙痒
局限性皮疹
迟发型皮疹(>24小时)症状未知
青霉素或其他药物过敏的家族史患者否认过敏但病历上有记录

Patients at Low Risk for Oral Challenge

If the patient gives only a low-risk history of IgE-mediated penicillin allergy that includes symptoms such gastrointestinal intolerance, headache, fatigue, or nonspecific pruritus, or gives a family history only, an oral challenge can be administered to document the absence of allergy (Box 2). If the reaction occurred in the distant past (>10 years), the likelihood is reduced even further (*653*,*658*,*663*,*682*,*683*,*685*,*686*). The risk for severe amoxicillin-mediated anaphylaxis has decreased over time and is rare. In the United Kingdom during 1972–2007, one fatal case of amoxicillin-medicated anaphylaxis was reported (*684*).

Skin Testing for Penicillin Allergy

Skin testing for penicillin allergy should be performed if any indication exists that the symptoms were secondary to an IgE-mediated hypersensitivity. Testing is also indicated as a potential diagnostic procedure to definitively rule out penicillin allergy and document a negative allergy status in the medical record (i.e., delabeling). Because penicillin allergy testing does not test for multiple minor determinants, a person with a negative skin test should follow up with an oral challenge to confirm the negative status.

Persons with negative results of a penicillin skin test, followed by an amoxicillin oral challenge, can receive conventional penicillin therapy safely if needed. Persons with positive skin test results and for whom no other clinical options exist (e.g., neurosyphilis and syphilis in a pregnant woman) should be referred to an allergist and desensitized before initiating treatment.

Testing Procedures

Penicillin skin testing includes use of skin test reagents for identifying persons at risk for adverse reactions (Box 3), followed by initial pinprick screening with penicillin major determinants (Pre-Pen) and penicillin G, followed by intradermal testing if pinprick results are negative. Penicillin testing procedures are performed in accordance with the Pre-Pen test kit instructions (https://penallergytest.com/wp-content/uploads/PRE-PEN-Package-Insert.pdf). Saline negative controls and histamine positive controls are an integral part of the procedure. Penicillin skin testing should not be performed for patients who have taken antihistamines within the past 7 days.

Skin testing can be safely performed by trained nonallergists and has been implemented as an antimicrobial stewardship intervention by internal medicine physicians, pharmacists, hospitalists, and infectious disease physicians (*670*,*673*,*678*,*679*). Patients tested should also receive documentation of status, and the results should be entered in the medical record.

Penicillin skin testing during pregnancy is considered safe. For pregnant persons who report a penicillin or ß-lactam allergy, penicillin allergy is an important consideration in treating syphilis during pregnancy and the potential for group B streptococcal infection and preoperative prophylaxis if a cesarean delivery is required. However, oral challenges should not be performed unless in a setting where additional support services are available.

Managing Persons Being Tested

Patients who have a positive skin test should not receive ß-lactam drugs in the ambulatory setting and should be referred to an allergist or penicillin allergy expert for further evaluation. The allergy testing results should be documented in the medical record. Patients who test negative should be informed that their risk for anaphylaxis is extremely low and is equivalent to a person who does not report an allergy history. If treatment with penicillin or ceftriaxone is indicated, it can be administered safely. Documentation of testing results should be provided to the patient.

Desensitization

Desensitization is required for persons who have a documented penicillin allergy and for whom no therapeutic alternatives exist (e.g., syphilis during pregnancy and persons with neurosyphilis). Modified protocols might be considered

BOX 3. Skin test reagents for identifying persons at risk for adverse reactions to penicillin

Major determinant
- Benzylpenicilloyl polylysine injection (Pre-Pen) (AllerQuest) (6×10^{-5}M)

Minor determinant precursors
- Benzylpenicillin G (10^{-2}M, 3.3 mg/mL, 10,000 units/mL)
- Benzylpenicilloate (10^{-2}M, 3.3 mg/mL)
- Benzylpenicilloate (or penicilloyl propylamine) (10^{-2}M, 3.3 mg/mL)

Aged penicillin is not an adequate source of minor determinants. Penicillin G should either be freshly prepared or come from a fresh-frozen source.

Positive control
- Commercial histamine for scratch testing (1.0 mg/mL)

Negative control
- Diluent (usually saline) or allergen diluent

Source: Adapted from Saxon A, Beall GN, Rohr AS, Adelman DC. Immediate hypersensitivity reactions to beta-lactam antibiotics. Ann Intern Med 1987;107:204–15.

口服激发试验低风险患者

如果患者仅提供IgE介导的青霉素过敏的低风险病史，包括胃肠道不耐受、头痛、乏力或非特异性瘙痒等症状，或仅提供家族史，可进行口服激发试验以记录无过敏(Box 2)。如果反应发生在遥远的过去(>10年)，可能性进一步降低(*653*, *658*, *663*, *682*, *683*, *685*, *686*)。严重阿莫西林介导的过敏性休克的风险随时间推移已降低，且罕见。在英国1972-2007年期间，报告了一例阿莫西林介导的过敏性休克致死病例(684)。

皮肤试验用于青霉素过敏

如果有任何指征表明症状继发于IgE介导的超敏反应，应进行青霉素过敏皮肤试验。检测也作为潜在的诊断程序，以明确排除青霉素过敏并在病历中记录阴性过敏状态(即去标签)。由于青霉素过敏检测不检测多种次要决定簇，皮肤试验阴性者应随后进行口服激发试验以确认阴性状态。

青霉素皮肤试验结果阴性、随后进行阿莫西林口服激发试验的人员，如有需要，可以安全地接受常规青霉素治疗。皮肤试验结果阳性且无其他临床选择的人员(例如，神经梅毒和孕妇梅毒)应转诊至过敏专科医生，在开始治疗前进行脱敏。

检测程序

青霉素皮肤试验包括使用皮肤试验试剂识别有不良反应风险者(Box 3)，随后用青霉素主要决定簇(Pre-Pen)和青霉素G进行初始点刺筛查，如果点刺结果为阴性，则进行皮内试验。青霉素检测程序按照Pre-Pen检测试剂盒说明书执行(https://penallergytest.com/wp-content/uploads/PRE-PEN- Package-Insert.pdf)。生理盐水阴性对照和组胺阳性对照是程序的组成部分。过去7天内服用过抗组胺药的患者不应进行青霉素皮肤试验。

皮肤试验可由经过培训的非过敏专科医生安全地进行，并已作为抗菌药物管理干预措施由内科医师、药师、住院医师和感染病医师实施(*670*,*673*,*678*,*679*)。接受检测的患者还应获得状态记录，结果应录入病历。

妊娠期青霉素皮肤试验被认为是安全的。对于报告青霉素或β-内酰胺过敏的孕妇，青霉素过敏是妊娠期梅毒治疗以及B组链球菌感染潜在风险和如需剖宫产时术前预防的重要考虑因素。然而，口服激发试验不应进行，除非在可获得额外支持服务的环境中。

管理受检者

皮肤试验阳性的患者不应在门诊环境中接受β-内酰胺类药物，应转诊至过敏专科医生或青霉素过敏专家进一步评估。过敏检测结果应记录在病历中。检测阴性的患者应被告知其过敏性休克风险极低，等同于无过敏史报告者。如果有指征使用青霉素或头孢曲松治疗，可安全给药。应向患者提供检测结果的记录。

脱敏

对于有记录青霉素过敏且无治疗替代方案的人员(例如，妊娠期梅毒和神经梅毒患者)，需要进行脱敏。可考虑修改方案

框3. 用于识别青霉素不良反应风险人员的皮肤试验试剂

主要决定因素
- 苄青霉素多赖氨酸注射液(Pre-Pen) (AllerQuest) (6 × 10-5M)

次要决定簇前体
- 苄青霉素G(10^{-2} M,3.3 mg/mL,10,000单位/mL)
- 苄青霉素噻唑酸(10–2 M,3.3 mg/mL)
- 苄青霉素噻唑酸(或青霉噻唑酰丙胺) (10-2M，3.3 mg/mL)

陈旧的青霉素不是次要决定簇的 adequate 来源。青霉素G应新鲜制备或来自新鲜冷冻来源。阳性对照

- 用于划痕试验的商业组胺(1.0 mg/mL)

阴性对照
- 稀释剂(通常为生理盐水)或过敏原稀释剂

来源：改编自 Saxon A, Beall GN, Rohr AS, Adelman DC. Immediate hypersensitivity reactions to beta-lactam antibiotics. Ann Intern Med 1987;107:204–15.

on the basis of the clinical syndrome, drug of choice, and route of administration (*687*–*690*). Patients might require referral to a specialty center where desensitization can be performed.

Allergy Referral Resources

With increased access to skin testing kits and the need to better target therapy for gonorrhea and syphilis, programs should identify local allergy consultant resources.

Diseases Characterized by Urethritis and Cervicitis

Urethritis

Urethritis, as characterized by urethral inflammation, can result from either infectious or noninfectious conditions. Symptoms, if present, include dysuria, urethral pruritis, and mucoid, mucopurulent, or purulent discharge. Signs of urethral discharge on examination can also be present among persons without symptoms. Although *N. gonorrhoeae* and *C. trachomatis* are well established as clinically important infectious causes of urethritis, *M. genitalium* has been strongly associated with urethritis and, less commonly, prostatitis (*691*–*697*). If POC diagnostic tools (e.g., Gram, methylene blue [MB], or gentian violet [GV] stain microscopy) are unavailable, drug regimens effective against both gonorrhea and chlamydia should be administered. Further testing to determine the specific etiology is recommended for preventing complications, reinfection, and transmission because a specific diagnosis might improve treatment compliance, delivery of risk-reduction interventions, and partner services. Both chlamydia and gonorrhea are reportable to health departments. NAATs are preferred for detecting *C. trachomatis* and *N. gonorrhoeae*, and urine is the preferred specimen for males (*553*). NAAT-based tests for diagnosing *T. vaginalis* among men with urethritis have not been cleared by FDA; however, laboratories have performed the CLIA-compliant validation studies (*698*) needed to provide such testing.

Etiology

Multiple organisms can cause infectious urethritis. The presence of gram-negative intracellular diplococci (GNID) or purple intracellular diplococci (MB or GV) on urethral smear is indicative of presumed gonococcal infection, which is frequently accompanied by chlamydial infection. Nongonococcal urethritis (NGU), which is diagnosed when microscopy of urethral secretions indicate inflammation without GNID or MB or GV purple intracellular diplococci, is caused by *C. trachomatis* in 15%–40% of cases; however, prevalence varies by age group, with a lower proportion of disease occurring among older men (*699*). Documentation of chlamydial infection as NGU etiology is essential because of the need for partner referral for evaluation and treatment to prevent complications of chlamydia, especially for female partners. Complications of *C. trachomatis*–associated NGU among males include epididymitis, prostatitis, and reactive arthritis.

M. genitalium is associated with symptoms of urethritis and urethral inflammation and accounts for 15%–25% of NGU cases in the United States (*691*–*693*,*696*,*697*,*700*). Among men with symptoms of urethritis, *M. genitalium* was detected in 11% of those with urethritis in Australia (*701*), 12%–15% in the United Kingdom (*702*–*704*), 15% in South Africa (*696*), 19% in China (*705*), 21% in Korea, 22% in Japan (*706*), and 28.7% in the United States (range: 20.4%–38.8%) (*697*). Data are inconsistent regarding other *Mycoplasma* and *Ureaplasma* species as etiologic agents of urethritis (*707*). The majority of men with *Ureaplasma* infections do not have overt disease unless a high organism load is present.

T. vaginalis can cause urethritis among heterosexual men; however, the prevalence varies substantially by U.S. geographic region, age, and sexual behavior and within specific populations. Studies among men with and without overt urethritis in developed countries document relatively low rates of *T. vaginalis* in the Netherlands (0.5%) (*708*), Japan (1.3%) (*706*,*709*), the United States (2.4%) (*710*), and the United Kingdom (3.6%) (*703*). Studies in other countries have documented higher rates, such as in Croatia (8.2%) (*711*) and Zimbabwe (8.4%) (*712*), particularly among symptomatic patients.

Neisseria meningitidis can colonize mucosal surfaces and cause urethritis (*713*). Urogenital *N. meningitidis* rates and duration of carriage, prevalence of asymptomatic and symptomatic infection, and modes of transmission have not been systematically described; however, studies indicate that *N. meningitidis* can be transmitted through oral-penile contact (i.e., fellatio) (*714*–*716*). *N. meningitidis* has similar colony morphology appearance on culture and cannot be distinguished from *N. gonorrhoeae* on Gram stain. Identification of *N. meningitidis* as the etiologic agent with presumed gonococcal urethritis on the basis of Gram stain but negative NAAT for gonorrhea requires a confirmation by culture. Meningococcal urethritis is treated with the same antimicrobial regimens as gonococcal urethritis. Although evidence is limited regarding the risk for sexual transmission or recurrent infections with meningococcal urethritis, treatment of sex partners of patients with meningococcal urethritis with the same antimicrobial regimens as for exposure to gonococcal infection can be considered. No indication exists for treating

基于临床综合征、首选药物和给药途径(*687 - 690*)。患者可能需要转诊至可进行脱敏的专科中心。

过敏转诊资源

随着皮肤试验试剂盒可及性的增加以及更好地针对性治疗淋病和梅毒的需要，项目应确定当地的过敏咨询资源。

疾病以尿道炎为特征和宫颈炎

尿道炎

尿道炎以尿道炎症为特征，可由感染性或非感染性病因引起。如有症状，包括排尿困难、尿道瘙痒，以及黏液性、黏液脓性或脓性分泌物。体检时发现尿道分泌物征象也可出现在无症状者中。尽管*N.gonorrhoeae*和*C.trachomatis*已被确认为尿道炎临床上重要的感染性病因，但*M.genitalium*与尿道炎以及较少见的前列腺炎(*691 - 697*)密切相关。如果无法获得POC诊断工具(例如革兰染色、亚甲蓝[MB]或龙胆紫[GV]染色显微镜检查)，应给予对淋病和衣原体均有效的药物治疗方案。建议进一步检测以确定具体病因，用于预防并发症、再感染和传播，因为明确诊断可能改善治疗依从性、风险降低干预措施的实施以及性伴服务。衣原体和淋病均须向卫生部门报告。NAAT是检测*C.trachomatis*和*N.gonorrhoeae*的首选方法，尿液是男性的首选标本(553)。用于诊断男性尿道炎患者*T.vaginalis*感染的NAAT尚未获FDA批准；然而，实验室已开展提供此类检测所需的符合CLIA的验证研究(698)。

病因学

多种微生物可引起感染性尿道炎。尿道涂片中存在革兰阴性细胞内双球菌(GNID)或紫色细胞内双球菌(MB或GV)提示推定为淋球菌感染，常伴衣原体感染。非淋球菌性尿道炎(NGU)的诊断依据是尿道分泌物显微镜检查显示炎症，但无GNID或MB或GV紫色细胞内双球菌；15%-40%的病例由*C.trachomatis*引起；然而，

患病率因年龄组而异，老年男性中发病比例较低(699)。记录衣原体感染作为NGU病因至关重要，因为需要对性伴侣进行转介评估和治疗，以预防衣原体并发症，尤其是女性伴侣。男性中*C.trachomatis*相关NGU的并发症包括附睾炎、前列腺炎和反应性关节炎。

*M.genitalium*与尿道炎症状和尿道炎症相关，在美国占NGU病例的15%-25%(*691 - 693*, *696*, *697*, *700*)。在有尿道炎症状的男性中，澳大利亚尿道炎患者中检出*M.genitalium*的比例为11%(701)，英国为12%-15%(*702 - 704*)，南非为15%(696)，中国为19%(705)，韩国为21%，日本为22%(706)，并且

在美国为28.7%(范围：20.4%-38.8%)(697)。关于其他*Mycoplasma*和*Ureaplasma*菌种作为尿道炎病因的数据不一致(707)。大多数感染*Ureaplasma*的男性除非存在高菌量，否则无明显疾病表现。

*T.vaginalis*可在异性恋男性中引起尿道炎；然而，其患病率因美国地理区域、年龄和性行为以及特定人群而有很大差异。在发达国家对有或无明确尿道炎的男性进行的研究记录了相对较低的*T.vaginalis*感染率：荷兰(0.5%)(708)、日本(1.3%)(*706*, *709*)、美国(2.4%)(710)和英国(3.6%)(703)。其他国家的研究记录了更高的感染率，例如克罗地亚(8.2%)(711)和津巴布韦(8.4%)(712)，尤其是在有症状的患者中。

*Neisseria meningitidis*可定植于黏膜表面并引起尿道炎(713)。泌尿生殖道*N.meningitidis*的感染率及携带持续时间、无症状和有症状感染的患病率以及传播方式尚未得到系统描述；然而，研究表明*N.meningitidis*可通过口-阴茎接触(即口交)传播(*714 - 716*)。*N.meningitidis*在培养时具有相似的菌落形态外观，并且在革兰染色上无法与*N.gonorrhoeae*区分。若根据革兰染色推定为淋球菌性尿道炎，但淋病NAAT阴性，则需通过培养确认*N.meningitidis*为病原体。脑膜炎球菌性尿道炎采用与淋球菌性尿道炎相同的抗菌治疗方案。尽管关于脑膜炎球菌性尿道炎性传播风险或复发性感染的证据有限，但可考虑对脑膜炎球菌性尿道炎患者的性伴采用与淋球菌感染暴露相同的抗菌治疗方案进行治疗。没有指征治疗

persons with *N. meningitidis* identified in their oropharynx when not also associated with symptomatic urethritis.

In other instances, NGU can be caused by HSV, Epstein-Barr virus, and adenovirus (*699*) acquired by fellatio (i.e., oral-penile contact). In a retrospective review of 80 cases of HSV urethritis in Australia (*717*), the majority of infections were associated with HSV-1 with clinical findings of meatitis (62%), genital ulceration (37%), and dysuria (20%). Adenovirus can present with dysuria, meatal inflammation, and conjunctivitis (*718*). Enteric bacteria have been identified as an uncommon cause of NGU and might be associated with insertive anal intercourse (*699*).

Other bacterial pathogens have been implicated as potential causes of clinical urethritis, either in clustered case series or as sporadic cases such as *Haemophilus influenzae* and *Haemophilus parainfluenzae* (*719–723*). *Haemophilus* was identified in 12.6% of cases among 413 men (mostly MSM reporting insertive oral sex) (*724*), and high rates of azithromycin resistance (39.5%) were identified among *Haemophilus* urethritis patients (*725*). Individual case reports have linked NGU to multiple bacterial species, including *Corynebacterium propinquum* (*726*), *Kurthia gibsonii* (*727*), *Corynebacterium glucuronolyticum* (*728*,*729*), *Corynebacterium striatrium* (*730*), *Aerococcus urinae* (*731*), and *Neisseria elongata* (*732*). Diagnostic testing and treatment for less-common organisms are reserved for situations in which these infections are suspected (e.g., sexual partner with trichomoniasis, urethral lesions, or severe dysuria and meatitis) or when NGU is not responsive to recommended therapy.

Even in settings that provide comprehensive diagnostic testing, etiology can remain obscure in half of cases. Idiopathic NGU was reported in 772 (59%) of 1,295 first presentations of NGU among men seeking sexual health services in Australia (*701*). In a case-control study of 211 men with NGU symptoms in Denmark, no identifiable pathogen was identified in 24% of acute cases and 33% of chronic cases (*733*). NGU's importance if not caused by a defined pathogen is uncertain; neither complications (e.g., urethral stricture or epididymitis) nor adverse outcomes among sex partners have been identified in these cases.

Associations between NGU and insertive anal and oral exposure have been reported (*734*), as have higher rates of BV-associated *Leptotrichia* or *Sneathia* species among heterosexual men with urethritis (*735*). These studies increase concern for possible undetected infectious rectal or vaginal pathogens, or alternatively, a transient reactive dysbiosis after exposure to a new microbiome or even a noninfectious reactive etiology (*736*).

Diagnostic Considerations

Clinicians should attempt to obtain objective evidence of urethral inflammation. If POC diagnostic tests (e.g., Gram stain or MB or GV microscopy) are unavailable, urethritis can be documented on the basis of any of the following signs or laboratory tests:

- Mucoid, mucopurulent, or purulent discharge on examination.
- Gram stain is a POC diagnostic test for evaluating urethritis that is highly sensitive and specific for documenting both urethritis and the presence or absence of gonococcal infection; MB or GV stain of urethral secretions is an alternative POC diagnostic test with performance characteristics similar to Gram stain; thus, the cutoff number for WBCs per oil immersion field should be the same (*737*).
  - Presumed gonococcal infection is established by documenting the presence of WBCs containing GNID in Gram stain or intracellular purple diplococci in MB or GV smears; men should be tested for *C. trachomatis* and *N. gonorrhoeae* by NAATs and presumptively treated and managed accordingly for gonococcal infection (see Gonococcal Infections).
  - If no intracellular gram-negative or purple diplococci are present, men should receive NAATs for *C. trachomatis* and *N. gonorrhoeae* and can be managed for NGU as recommended (see Nongonococcal Urethritis).
  - Gram stain of urethral secretions exist that demonstrate ≥2 WBCs per oil immersion field (*738*). The microscopy diagnostic cutoff might vary, depending on background prevalence (≥2 WBCs/high power field [HPF] in high-prevalence settings [STI clinics] or ≥5 WBCs/HPF in lower-prevalence settings).§§

§§ For urethral microscopy, the cutoff for diagnosing urethritis is ≥2 WBCs/HPF (**Sources:** Rietmeijer CA, Mettenbrink CJ. Recalibrating the Gram stain diagnosis of male urethritis in the era of nucleic acid amplification testing. Sex Transm Dis 2012;39:18–20; Rietmeijer CA, Mettenbrink CJ. The diagnosis of nongonococcal urethritis in men: can there be a universal standard? Sex Transm Dis 2017;44:195–6). An additional evaluation supported this cutoff by demonstrating NGU sensitivity of 92.6% for cutoff of ≥2 versus 55.6% sensitivity for cutoff of ≥5 (**Source:** Sarier M, Sepin N, Duman I, et al. Microscopy of Gram-stained urethral smear in the diagnosis of urethritis: which threshold value should be selected? Andrologia 2018;50:e13143). Diagnostic cutoffs for 369 symptomatic and asymptomatic heterosexual men seeking STI care in Seattle revealed a maximal sensitivity and specificity achieved with a cutoff of ≥5 WBCs/HPF. Using a lower cutoff of ≥2 WBCs/HPF would miss 13% of *C. trachomatis* and *M. genitalium* and overtreat 45% of persons who have negative tests (**Source:** Leipertz G, Chambers L, Lowens S, et al. P796 Reassessing the Gram stain smear [GSS] polymorphonuclear leukocyte [PMN] cutoff for diagnosing non-gonococcal urethritis [NGU]. Sex Transm Infect 2019;95[Suppl 1]:A339). Another study discussed that the WBC/HPF cutoff value should discriminate on the basis of the prevalence of chlamydia, mycoplasma, and gonorrhea among a clinic population (**Source:** Moi H, Hartgill U, Skullerud KH, Reponen EJ, Syvertsen L, Moghaddam A. Microscopy of stained urethral smear in male urethritis: which cutoff should be used? Sex Transm Dis 2017;44:189–94).

在口咽部检出*N.meningitidis*但不同时伴有症状性尿道炎者。

在其他情况下，NGU 可由经口交(即口腔-阴茎接触)获得的 HSV、Epstein-Barr 病毒和腺病毒(699)引起。在澳大利亚对 80 例 HSV 尿道炎病例的回顾性综述中(717)，大多数感染与 HSV-1 相关，临床表现为尿道口炎(62%)、生殖器溃疡(37%)和排尿困难(20%)。腺病毒可表现为排尿困难、尿道口炎症和结膜炎(718)。肠道细菌已被确定为 NGU 的不常见病因，并可能与插入性肛交相关(699)。

其他细菌病原体也被认为可能是临床尿道炎的潜在病因，无论是聚集性病例系列还是散发病例，如流感嗜血杆菌和副流感嗜血杆菌(*719 - 723*)。在 413 名男性(多为报告插入性口交的 MSM)中，12.6% 的病例检出了嗜血杆菌(724)，并且在嗜血杆菌尿道炎患者中发现了高比例的阿奇霉素耐药(39.5%)(725)。个别病例报告将 NGU 与多种细菌种类相关联，包括*Corynebacterium propinquum*(726)、*Kurthia gibsonii*(727)、*Corynebacterium glucuronolyticum*(*728*, *729*)、*Corynebacterium striatrium*(730)、*Aerococcus urinae*(731),和*Neisseria elongata*(732)。对不常见微生物的诊断检测和治疗仅保留用于怀疑这些感染的情况(例如，性伴患有滴虫感染、尿道病变，或严重排尿困难和尿道口炎)，或当 NGU 对推荐治疗无反应时。

即使在提供全面诊断检测的环境中，半数病例的病因仍可能不明。在澳大利亚寻求性健康服务的男性中，1,295 例首次就诊的 NGU 中有 772 例(59%)报告为特发性 NGU(701)。在丹麦对 211 名有 NGU 症状男性的病例对照研究中，24% 的急性病例和 33% 的慢性病例未鉴定出可识别的病原体(733)。若非由明确病原体引起，NGU 的重要性尚不确定；在这些病例中，既未发现并发症(如尿道狭窄或附睾炎)，也未发现性伴的不良结局。

已有NGU与插入性肛交和口交暴露之间关联的报道(734)，也有报道显示异性恋男性尿道炎患者中BV相关*Leptotrichia*或*Sneathia*菌种的检出率较高(735)。这些研究增加了对可能存在未被检测到的感染性直肠或阴道病原体的担忧，或者 alternatively，对暴露于新微生物组后的短暂反应性菌群失调甚至非感染性反应性病因的担忧(736)。

诊断考虑

临床医生应尝试获取尿道炎症的客观证据。如果POC诊断检测(如革兰染色或MB或GV显微镜检查)不可用，可根据以下任何体征或实验室检测结果记录尿道炎：

- 检查时可见黏液性、黏液脓性或脓性分泌物。
- 革兰染色是用于评估尿道炎的POC诊断检测，对记录尿道炎以及淋球菌感染的存在或缺失具有高度敏感性和特异性；尿道分泌物的MB或GV染色是替代性POC诊断检测，其性能特征与革兰染色相似；因此，每油镜视野WBC的截断值应相同(737)。
  - 推定淋球菌感染的确立依据是

    记录革兰染色中存在含GNID的WBC或MB或GV涂片中存在细胞内紫色双球菌；男性应通过NAAT检测*C.trachomatis*和*N.gonorrhoeae*，并据此对淋球菌感染进行推定治疗和管理(见淋球菌感染)。
  - 若无细胞内革兰阴性或紫色双球菌

    存在时，男性应接受*C.trachomatis*和*N.gonorrhoeae*的NAAT检测，并可按推荐对NGU进行管理(见非淋球菌性尿道炎)。

    尿道分泌物革兰染色显示

    每油镜视野≥2个WBC(738)。显微镜诊断截断值可能因背景患病率而异(高患病率环境[STI门诊]中≥2个WBC/高倍视野[HPF]，或较低患病率环境中≥5个WBC/HPF)。

对于尿道显微镜检查，诊断尿道炎的临界值为≥2个白细胞/高倍视野（来源：Rietmeijer CA, Mettenbrink CJ. Recalibrating the Gram stain diagnosis of male urethritis in the era of nucleic acid amplification testing. Sex Transm Dis 2012;39:18–20; Rietmeijer CA, Mettenbrink CJ. The diagnosis of nongonococcal urethritis in men: can there be a universal standard? Sex Transm Dis 2017;44:195–6）。另一项评估支持该临界值，其显示非淋球菌性尿道炎（NGU）在临界值≥2时的敏感性为92.6%，而临界值≥5时的敏感性为55.6%（来源：Sarier M, Sepin N, Duman I, et al. Microscopy of Gram-stained urethral smear in the diagnosis of urethritis: which threshold value should be selected? Andrologia 2018;50:e13143）。对西雅图369名寻求性传播感染诊疗的有症状和无症状异性恋男性进行的诊断临界值研究显示，临界值≥5个白细胞/高倍视野时可达到最大敏感性和特异性。使用较低的临界值≥2个白细胞/高倍视野会漏诊13%的沙眼衣原体和生殖支原体感染，并对45%检测阴性者过度治疗（来源：Leipertz G, Chambers L, Lowens S, et al. P796 Reassessing the Gram stain smear [GSS] polymorphonuclear leukocyte [PMN] cutoff for diagnosing non-gonococcal urethritis [NGU]. Sex Transm Infect 2019;95[Suppl 1]:A339）。另一项研究讨论认为，白细胞/高倍视野临界值应根据门诊人群中衣原体、支原体和淋病的患病率来区分（来源：Moi H, Hartgill U, Skullerud KH, Reponen EJ, Syvertsen L, Moghaddam A. Microscopy of stained urethral smear in male urethritis: which cutoff should be used? Sex Transm Dis 2017;44:189–94）。

- Positive leukocyte esterase test on first-void urine or microscopic examination of sediment from a spun first-void urine demonstrating ≥10 WBCs/HPF.

Men evaluated in settings in which Gram stain or MB or GV smear is unavailable who meet at least one criterion for urethritis (i.e., urethral discharge, positive leukocyte esterase test on first void urine, or microscopic examination of first-void urine sediment with ≥10 WBCs/HPF) should be tested for *C. trachomatis* and *N. gonorrhoeae* by NAATs and treated with regimens effective against gonorrhea and chlamydia.

If symptoms are present but no evidence of urethral inflammation is present, NAATs for *C. trachomatis* and *N. gonorrhoeae* might identify infections (*739*). Persons with chlamydia or gonorrhea should receive recommended treatment, and sex partners should be referred for evaluation and treatment. If none of these clinical criteria are present, empiric treatment of men with symptoms of urethritis is recommended only for those at high risk for infection who are unlikely to return for a follow-up evaluation or test results. Such men should be treated with drug regimens effective against gonorrhea and chlamydia.

Nongonococcal Urethritis

NGU is a nonspecific diagnosis that can have various infectious etiologies. *C. trachomatis* has been well established as an NGU etiology; however, prevalence varies across populations and accounts for <50% of overall cases (*712*,*740*–*742*). *M. genitalium* is estimated to account for 10%–25% of cases (*696*,*697*,*701*,*703*,*704*,*706*,*733*,*743*), and *T. vaginalis* for 1%–8% of cases depending on population and location (*703*,*706*,*708*,*710*,*712*). Other etiologies include different bacteria, such as *Haemophilus* species (*724*,*725*), *N. meningitidis* (*713*,*716*), HSV (*706*,*717*), and adenovirus (*744*). However, even when extensive testing is performed, no pathogens are identified in approximately half of cases (*701*,*733*).

Diagnostic Considerations

Clinical presentation can include urethral discharge, irritation, dysuria, or meatal pruritus (*697*,*743*,*745*). NGU is confirmed for symptomatic men when diagnostic evaluation of urethral secretions indicates inflammation, without evidence of diplococci by Gram, MB, or GV smear on microscopy (*712*,*746*,*747*). Visible discharge or secretions can be collected by a swab without inserting it into the urethra; if no visible secretions, the swab can be inserted into the urethral meatus and rotated, making contact with the urethral wall before removal. If microscopy is unavailable, urine testing for leukocyte esterase can be performed on first-void urine, and microscopic examination of sediment from a spun first-void urine demonstrating ≥10 WBCs/HPF has a high negative predictive value.

All men who have suspected or confirmed NGU should be tested for chlamydia and gonorrhea by using NAATs. A specific diagnosis can potentially reduce complications, reinfection, and transmission. *M. genitalium* testing should be performed for men who have persistent or recurrent symptoms after initial empiric treatment. Testing for *T. vaginalis* should be considered in areas or among populations with high prevalence, in cases where a partner is known to be infected, or for men who have persistent or recurrent symptoms after initial empiric treatment.

Treatment

Ideally, treatment should be pathogen based; however, diagnostic information might not be immediately available. Presumptive treatment should be initiated at NGU diagnosis. Doxycycline is highly effective for chlamydial urethral infections and is also effective for chlamydial infections of the rectum; it also has some activity against *M. genitalium*. In contrast, reports have increased of azithromycin treatment failures for chlamydial infection (*748*,*749*), and the incidence of macrolide resistance in *M. genitalium* also has been rapidly rising (*697*,*702*,*705*,*750*,*751*). Pharmacokinetic data indicate that changing azithromycin dosing from a single-dose strategy to a multiday strategy might protect against inducing resistance in *M. genitalium* infections (*745*,*752*) (see *Mycoplasma genitalium*).

Recommended Regimen for Nongonococcal Urethritis

Doxycycline 100 mg orally 2 times/day for 7 days

Alternative Regimens

Azithromycin 1 g orally in a single dose
or
Azithromycin 500 mg orally in a single dose; then 250 mg orally daily for 4 days

To maximize compliance with recommended therapies, medications should be dispensed on-site at the clinic, and, regardless of the number of doses involved in the regimen, the first dose should be directly observed. Erythromycin is no longer recommended for NGU because of its gastrointestinal side effects and dosing frequency. Levofloxacin is no longer recommended for NGU because of its inferior efficacy, especially for *M. genitalium.*

Management Considerations

To minimize transmission and reinfections, men treated for NGU should be instructed to abstain from sexual intercourse until they and their partners have been treated (i.e., until

- 首段尿白细胞酯酶试验阳性，或
离心首段尿沉渣显微镜检查显示≥10个WBC/HPF。

在无法进行革兰染色或MB或GV涂片的环境中接受评估的男性，若符合至少一项尿道炎标准(即尿道分泌物、首段尿白细胞酯酶试验阳性，或首段尿沉渣显微镜检查≥10个WBC/HPF)，应通过NAAT检测*C.trachomatis*和*N.gonorrhoeae*，并接受对淋病和衣原体有效的方案治疗。

如果存在症状但无尿道炎症证据，沙眼衣原体和淋病奈瑟菌的 NAAT 可能识别感染(739)。衣原体或淋病患者应接受推荐治疗，性伴应转诊进行评估和治疗。如果不存在这些临床标准中的任何一项，仅推荐对有尿道炎症状且感染高风险、不太可能返回进行随访评估或获取检测结果的男性进行经验性治疗。此类男性应接受对淋病和衣原体有效的药物治疗方案。

非淋菌性尿道炎

NGU 是一种非特异性诊断，可有多种感染性病因。沙眼衣原体已被充分确立为 NGU 的病因；然而，患病率因人群而异，占总体病例的<50%(*712*, *740* - *742*)。据估计，生殖支原体占病例的 10%-25%(*696*, *697*, *701*, *703*, *704*, *706*, *733*, *743*)，而阴道毛滴虫占病例的 1%-8%，取决于人群和地点(*703*, *706*, *708*, *710*, *712*)。其他病因包括不同的细菌，如嗜血杆菌属(*724*, *725*)、脑膜炎奈瑟菌(*713*, *716*)、HSV(*706*, *717*)和腺病毒(744)。然而，即使进行了广泛的检测，约半数病例仍未鉴定出病原体(*701*, *733*)。

诊断考虑

临床表现可包括尿道分泌物、刺激感、排尿困难或尿道口瘙痒(*697*, *743*, *745*)。当尿道分泌物的诊断性评估显示炎症，且显微镜检查未发现革兰染色、MB或GV涂片中有双球菌证据时，可确诊有症状男性的NGU(*712*, *746*, *747*)。可见的分泌物或溢液可用拭子采集，无需插入尿道；若无可见分泌物，可将拭子插入尿道口并旋转，在取出前与尿道壁接触。若无法进行显微镜检查，可对首段尿进行白细胞酯酶尿液检测，并对离心后的首段尿沉渣进行显微镜检查

尿液显示≥10 WBCs/HPF具有很高的阴性预测价值。

所有疑似或确诊NGU的男性均应通过NAAT检测衣原体和淋病。明确的诊断有可能减少并发症、再感染和传播。对于初始经验性治疗后症状持续或复发的男性，应进行*M.genitalium*检测。在流行率高的地区或人群中、在伴侣已知感染的情况下，或对于初始经验性治疗后症状持续或复发的男性，应考虑进行*T.vaginalis*检测。

治疗

理想情况下，治疗应基于病原体；然而，诊断信息可能无法立即获得。应在诊断NGU时开始推定治疗。多西环素对衣原体尿道感染高度有效，对直肠衣原体感染也有效；它还对*M.genitalium*有一定活性。相反，关于衣原体感染阿奇霉素治疗失败的报道有所增加(*748*, *749*)，且*M.genitalium*对大环内酯类耐药的发生率也迅速上升(*697*, *702*, *705*, *750*, *751*)。药代动力学数据表明，将阿奇霉素给药方案从单剂策略改为多日策略可能有助于防止诱导*M.genitalium*感染耐药(*745*, *752*)(见*Mycoplasma genitalium*)。

非淋菌性尿道炎推荐治疗方案

多西环素 100 mg 口服每日2次连用7天

替代方案

阿奇霉素 1 g 口服，单次给药
或
阿奇霉素 500 mg口服，单次给药；然后250 mg口服，每日一次，共4天

为最大限度地提高对推荐治疗的依从性，药物应在诊所现场发放，并且无论方案涉及多少剂次，首剂应直接观察服用。由于胃肠道副作用和给药频率，不再推荐红霉素用于NGU。由于疗效较差，尤其是对*M.genitalium*，不再推荐左氧氟沙星用于NGU。

管理注意事项

为尽量减少传播和再感染，接受NGU治疗的男性应被告知在本人及其伴侣均完成治疗之前避免性交(即直到

completion of a 7-day regimen and symptoms have resolved or for 7 days after single-dose therapy). Men with NGU should be tested for HIV and syphilis.

Follow-Up

Men should be provided their testing results obtained as part of the NGU evaluation. Those with a specific diagnosis of chlamydia, gonorrhea, or trichomoniasis should be offered partner services and instructed to return 3 months after treatment for repeat testing because of high rates of reinfection, regardless of whether their sex partners were treated (*136*,*137*,*753*,*754*) (see Chlamydial Infections; Gonococcal Infections; Trichomoniasis).

If symptoms persist or recur after therapy completion, men should be instructed to return for reevaluation and should be tested for *M. genitalium* and *T. vaginalis*. Symptoms alone, without documentation of signs or laboratory evidence of urethral inflammation, are insufficient basis for retreatment. Providers should be alert to the possible diagnosis of chronic prostatitis or chronic pelvic pain syndrome in men experiencing persistent perineal, penile, or pelvic pain or discomfort; voiding symptoms; pain during or after ejaculation; or new-onset premature ejaculation lasting for >3 months. Men with persistent pain should be referred to a urologist with expertise in pelvic pain disorders.

Management of Sex Partners

All sex partners of men with NGU within the preceding 60 days should be referred for evaluation and testing and presumptive treatment with a drug regimen effective against chlamydia. All partners should be evaluated and treated according to the management section for their respective pathogen; EPT could be an alternate approach if a partner is unable to access timely care. To avoid reinfection, sex partners should abstain from sexual intercourse until they and their partners are treated.

Persistent or Recurrent Nongonococcal Urethritis

The objective diagnosis of persistent or recurrent NGU should be made before considering additional antimicrobial therapy. Symptomatic recurrent or persistent urethritis might be caused by treatment failure or reinfection after successful treatment. Among men who have persistent symptoms after treatment without objective signs of urethral inflammation, the value of extending the duration of antimicrobials has not been demonstrated. Treatment failure for chlamydial urethritis has been estimated at 6%–12% (*755*). The most common cause of persistent or recurrent NGU is *M. genitalium*, especially after doxycycline therapy (*756*,*757*). Treatment failure for *M. genitalium* is harder to determine because certain men achieve clinical cure (i.e., resolution of symptoms) but can still have detectable *M. genitalium* in urethral specimens (*758*).

The initial step in recurrent urethritis is assessing compliance with treatment or potential reexposure to an untreated sex partner (*697*,*743*). If the patient did not comply with the treatment regimen or was reexposed to an untreated partner, retreatment with the initial regimen can be considered. If therapy was appropriately completed and no reexposure occurred, therapy is dependent on the initial treatment regimen. Ideally, diagnostic testing among men with recurrent or persistent symptoms, including those with gonorrhea, chlamydia, *M. genitalium*, and trichomoniasis, can be used to guide further management decisions.

T. vaginalis is also known to cause urethritis among men who have sex with women. In areas where *T. vaginalis* is prevalent, men who have sex with women with persistent or recurrent urethritis should be tested for *T. vaginalis* and presumptively treated with metronidazole 2 g orally in a single dose or tinidazole 2 g orally in a single dose; their partners should be referred for evaluation and treatment, if needed.

If *T. vaginalis* is unlikely (MSM with NGU or negative *T. vaginalis* NAAT), men with recurrent NGU should be tested for *M. genitalium* by using an FDA-cleared NAAT. Treatment for *M. genitalium* includes a two-stage approach, ideally using resistance-guided therapy. If *M. genitalium* resistance testing is available it should be performed, and the results should be used to guide therapy (see *Mycoplasma genitalium*). If *M. genitalium* resistance testing is not available, doxycycline 100 mg orally 2 times/day for 7 days followed by moxifloxacin 400 mg orally once daily for 7 days should be used. The rationale for this approach is that although not curative, doxycycline decreases the *M. genitalium* bacterial load, thereby increasing likelihood of moxifloxacin success (*759*). Higher doses of azithromycin have not been effective for *M. genitalium* after azithromycin treatment failures. Men with persistent or recurrent NGU after treatment for *M. genitalium* or *T. vaginalis* should be referred to an infectious disease or urology specialist.

Special Considerations

HIV Infection

NGU might facilitate HIV transmission (*760*). Persons with NGU and HIV infection should receive the same treatment regimen as those who do not have HIV.

Cervicitis

Two major diagnostic signs characterize cervicitis: 1) a purulent or mucopurulent endocervical exudate visible in the endocervical canal or on an endocervical swab specimen (commonly referred to as mucopurulent cervicitis), and

完成7天疗程且症状已缓解，或在单剂治疗后7天内)。NGU男性应进行HIV和梅毒检测。

随访

应向男性提供作为NGU评估一部分所获得的检测结果。那些被明确诊断为衣原体、淋病或滴虫感染者应获得性伴服务，并被告知在治疗后3个月返回进行重复检测，因为再感染率高，无论其性伴是否已接受治疗(*136*, *137*, *753*, *754*)(见衣原体感染；淋球菌感染；滴虫感染)。

如果治疗完成后症状持续或复发，应告知男性返回重新评估，并应检测*M.genitalium*和*T.vaginalis*。仅凭症状，而无尿道炎症的体征记录或实验室证据，不足以作为再次治疗的依据。对于出现持续性会阴、阴茎或盆腔疼痛或不适、排尿症状、射精时或射精后疼痛，或新发早泄持续>3个月的男性，医务人员应警惕慢性前列腺炎或慢性盆腔疼痛综合征的可能诊断。持续疼痛的男性应转诊至擅长盆腔疼痛疾病的泌尿科医生。

性伴侣的管理

NGU男性在前60天内的所有性伴应被转介进行评估和检测，并接受对衣原体有效的药物方案进行推定治疗。所有性伴应根据各自病原体的管理部分进行评估和治疗；如果性伴无法及时获得医疗照护，EPT可作为一种替代方法。为避免再感染，性伴应避免性交，直至他们及其性伴均接受治疗。

持续性或复发性非淋菌性尿道炎

在考虑额外抗菌治疗之前，应作出持续性或复发性NGU的客观诊断。有症状的复发性或持续性尿道炎可能由治疗失败或成功治疗后再感染引起。对于治疗后症状持续但无尿道炎症客观体征的男性，延长抗菌药物疗程的价值尚未得到证实。衣原体尿道炎的治疗失败率估计为6%-12%(755)。持续性或复发性NGU最常见的原因是*M.genitalium*，尤其是在多西环素治疗后(*756*, *757*)。*M.genitalium*的治疗失败较难确定，因为某些男性

达到临床治愈(即症状缓解)，但尿道标本中仍可检测到*M.genitalium*(758)。

复发性尿道炎的第一步是评估患者对治疗的依从性或是否存在再次暴露于未经治疗的性伴侣的风险(*697*,*743*)。如果患者未遵守治疗方案或再次暴露于未经治疗的伴侣，可考虑使用初始方案进行复治。如果治疗已适当完成且未发生再次暴露，则治疗方案取决于初始治疗方案。理想情况下，对于有复发或持续症状的男性，包括淋病、衣原体、生殖支原体和滴虫感染者，可通过诊断检测来指导进一步的管理决策。

*T.vaginalis*也已知可在与女性发生性行为的男性中引起尿道炎。在*T.vaginalis*流行的地区，与女性发生性行为且患有持续性或复发性尿道炎的男性应进行*T.vaginalis*检测，并接受甲硝唑2 g口服单剂或替硝唑2 g口服单剂推定治疗；其性伴应被转介进行评估和必要时的治疗。

如果阴道毛滴虫感染可能性不大(MSM伴NGU或阴道毛滴虫NAAT阴性)，复发性NGU男性应使用FDA批准的NAAT检测生殖支原体。生殖支原体的治疗包括两阶段方案，理想情况下采用耐药指导的治疗。如果生殖支原体耐药检测可用，应进行检测，并应根据结果指导治疗(见生殖支原体)。如果生殖支原体耐药检测不可用，应使用多西环素100 mg口服每日2次共7天，随后莫西沙星400 mg口服每日1次共7天。该方案的原理是，多西环素虽不能治愈，但可降低生殖支原体细菌载量，从而提高莫西沙星成功的可能性(759)。阿奇霉素治疗后失败的生殖支原体感染，使用更高剂量的阿奇霉素无效。生殖支原体或阴道毛滴虫治疗后仍有持续或复发性NGU的男性应转诊至感染病科或泌尿外科专科医生。

特殊考虑

HIV感染

NGU可能促进HIV传播(760)。NGU合并HIV感染者应接受与无HIV感染者相同的治疗方案。

宫颈炎

宫颈炎有两个主要诊断体征：1)在宫颈管内或宫颈拭子标本上可见脓性或黏液脓性宫颈管分泌物(通常称为黏液脓性宫颈炎)，以及

2) sustained endocervical bleeding easily induced by gentle passage of a cotton swab through the cervical os. Either or both signs might be present. Cervicitis frequently is asymptomatic; however, certain women might report an abnormal vaginal discharge and intermenstrual vaginal bleeding (e.g., especially after sexual intercourse). The criterion of using an increased number of WBCs on endocervical Gram stain in the diagnosis of cervicitis has not been standardized; it is not sensitive, has a low positive predictive value for *C. trachomatis* and *N. gonorrhoeae* infections, and is not available in most clinical settings (*297*,*761*). Leukorrhea, defined as >10 WBCs/HPF on microscopic examination of vaginal fluid, might be a sensitive indicator of cervical inflammation with a high negative predictive value (i.e., cervicitis is unlikely in the absence of leukorrhea) (*762*,*763*). Finally, although the presence of gram-negative intracellular diplococci on Gram stain of endocervical exudate might be specific for diagnosing gonococcal cervical infection when evaluated by an experienced laboratorian, it is not a sensitive indicator of infection (*764*).

Etiology

C. trachomatis or *N. gonorrhoeae* is the most common etiology of cervicitis defined by diagnostic testing. Trichomoniasis, genital herpes (especially primary HSV-2 infection), or *M. genitalium* (*761*,*765*–*768*) also have been associated with cervicitis. However, in many cases of cervicitis, no organism is isolated, especially among women at relatively low risk for recent acquisition of these STIs (e.g., women aged >30 years) (*769*). Limited data indicate that BV and frequent douching might cause cervicitis (*770*–*772*). The majority of persistent cases of cervicitis are not caused by reinfection with *C. trachomatis* or *N. gonorrhoeae;* other factors might be involved (e.g., persistent abnormality of vaginal flora, *M. genitalium,* douching or exposure to other types of chemical irritants, dysplasia, or idiopathic inflammation in the zone of ectopy). Available data do not indicate an association between group B streptococcus colonization and cervicitis (*773*,*774*). No specific evidence exists for a role for *Ureaplasma parvum* or *Ureaplasma urealyticum* in cervicitis (*707*,*761*,*765*,*775*,*776*).

Diagnostic Considerations

Because cervicitis might be a sign of upper genital tract infection (e.g., endometritis), women should be assessed for signs of PID and tested for *C. trachomatis* and *N. gonorrhoeae* with NAAT on vaginal, cervical, or urine samples (*553*) (see Chlamydial Infections; Gonococcal Infections). Women with cervicitis also should be evaluated for concomitant BV and trichomoniasis. Because sensitivity of microscopy for detecting *T. vaginalis* is relatively low (approximately 50%), symptomatic women with cervicitis and negative wet-mount microscopy for trichomonads should receive further testing (i.e., NAAT, culture, or other FDA-cleared diagnostic test) (see Trichomoniasis). Testing for *M. genitalium* with the FDA-cleared NAAT can be considered. Although HSV-2 infection has been associated with cervicitis, the utility of specific testing (i.e., PCR or culture) for HSV-2 is unknown. Testing for *U. parvum, U. urealyticum, Mycoplasma hominis*, or genital culture for group B streptococcus is not recommended.

Treatment

Multiple factors should affect the decision to provide presumptive therapy for cervicitis. Presumptive treatment with antimicrobials for *C. trachomatis* and *N. gonorrhoeae* should be provided for women at increased risk (e.g., those aged <25 years and women with a new sex partner, a sex partner with concurrent partners, or a sex partner who has an STI), if follow-up cannot be ensured, or if testing with NAAT is not possible. Trichomoniasis and BV should be treated if detected (see Bacterial Vaginosis; Trichomoniasis). For women at lower risk for STIs, deferring treatment until results of diagnostic tests are available is an option. If treatment is deferred and *C. trachomatis* and *N. gonorrhoeae* NAATs are negative, a follow-up visit to determine whether the cervicitis has resolved can be considered.

Recommended Regimen for Cervicitis*
Doxycycline 100 mg orally 2 times/day for 7 days

* Consider concurrent treatment for gonococcal infection if the patient is at risk for gonorrhea or lives in a community where the prevalence of gonorrhea is high (see Gonococcal Infections).

Alternative Regimen
Azithromycin 1 g orally in a single dose

Other Management Considerations

To minimize transmission and reinfection, women treated for cervicitis should be instructed to abstain from sexual intercourse until they and their partners have been treated (i.e., until completion of a 7-day regimen or for 7 days after single-dose therapy) and symptoms have resolved. Women who receive a cervicitis diagnosis should be tested for syphilis and HIV in addition to other recommended diagnostic tests.

Follow-Up

Women receiving treatment should return to their provider for a follow-up visit to determine whether cervicitis has resolved. For women who are untreated, a follow-up visit gives providers an opportunity to communicate test results obtained as part of the cervicitis evaluation. Providers should treat on the basis of any positive test results and determine whether

2) 持续存在的宫颈管内出血，轻轻用棉签通过宫颈口即可诱发。可能出现其中任一或两种体征。宫颈炎常无症状；然而，某些女性可能报告异常阴道分泌物和月经间期阴道出血(例如，尤其在性交后)。使用宫颈管内革兰染色白细胞增多作为宫颈炎诊断标准尚未标准化；它不敏感，对沙眼衣原体和淋病奈瑟菌感染的阳性预测值低，且大多数临床环境不可用(*297*, *761*)。白细胞增多，定义为阴道分泌物显微镜检查>10 WBCs/HPF，可能是宫颈炎症的敏感指标，具有高阴性预测值(即，无白细胞增多时宫颈炎不太可能)(*762*, *763*)。最后，尽管在 experienced laboratorian 评估时，宫颈管内渗出物革兰染色出现革兰阴性细胞内双球菌可能对诊断淋球菌宫颈感染具有特异性，但它不是感染的敏感指标(764)。

病因学

*C.trachomatis*或*N.gonorrhoeae*是通过诊断检测确定的宫颈炎最常见的病因。滴虫感染、生殖器疱疹(尤其是原发性HSV-2感染)或*M.genitalium*(*761*,*765 - 768*)也与宫颈炎相关。然而，在许多宫颈炎病例中，未分离出任何微生物，尤其是在近期获得这些STI风险相对较低的女性中(例如年龄>30岁的女性)(769)。有限的数据表明，BV和频繁阴道冲洗可能导致宫颈炎(*770 - 772*)。大多数持续性宫颈炎病例并非由*C.gonorrhoeae*再感染引起；可能涉及其他因素(例如阴道菌群持续异常、*M.genitalium*、阴道冲洗或暴露于其他类型的化学刺激物、异型增生或宫颈外翻区的特发性炎症)。现有数据未表明B组链球菌定植与宫颈炎之间存在关联(*773*,*774*)。没有具体证据表明*Ureaplasma parvum*或*Ureaplasma urealyticum*在宫颈炎中起作用(*707*,*761*,*765*,*775*,*776*)。

诊断考虑

由于宫颈炎可能是上生殖道感染(例如子宫内膜炎)的体征，应评估女性是否有PID体征，并使用NAAT对阴道、宫颈或尿液样本检测*C.trachomatis*和*N.gonorrhoeae*(553)(见衣原体感染；淋球菌感染)。宫颈炎女性还应评估是否合并BV和滴虫感染。由于显微镜检查检测*T.vaginalis*的敏感性相对较低(约50%)，有症状的宫颈炎女性且湿片阴性滴虫显微镜检查应接受进一步检测(即NAAT、培养或其他FDA批准的诊断检测)(见滴虫感染)。可考虑使用FDA批准的NAAT检测*M.genitalium*。尽管HSV-2感染与宫颈炎相关，但HSV-2特异性检测(即PCR或培养)的效用尚不明确。不推荐检测*U.parvum*、*U.urealyticum*、*Mycoplasma hominis*，也不推荐对B族链球菌进行生殖道培养。

治疗

多种因素应影响为宫颈炎提供经验性治疗的决策。对于风险增加的女性(例如年龄<25岁、有新性伴侣、性伴侣同时有其他性伴侣或性伴侣患有STI),如果无法确保随访,或无法进行NAAT检测,应提供针对*C.trachomatis*和*N.gonorrhoeae*的抗菌药物经验性治疗。如检测到滴虫感染和BV，应予以治疗(见细菌性阴道病；滴虫感染)。对于STI风险较低的女性，可选择推迟治疗直至获得诊断检测结果。如果推迟治疗且*C.gonorrhoeae* NAATs为阴性，可考虑进行随访就诊以确定宫颈炎是否已消退。

宫颈炎推荐治疗方案 *
多西环素 100 mg 口服每日2次连用7天

* 如果患者有淋病风险或居住在淋病患病率高的社区，应考虑同时治疗淋球菌感染(见淋球菌感染)。

替代方案
阿奇霉素 1 g 口服，单次给药

其他管理考虑

为尽量减少传播和再感染，接受宫颈炎治疗的女性应被告知避免性交，直至她们及其性伴均已接受治疗(即完成7天疗程或单剂治疗后7天)且症状已缓解。被诊断为宫颈炎的女性除其他推荐的诊断检测外，还应进行梅毒和HIV检测。

随访

接受治疗的女性应返回其医疗服务提供者处进行随访，以确定宫颈炎是否已缓解。对于未接受治疗的女性，随访为提供者提供了沟通作为宫颈炎评估一部分所获得的检测结果的机会。提供者应根据任何阳性检测结果进行治疗，并确定是否

cervicitis has resolved. Women with a specific diagnosis of chlamydia, gonorrhea, or trichomoniasis should be offered partner services and instructed to return in 3 months after treatment for repeat testing because of high rates of reinfection, regardless of whether their sex partners were treated (*753*). If symptoms persist or recur, women should be instructed to return for reevaluation.

Management of Sex Partners

Management of sex partners of women treated for cervicitis should be tailored for the specific infection identified or suspected. All sex partners during the previous 60 days should be referred for evaluation, testing, and presumptive treatment if chlamydia, gonorrhea, or trichomoniasis was identified. EPT and other effective partner referral strategies are alternative approaches for treating male partners of women who have chlamydial or gonococcal infection (*125–127*) (see Partner Services). To avoid reinfection, sex partners should abstain from sexual intercourse until they and their partners are treated.

Persistent or Recurrent Cervicitis

Women with persistent or recurrent cervicitis despite antimicrobial therapy should be reevaluated for possible reexposure or treatment failure. If relapse or reinfection with a specific infection has been excluded, BV is not present, and sex partners have been evaluated and treated, management options for persistent cervicitis are undefined. In addition, the usefulness of repeated or prolonged administration of antimicrobial therapy for persistent symptomatic cervicitis remains unknown. The etiology of persistent cervicitis, including the potential role of *M. genitalium* (*777*), is unclear. *M. genitalium* might be considered for cases of cervicitis that persist after azithromycin or doxycycline therapy in which reexposure to an infected partner or medical nonadherence is unlikely. Among women with persistent cervicitis who were previously treated with doxycycline or azithromycin, testing for *M. genitalium* can be considered and treatment initiated on the basis of results of diagnostic testing (*318*) (see *Mycoplasma genitalium*). For women with persistent symptoms that are clearly attributable to cervicitis, referral to a gynecologic specialist can be considered for evaluation of noninfectious causes (e.g., cervical dysplasia or polyps) (*778*).

Special Considerations

HIV Infection

Women with cervicitis and HIV infection should receive the same treatment regimen as those who do not have HIV. Cervicitis can increase cervical HIV shedding, and treatment reduces HIV shedding from the cervix and thereby might reduce HIV transmission to susceptible sex partners (*779–783*).

Pregnancy

Diagnosis and treatment of cervicitis for pregnant women does not differ from that for women who are not pregnant (see Diagnostic Considerations; Treatment).

Contraceptive Management

According to *U.S. Medical Eligibility Criteria for Contraceptive Use, 2016*, leaving an IUD in place during treatment for cervicitis is advisable (*58*). However, current recommendations specify that an IUD should not be placed if active cervicitis is diagnosed (*59*).

Chlamydial Infections

Chlamydial Infection Among Adolescents and Adults

Chlamydial infection is the most frequently reported bacterial infectious disease in the United States, and prevalence is highest among persons aged ≤24 years (*141*,*784*). Multiple sequelae can result from *C. trachomatis* infection among women, the most serious of which include PID, ectopic pregnancy, and infertility. Certain women who receive a diagnosis of uncomplicated cervical infection already have subclinical upper genital tract infection.

Asymptomatic infection is common among both men and women. To detect chlamydial infection, health care providers frequently rely on screening tests. Annual screening of all sexually active women aged <25 years is recommended, as is screening of older women at increased risk for infection (e.g., women aged ≥25 years who have a new sex partner, more than one sex partner, a sex partner with concurrent partners, or a sex partner who has an STI) (*149*). In a community-based cohort of female college students, incident chlamydial infection was also associated with BV and high-risk HPV infection (*785*). Although chlamydia incidence might be higher among certain women aged ≥25 years in certain communities, overall, the largest proportion of infection is among women aged <25 years (*141*).

Chlamydia screening programs have been demonstrated to reduce PID rates among women (*786*,*787*). Although evidence is insufficient to recommend routine screening for *C. trachomatis* among sexually active young men because of certain factors (i.e., feasibility, efficacy, and cost-effectiveness), screening of sexually active young men should be considered in clinical settings with a high prevalence of chlamydia (e.g., adolescent clinics, correctional facilities, or STD specialty clinics) or for populations with a high burden of infection (e.g., MSM) (*149*,*788*). Among women, the primary focus of

宫颈炎已缓解。被明确诊断为衣原体、淋病或滴虫感染的女性应获得性伴服务，并被告知在治疗后3个月返回进行重复检测，因为再感染率高，无论其性伴是否已接受治疗(753)。如果症状持续或复发，应告知女性返回重新评估。

性伴侣的管理

因宫颈炎接受治疗的女性，其性伴侣的管理应根据所识别或怀疑的具体感染进行个体化处理。如果在过去60天内识别出衣原体、淋病或滴虫感染，应转介所有性伴侣进行评估、检测和经验性治疗。EPT和其他有效的伴侣转介策略是治疗衣原体或淋球菌感染女性男性伴侣的替代方法(*125 - 127*)(见伴侣服务)。为避免再感染，性伴侣应避免性交，直至他们及其伴侣均接受治疗。

持续性或复发性宫颈炎

尽管接受了抗菌治疗但仍存在持续性或复发性宫颈炎的女性，应重新评估是否存在可能的再暴露或治疗失败。如果已排除特定感染的复发或再感染、不存在BV，且性伴侣已接受评估和治疗，则持续性宫颈炎的管理方案尚不明确。此外，重复或延长抗菌治疗对持续性症状性宫颈炎的有效性仍未知。持续性宫颈炎的病因，包括*M.genitalium*(777),的潜在作用，尚不清楚。对于在阿奇霉素或多西环素治疗后持续存在宫颈炎、且不太可能再暴露于感染伴侣或医学不依从的病例，可考虑*M.genitalium*。对于既往接受过多西环素或阿奇霉素治疗的持续性宫颈炎女性，可考虑检测*M.genitalium*，并根据诊断检测结果开始治疗(318)(见*Mycoplasma genitalium*)。对于症状明显归因于宫颈炎的持续性症状女性，可考虑转诊至妇科专科医生评估非感染性病因(例如宫颈异型增生或息肉)(778)。

妊娠

孕妇宫颈炎的诊断和治疗与非妊娠女性相同（参见诊断考虑；治疗）。

避孕管理

根据美国避孕医疗 *Eligibility* 标准 *Use, 2016*，在宫颈炎治疗期间留置IUD是明智的(58)。然而，当前建议规定，如果诊断为活动性宫颈炎，则不应放置IUD(59)。

衣原体感染

衣原体感染在青少年和成人

衣原体感染是美国最常报告的细菌性传染病，患病率在≤24岁人群中最高(*141*, *784*)。女性*C.trachomatis*感染可导致多种后遗症，其中最严重的包括PID、异位妊娠和不孕。某些被诊断为无并发症宫颈感染的女性已经存在亚临床上生殖道感染。

无症状感染在男性和女性中均很常见。为检测衣原体感染，医疗服务提供者经常依赖筛查试验。建议对所有性活跃且年龄<25岁的女性进行年度筛查,同时也建议对感染风险增加的年龄较大女性进行筛查(例如,年龄≥25岁且有新性伴侣、有多个性伴侣、性伴侣同时有其他性伴侣或性伴侣患有STI的女性)(149)。在一项基于社区的女大学生队列研究中,新发衣原体感染还与BV和高危HPV感染相关(785)。尽管在某些社区的某些年龄≥25岁女性中衣原体发病率可能更高,但总体而言,最大比例的感染发生在年龄<25岁的女性中(141)。

已证明衣原体筛查项目可降低女性PID发生率(*786*, *787*)。尽管由于某些因素(即可行性、有效性和成本效益)，证据不足以建议对性活跃年轻男性进行常规*C.trachomatis*筛查，但在衣原体高流行率的临床环境中(例如青少年诊所、惩教机构或STD专科诊所)或对感染负担高的人群(例如MSM)，应考虑对性活跃年轻男性进行筛查(*149*, *788*)。在女性中，主要关注点是

特殊考虑

HIV感染

宫颈炎合并HIV感染的女性应接受与无HIV感染者相同的治疗方案。宫颈炎可增加宫颈HIV排放，治疗可减少宫颈HIV排放，从而可能减少HIV向易感性伴的传播(*779 - 783*)。

chlamydia screening should be to detect and treat chlamydia, prevent complications, and test and treat their partners, whereas targeted chlamydia screening for men should be considered only when resources permit, prevalence is high, and such screening does not hinder chlamydia screening efforts for women (*789–791*). More frequent screening than annual for certain women (e.g., adolescents) or certain men (e.g., MSM) might be indicated on the basis of risk behaviors.

Diagnostic Considerations

For women, *C. trachomatis* urogenital infection can be diagnosed by vaginal or cervical swabs or first-void urine. For men, *C. trachomatis* urethral infection can be diagnosed by testing first-void urine or a urethral swab. NAATs are the most sensitive tests for these specimens and are the recommended test for detecting *C. trachomatis* infection (*553*). NAATs that are FDA cleared for use with vaginal swab specimens can be collected by a clinician or patient in a clinical setting. Patient-collected vaginal swab specimens are equivalent in sensitivity and specificity to those collected by a clinician using NAATs (*792*,*793*), and this screening strategy is highly acceptable among women (*794*,*795*). Optimal urogenital specimen types for chlamydia screening by using NAAT include first-catch urine (for men) and vaginal swabs (for women) (*553*). Recent studies have demonstrated that among men, NAAT performance on self-collected meatal swabs is comparable to patient-collected urine or provider-collected urethral swabs (*796–798*). Patient collection of a meatal swab for *C. trachomatis* testing might be a reasonable approach for men who are either unable to provide urine or prefer to collect their own meatal swab over providing urine. Previous evidence indicates that the liquid-based cytology specimens collected for Pap smears might be acceptable specimens for NAAT, although test sensitivity using these specimens might be lower than that associated with use of cervical or vaginal swab specimens (*799*); regardless, certain NAATs have been cleared by FDA for use on liquid-based cytology specimens.

Rectal and oropharyngeal *C. trachomatis* infection among persons engaging in receptive anal or oral intercourse can be diagnosed by testing at the anatomic exposure site. NAATs have been demonstrated to have improved sensitivity and specificity, compared with culture, for detecting *C. trachomatis* at rectal and oropharyngeal sites (*553*,*800–804*), and certain NAAT platforms have been cleared by FDA for these anatomic sites (*805*). Data indicate that NAAT performance on self-collected rectal swabs is comparable to clinician-collected rectal swabs, and this specimen collection strategy for rectal *C. trachomatis* screening is highly acceptable among men (*217*,*806*). Self-collected rectal swabs are a reasonable alternative to clinician-collected rectal swabs for *C. trachomatis* screening by NAAT, especially when clinicians are not available or when self-collection is preferred over clinician collection. Annual screening for rectal *C. trachomatis* infection should be performed among men who report sexual activity at the rectal site. Extragenital chlamydial testing at the rectal site can be considered for females on the basis of reported sexual behaviors and exposure through shared clinical decision-making by the patient and the provider. The majority of persons with *C. trachomatis* detected at oropharyngeal sites do not have oropharyngeal symptoms. The clinical significance of oropharyngeal *C. trachomatis* infection is unclear, and prevalence is low, even among populations at high risk. However, when gonorrhea testing is performed at the oropharyngeal site, chlamydia test results might be reported because certain NAATs detect both bacteria from a single specimen.

POC tests for *C. trachomatis* among asymptomatic persons can expedite treatment of infected persons and their sex partners. Among symptomatic patients, POC tests for *C. trachomatis* can optimize treatment by limiting unnecessary presumptive treatment at the time of clinical decision-making and improve antimicrobial stewardship. Thus, using a POC test will likely be a cost-effective diagnostic strategy for *C. trachomatis* infection (*807*). Newer NAAT-based POC tests have promising performance and are becoming commercially available (*807–809*).

Treatment

Treating persons with *C. trachomatis* prevents adverse reproductive health complications and continued sexual transmission. Furthermore, treating their sex partners can prevent reinfection and infection of other partners. Treating pregnant women usually prevents transmission of *C. trachomatis* to neonates during birth. Treatment should be provided promptly for all persons with chlamydial infection; treatment delays have been associated with complications (e.g., PID) in a limited proportion of women (*810*).

Recommended Regimen for Chlamydial Infection Among Adolescents and Adults
Doxycycline 100 mg orally 2 times/day for 7 days

Alternative Regimens
Azithromycin 1 g orally in a single dose *or* **Levofloxacin** 500 mg orally once daily for 7 days

A meta-analysis and a Cochrane systematic review evaluated data from randomized clinical trials of azithromycin versus doxycycline for treating urogenital chlamydial infection determined that microbiologic treatment failure among men was higher for azithromycin than for doxycycline (*748*,*749*).

衣原体筛查应旨在发现和治疗衣原体、预防并发症，并检测和治疗其性伴，而针对男性的靶向衣原体筛查仅在资源允许、患病率高且此类筛查不阻碍女性衣原体筛查工作的情况下才应考虑(*789 - 791*)。对于某些女性(如青少年)或某些男性(如MSM)，基于风险行为可能需要比每年更频繁的筛查。

诊断考虑

对于女性，*C.trachomatis*泌尿生殖道感染可通过阴道或宫颈拭子或首段尿进行诊断。对于男性，*C.trachomatis*尿道感染可通过检测首段尿或尿道拭子进行诊断。NAATs是这些标本中最敏感的检测方法，也是检测*C.trachomatis*感染的推荐检测方法(553)。经FDA批准用于阴道拭子标本的NAATs可由临床医生或患者在临床环境中采集。患者自采阴道拭子标本在使用NAATs时的敏感性和特异性与临床医生采集的标本相当(*792*, *793*)，且该筛查策略在女性中接受度很高(*794*, *795*)。使用NAAT进行衣原体筛查的最佳泌尿生殖道标本类型包括首段尿(男性)和阴道拭子(女性)(553)。近期研究表明，在男性中，自采尿道口拭子的NAAT性能与患者自采尿液或医务人员采集的尿道拭子相当(*796 - 798*)。对于无法提供尿液或更愿意自行采集尿道口拭子而非提供尿液的男性，患者自采尿道口拭子用于*C.trachomatis*检测可能是合理的方法。既往证据表明，为Pap涂片采集的液基细胞学标本可能是NAAT可接受的标本，尽管使用这些标本的检测敏感性可能低于使用宫颈或阴道拭子标本(799)；无论如何，某些NAATs已获FDA批准用于液基细胞学标本。

对于进行接受性肛交或口交的人群，直肠和口咽部*C.trachomatis*感染可通过在解剖暴露部位进行检测来诊断。与培养相比，NAATs在检测直肠和口咽部位*C.trachomatis*方面已显示出更高的敏感性和特异性(*553*, *800 - 804*)，且某些NAAT平台已获FDA批准用于这些解剖部位(805)。数据表明，自采直肠拭子的NAAT性能与临床医生采集的直肠拭子相当，且这种用于直肠*C.trachomatis*筛查的标本采集策略在男性中接受度很高(*217*, *806*)。自采直肠拭子是临床医生采集直肠拭子用于*C.trachomatis*的合理替代方案

通过NAAT进行筛查，尤其是当临床医生不可用或自我采集优于临床医生采集时。对于报告有直肠部位性行为的男性，应每年进行直肠沙眼衣原体感染筛查。对于女性，可根据报告的性行为和暴露情况，通过患者与提供者的共同临床决策考虑进行直肠部位的生殖道外衣原体检测。大多数在口咽部位检测到沙眼衣原体的人没有口咽症状。口咽部沙眼衣原体感染的临床意义尚不明确，且患病率低，即使在高危人群中也是如此。然而，当在口咽部位进行淋病检测时，可能会报告衣原体检测结果，因为某些NAAT可从单一样本中检测两种细菌。

对无症状者进行沙眼衣原体POC检测可加快感染者及其性伴侣的治疗。在有症状的患者中，沙眼衣原体POC检测可通过在临床决策时限制不必要的推定性治疗来优化治疗，并改善抗菌药物管理。因此，使用POC检测可能是沙眼衣原体感染的一种具有成本效益的诊断策略(807)。更新的基于NAAT的POC检测具有前景良好的性能，并正在进入商业市场(*807 - 809*)。

治疗

治疗沙眼衣原体感染者可预防不良生殖健康并发症和持续的性传播。此外，治疗其性伴侣可预防再感染和其他伴侣的感染。治疗孕妇通常可预防分娩期间沙眼衣原体传播给新生儿。应为所有衣原体感染者及时提供治疗；治疗延迟与有限比例女性中的并发症(如PID)相关(810)。

青少年和成人衣原体感染的推荐方案
多西环素 100 mg 口服每日2次连用7天

替代方案
阿奇霉素 1 g 口服，单次给药 或 **左氧氟沙星** 500 mg 口服，每日一次，共 7 天

一项荟萃分析和一项Cochrane系统评价评估了阿奇霉素与多西环素治疗泌尿生殖道衣原体感染的随机临床试验数据，确定男性中阿奇霉素的微生物学治疗失败率高于多西环素(*748*, *749*)。

Observational studies have also demonstrated that doxycycline is more efficacious for rectal *C. trachomatis* infection for men and women than azithromycin (*748*,*811*). A randomized trial for the treatment of rectal chlamydia infection among MSM reported microbiologic cure was 100% with doxycycline and 74% with azithromycin (*812*). A published review reported that *C. trachomatis* was detected at the anorectal site among 33%–83% of women who had urogenital *C. trachomatis* infection, and its detection was not associated with report of receptive anorectal sexual activity (*813*).

Although the clinical significance of oropharyngeal *C. trachomatis* infection is unclear and routine oropharyngeal screening is not recommended, oropharyngeal *C. trachomatis* can be sexually transmitted to genital sites (*211*,*814*); therefore, if *C. trachomatis* is identified from an oropharyngeal specimen while screening for pharyngeal gonorrhea, it should be treated. Evidence is limited regarding the efficacy of antimicrobial regimens for oropharyngeal chlamydia; however, a recently published observational study indicates doxycycline might be more efficacious than azithromycin for oropharyngeal chlamydia (*815*).

Available evidence supports that doxycycline is efficacious for *C. trachomatis* infections of urogenital, rectal, and oropharyngeal sites. Although azithromycin maintains high efficacy for urogenital *C. trachomatis* infection among women, concern exists regarding effectiveness of azithromycin for concomitant rectal *C. trachomatis* infection, which can occur commonly among women and cannot be predicted by reported sexual activity. Inadequately treated rectal *C. trachomatis* infection among women who have urogenital chlamydia can increase the risk for transmission and place women at risk for repeat urogenital *C. trachomatis* infection through autoinoculation from the anorectal site (*816*). Doxycycline is also available in a delayed-release 200-mg tablet formulation, which requires once-daily dosing for 7 days and is as effective as doxycycline 100 mg twice daily for 7 days for treating urogenital *C. trachomatis* infection in men and women. It is more costly but also has lower frequency of gastrointestinal side effects (*817*). Levofloxacin is an effective treatment alternative but is more expensive. Erythromycin is no longer recommended because of the frequency of gastrointestinal side effects, which can result in nonadherence. When nonadherence to doxycycline regimen is a substantial concern, azithromycin 1 g regimen is an alternative treatment option but might require posttreatment evaluation and testing because it has demonstrated lower treatment efficacy among persons with rectal infection.

Among persons receiving multidose regimens, medication should be dispensed with all doses involved, on-site and in the clinic, and the first dose should be directly observed. To maximize adherence with recommended therapies, on-site, directly observed single-dose therapy with azithromycin should always be available for persons for whom adherence with multiday dosing is a considerable concern.

Other Management Considerations

To minimize disease transmission to sex partners, persons treated for chlamydia should be instructed to abstain from sexual intercourse for 7 days after single-dose therapy or until completion of a 7-day regimen and resolution of symptoms if present. To minimize risk for reinfection, patients also should be instructed to abstain from sexual intercourse until all of their sex partners have been treated. Persons who receive a diagnosis of chlamydia should be tested for HIV, gonorrhea, and syphilis. MSM who are HIV negative with a rectal chlamydia diagnosis should be offered HIV PrEP.

Follow-Up

Test of cure to detect therapeutic failure (i.e., repeat testing 4 weeks after completing therapy) is not advised for nonpregnant persons treated with the recommended or alternative regimens, unless therapeutic adherence is in question, symptoms persist, or reinfection is suspected. Moreover, using chlamydial NAATs at <4 weeks after completion of therapy is not recommended because the continued presence of nonviable organisms (*553*,*818*,*819*) can lead to false-positive results.

A high prevalence of *C. trachomatis* infection has been observed among women and men who were treated for chlamydial infection during the preceding months (*753*,*755*,*820*–*822*). The majority of posttreatment infections do not result from treatment failure but rather from reinfection caused by failure of sex partners to receive treatment or initiation of sexual activity with a new infected partner (*823*), indicating a need for improved education and treatment of sex partners. Repeat infections confer an elevated risk for PID and other complications among women. Men and women who have been treated for chlamydia should be retested approximately 3 months after treatment, regardless of whether they believe their sex partners were treated; scheduling the follow-up visit at the time of treatment is encouraged (*753*). If retesting at 3 months is not possible, clinicians should retest whenever persons next seek medical care <12 months after initial treatment.

Management of Sex Partners

Sex partners should be referred for evaluation, testing, and presumptive treatment if they had sexual contact with the partner during the 60 days preceding the patient's onset of symptoms or chlamydia diagnosis. Although the exposure intervals defining identification of sex partners at risk are

观察性研究还表明，对于男性和女性的直肠沙眼衣原体感染，多西环素比阿奇霉素更有效(*748*,*811*)。一项针对MSM直肠衣原体感染治疗的随机试验报告，多西环素的微生物学治愈率为100%，阿奇霉素为74%(812)。一篇已发表的综述报告，在患有泌尿生殖道沙眼衣原体感染的女性中，33%-83%在肛门直肠部位检测到沙眼衣原体，且其检出与接受性肛门直肠性行为的报告无关(813)。

尽管口咽部*C.trachomatis*感染的临床意义尚不明确，且不推荐常规进行口咽部筛查，但口咽部*C.trachomatis*可通过性行为传播至生殖器部位(*211*,*814*)；因此，若在筛查咽部淋病时从口咽部标本中检出*C.trachomatis*，应予以治疗。关于抗菌方案对口咽部衣原体感染疗效的证据有限；然而，最近发表的一项观察性研究表明，多西环素对口咽部衣原体感染可能比阿奇霉素更有效(815)。

现有证据支持多西环素对泌尿生殖道、直肠和口咽部沙眼衣原体感染有效。尽管阿奇霉素对女性泌尿生殖道沙眼衣原体感染保持高效，但对其治疗合并直肠沙眼衣原体感染的有效性存在担忧，这种合并感染在女性中常见，且无法通过报告的性活动预测。在患有泌尿生殖道衣原体的女性中，未充分治疗的直肠沙眼衣原体感染可增加传播风险，并通过肛门直肠部位的自身接种使女性面临重复泌尿生殖道沙眼衣原体感染的风险（816）。多西环素也有延迟释放200毫克片剂配方，需每日一次给药，持续7天，其治疗男性和女性泌尿生殖道沙眼衣原体感染的效果与多西环素100毫克每日两次、持续7天相当。其费用较高，但胃肠道副作用的发生频率较低（817）。左氧氟沙星是有效的替代治疗选择，但费用更高。红霉素不再推荐使用，因为胃肠道副作用频繁，可能导致依从性不佳。当对多西环素方案的依从性成为重大担忧时，阿奇霉素1克方案是替代治疗选择，但可能需要治疗后评估和检测，因为其在直肠感染患者中显示的治疗效果较低。

对于接受多剂方案者，药物应在现场和诊所内配发所有相关剂量，且首剂应直接观察。为最大限度地提高对推荐治疗的依从性，对于多日给药依从性存在重大顾虑者，应始终提供阿奇霉素的现场直接观察单剂治疗。

其他管理考虑

为尽量减少疾病传播给性伴侣，应告知接受衣原体治疗的人员在单剂治疗后7天内，或直至完成7天方案且症状(如有)消退之前，避免性交。为尽量减少再感染风险，还应告知患者在全部性伴侣接受治疗之前避免性交。被诊断为衣原体感染的人员应接受HIV、淋病和梅毒检测。HIV阴性且诊断为直肠衣原体感染的MSM应接受HIV PrEP。

随访

对于接受推荐方案或替代方案治疗的非妊娠人员，不建议进行治愈检测以发现治疗失败(即完成治疗后4周重复检测)，除非依从性存疑、症状持续或怀疑再感染。此外，不建议在完成治疗后<4周使用衣原体NAAT,因为非存活菌体的持续存在(*553*,*818*,*819*)可导致假阳性结果。

在既往数月内因衣原体感染接受治疗的女性与男性中，已观察到*C.trachomatis*感染的高流行率(*753*,*755*,*820* - *822*)。大多数治疗后感染并非源于治疗失败，而是由于性伴侣未接受治疗或与新感染伴侣开始性活动导致的再感染(823)，这表明需要改进对性伴侣的健康教育和治疗。重复感染会升高女性PID及其他并发症的风险。接受衣原体治疗的男性和女性应在治疗后约3个月复检，无论其是否认为性伴侣已接受治疗；鼓励在治疗时安排随访就诊(753)。若3个月时无法复检，临床医生应在初次治疗后<12个月内患者下次就医时复检。

性伴侣的管理

如果性伴在患者症状出现或衣原体诊断前60天内与其有性接触，应转介其进行评估、检测和推定治疗。尽管界定有风险性伴识别的暴露间隔是

based on limited data, the most recent sex partner should be evaluated and treated, even if the time of the last sexual contact was >60 days before symptom onset or diagnosis.

If health department partner management strategies (e.g., disease intervention specialists) are impractical or unavailable for persons with chlamydia, and if a provider is concerned that sex partners are unable to promptly access evaluation and treatment services, EPT should be considered as permitted by law (see Partner Services). Compared with standard patient referral of partners, this approach to therapy, which involves delivering the medication itself or a prescription by the patient or collaborating pharmacy, has been associated with decreased rates of persistent or recurrent chlamydia among women (*125*–*127*). Providers should provide patients with written educational materials to give to their partners about chlamydia, which should include notification that partners have been exposed and information about the importance of treatment. These materials also should inform partners about potential therapy-related allergies and adverse effects, along with symptoms indicative of complications (e.g., testicular pain among men and pelvic or abdominal pain among women). Educational materials for female partners should include information about the importance of seeking medical evaluation, especially if PID symptoms are present; undertreatment of PID among female partners and missed opportunities for diagnosing other STIs among women are concerning. MSM with chlamydia have a high risk for coexisting infections, especially undiagnosed HIV, among their partners and might have partners without HIV who could benefit from HIV PrEP. Data are also limited regarding effectiveness of EPT in reducing persistent or recurrent chlamydia among MSM (*123*,*133*,*134*); thus, shared clinical decision-making regarding EPT for MSM is recommended. Having partners accompany patients when they return for treatment is another strategy that has been used successfully for ensuring partner treatment (see Partner Services). To avoid reinfection, sex partners should be instructed to abstain from condomless sexual intercourse until they and their sex partners have been treated (i.e., after completion of a 7-day regimen) and any symptoms have resolved.

Special Considerations

Pregnancy

Clinical experience and published studies indicate that azithromycin is safe and effective during pregnancy (*824*–*826*). Doxycycline is contraindicated during the second and third trimesters of pregnancy because of risk for tooth discoloration. Human data reveal that levofloxacin presents a low risk to the fetus during pregnancy but has potential for toxicity during breastfeeding; however, data from animal studies increase concerns regarding cartilage damage to neonates (*431*).

Test of cure (i.e., repeat testing after completion of therapy) to document chlamydial eradication, preferably by NAAT, at approximately 4 weeks after therapy completion during pregnancy is recommended because severe sequelae can occur among mothers and neonates if the infection persists. In addition, all pregnant women who have chlamydial infection diagnosed should be retested 3 months after treatment. Detection of *C. trachomatis* infection during the third semester is not uncommon among adolescent and young adult women, including those without *C. trachomatis* detected at the time of initial prenatal screening (*827*). Women aged <25 years and those at increased risk for chlamydia (i.e., those who have a new sex partner, more than one sex partner, a sex partner with concurrent partners, or a sex partner who has an STI) should be screened at the first prenatal visit and rescreened during the third trimester to prevent maternal postnatal complications and chlamydial infection in the infant (*149*).

Recommended Regimen for Chlamydial Infection During Pregnancy
Azithromycin 1 g orally in a single dose

Alternative Regimen
Amoxicillin 500 mg orally 3 times/day for 7 days

Because of concerns regarding chlamydia persistence after exposure to penicillin-class antibiotics that has been demonstrated in animal and in vitro studies, amoxicillin is listed as an alternative therapy for *C. trachomatis* for pregnant women (*828*,*829*). Erythromycin is no longer recommended because of the frequency of gastrointestinal side effects that can result in therapy nonadherence. In addition, systematic reviews and meta-analyses have noted an association with macrolide antimicrobials, especially erythromycin, during pregnancy and adverse child outcomes, indicating cautious use in pregnancy (*830*–*831*).

HIV Infection

Persons who have chlamydia and HIV infection should receive the same treatment regimen as those who do not have HIV.

Chlamydial Infection Among Neonates

Prenatal screening and treatment of pregnant women is the best method for preventing chlamydial infection among neonates. *C. trachomatis* infection of neonates results from perinatal exposure to the mother's infected cervix. Initial *C. trachomatis* neonatal infection involves the mucous

基于有限数据，最近的性伴应接受评估和治疗，即使最后一次性接触时间在症状出现或诊断前>60天。

如果对于衣原体感染者，卫生部门伴侣管理策略(例如疾病干预专家)不切实际或不可用，且如果提供者担心性伴侣无法及时获得评估和治疗服务，则应在法律允许的情况下考虑EPT(见Partner Services)。与标准的患者伴侣转介相比，这种治疗方法(涉及由患者或合作药房递送药物本身或处方)与女性持续性或复发性衣原体感染率降低相关(*125 - 127*)。提供者应向患者提供书面教育材料以转交其伴侣，内容关于衣原体，应包括告知伴侣已暴露以及治疗重要性的信息。这些材料还应告知伴侣潜在的治疗相关过敏和不良反应，以及提示并发症的症状(例如男性睾丸疼痛和女性盆腔或腹部疼痛)。面向女性伴侣的教育材料应包括寻求医学评估重要性的信息，尤其是存在PID症状时；女性伴侣中PID治疗不足以及女性其他STI诊断机会遗漏令人担忧。感染衣原体的MSM其伴侣合并感染风险高，尤其是未诊断的HIV，且可能有HIV阴性伴侣可从HIV PrEP获益。关于EPT在减少MSM持续性或复发性衣原体感染方面有效性的数据也有限(*123*,*133*,*134*)；因此，建议就MSM的EPT进行共同临床决策。让伴侣在患者返回治疗时陪同患者是另一种已成功用于确保伴侣治疗的策略(见Partner Services)。为避免再感染，应告知性伴侣在双方均接受治疗(即完成7天方案)且任何症状消退之前避免无套性交。

衣原体感染期间的推荐治疗方案 妊娠
阿奇霉素 1 g 口服，单次给药

替代方案
阿莫西林 500 mg 口服每日3次共7天

由于动物和体外研究显示，暴露于青霉素类抗生素后会出现衣原体持续存在，因此阿莫西林被列为妊娠女性沙眼衣原体感染的替代治疗方案(*828*,*829*)。红霉素不再推荐使用，因为其胃肠道副作用发生频率较高，可导致治疗依从性不佳。此外，系统综述和荟萃分析注意到，妊娠期使用大环内酯类抗菌药物(尤其是红霉素)与儿童不良结局存在关联，提示妊娠期应谨慎使用(*830 - 831*)。

HIV感染

衣原体合并HIV感染者应接受与无HIV感染者相同的治疗方案。

衣原体感染在新生儿中

产前筛查和治疗孕妇是预防新生儿衣原体感染的最佳方法。新生儿*C.trachomatis*感染源于围产期暴露于母亲感染的宫颈。初始*C.trachomatis*新生儿感染涉及黏膜

特殊考虑

妊娠

临床经验和已发表的研究表明，阿奇霉素在妊娠期间安全有效(*824 - 826*)。多西环素在妊娠第二和第三孕期禁用，因为有牙齿变色风险。人类数据显示，左氧氟沙星在妊娠期间对胎儿风险低，但在

哺乳期有潜在毒性；然而，动物研究数据增加了对新生儿软骨损伤的担忧(431)。

推荐在妊娠期完成治疗后约4周进行治愈检测(即在完成治疗后重复检测)，最好采用NAAT，以确认衣原体已被清除，因为如果感染持续存在，母亲和新生儿可能发生严重后遗症。此外，所有确诊衣原体感染的孕妇应在治疗后3个月重新检测。在青少年和年轻成年女性中，包括在初次产前筛查时未检出*C.trachomatis*者，在妊娠晚期检出*C.trachomatis*感染并不少见(827)。年龄<25岁的女性以及衣原体感染风险增加者(即有新性伴、有多个性伴、性伴有同时存在的其他性伴,或性伴有STI者)应在首次产前检查时接受筛查,并在妊娠晚期再次筛查,以预防母亲产后并发症和婴儿衣原体感染(149)。

membranes of the eye, oropharynx, urogenital tract, and rectum, although infection might be asymptomatic in these locations. Instead, *C. trachomatis* infection among neonates is most frequently recognized by conjunctivitis that develops 5–12 days after birth. *C. trachomatis* also can cause a subacute, afebrile pneumonia with onset at ages 1–3 months. Although *C. trachomatis* has been the most frequent identifiable infectious cause of ophthalmia neonatorum, neonatal chlamydial infections, including ophthalmia and pneumonia, have occurred less frequently since institution of widespread prenatal screening and treatment of pregnant women. Neonates born to mothers at high risk for chlamydial infection, with untreated chlamydia, or with no or unconfirmed prenatal care, are at high risk for infection. However, presumptive treatment of the neonate is not indicated because the efficacy of such treatment is unknown. Infants should be monitored to ensure prompt and age-appropriate treatment if symptoms develop. Processes should be in place to ensure communication between physicians and others caring for the mother and the newborn to ensure thorough monitoring of the newborn after birth.

Ophthalmia Neonatorum Caused by *C. trachomatis*

A chlamydial etiology should be considered for all infants aged ≤30 days who experience conjunctivitis, especially if the mother has a history of chlamydial infection. These infants should receive evaluation and age-appropriate care and treatment.

Preventing Ophthalmia Neonatorum Caused by *C. trachomatis*

Neonatal ocular prophylaxis with erythromycin, the only agent available in the United States for this purpose, is ineffective against chlamydial ophthalmia neonatorum (or pneumonia) (*833*). As an alternative, prevention efforts should focus on prenatal screening for *C. trachomatis,* including

- screening pregnant women at risk for *C. trachomatis* infection at the first prenatal visit (e.g., women aged <25 years and those aged ≥25 years who have a new sex partner, more than one sex partner, a sex partner with concurrent partners, or a sex partner who has an STI);
- treating all pregnant women with *C. trachomatis* during pregnancy and performing a test of cure 4 weeks after treatment to verify chlamydial eradication; these women should also be retested 3 months after treatment and again in the third trimester or at time of delivery, and their partners should also be tested and treated;
- retesting pregnant women during the third trimester who initially tested negative but remained at increased risk for acquiring infection (e.g., women aged <25 years and those aged ≥25 years who have a new sex partner, more than one sex partner, a sex partner with concurrent partners, or a sex partner who has an STI); and
- screening at delivery those pregnant women who were not screened for *C. trachomatis* during pregnancy if at risk or who had no prenatal care; physicians and others caring for the mother and the newborn should communicate to ensure follow-up on the results of laboratory tests performed at delivery, and if positive, prompt and age-appropriate treatment for the newborn and the mother.

Neonates born to mothers for whom prenatal chlamydia screening has been confirmed and the results are negative are not at high risk for infection.

Diagnostic Considerations

Sensitive and specific methods for diagnosing chlamydial ophthalmia in the neonate include both tissue culture and nonculture tests (e.g., DFA tests and NAATs). DFA is the only nonculture FDA-cleared test for detecting chlamydia from conjunctival swabs. NAATs are not cleared by FDA for detecting chlamydia from conjunctival swabs, and clinical laboratories should verify the procedure according to CLIA regulations. Specimens for culture isolation and nonculture tests should be obtained from the everted eyelid by using a Dacron (DuPont)-tipped swab or the swab specified by the manufacturer's test kit; for culture and DFA, specimens must contain conjunctival cells, not exudate alone. Ocular specimens from neonates being evaluated for chlamydial conjunctivitis also should be tested for *N. gonorrhoeae* (see Ophthalmia Neonatorum Caused by *N. gonorrhoeae*).

Treatment

Recommended Regimen for Chlamydial Infection Among Neonates

Erythromycin base or ethyl succinate 50 mg/kg body weight/day orally, divided into 4 doses daily for 14 days*

* An association between oral erythromycin and azithromycin and infantile hypertrophic pyloric stenosis (IHPS) has been reported among infants aged <6 weeks. Infants treated with either of these antimicrobials should be followed for IHPS signs and symptoms.

Although data regarding use of azithromycin for treating neonatal chlamydial infection are limited, available data demonstrate that a short therapy course might be effective (*834*). Topical antibiotic therapy alone is inadequate for treating ophthalmia neonatorum caused by chlamydia and is unnecessary when systemic treatment is administered.

Follow-Up

Because the efficacy of erythromycin treatment for ophthalmia neonatorum is approximately 80%, a second course of therapy might be required (*834*,*835*). Data regarding

眼、口咽、泌尿生殖道和直肠的黏膜，尽管在这些部位感染可能无症状。相反，新生儿沙眼衣原体感染最常通过出生后5-12天发生的结膜炎而被识别。沙眼衣原体也可引起亚急性、无发热性肺炎，发病年龄为1-3月龄。尽管沙眼衣原体一直是新生儿眼炎最常见的可识别感染性病因，但自广泛开展产前筛查和妊娠女性治疗以来，新生儿衣原体感染(包括眼炎和肺炎)的发生频率已降低。母亲为衣原体感染高风险、患有未经治疗的衣原体感染，或未接受或未确认产前保健的新生儿，感染风险高。然而，不推荐对新生儿进行推定治疗，因为此类治疗的疗效尚不明确。应对婴儿进行监测，以确保在出现症状时及时给予适龄治疗。应建立相关流程，确保医生与照护母亲和新生儿的其他人员之间的沟通，以保证出生后对新生儿进行全面监测。

由沙眼衣原体引起的新生儿眼炎

对于所有≤30天出现结膜炎的婴儿，应考虑衣原体病因，尤其是如果母亲有衣原体感染史。这些婴儿应接受评估以及适龄的照护和治疗。

预防由沙眼衣原体引起的新生儿眼炎

新生儿眼部预防性使用红霉素(美国唯一可用于此目的的药物)对衣原体性新生儿眼炎(或肺炎)无效(833)。作为替代方案，预防工作应侧重于产前筛查*C.trachomatis*，包括

- 筛查有沙眼衣原体感染风险的孕妇
  首次产前检查时的感染(例如，年龄<25岁的女性以及年龄≥25岁但有新性伴侣、多个性伴侣、有并发性伴侣的性伴侣或患有STI的性伴侣的女性)；
- 在孕期治疗所有感染沙眼衣原体的孕妇
  妊娠，并在治疗后4周进行治愈检测以确认衣原体清除；这些女性还应在治疗后3个月以及妊娠晚期或分娩时再次检测，其性伴侣也应接受检测和治疗；
- 在妊娠晚期对以下孕妇进行重新检测：
  初始检测为阴性但仍处于感染获得风险增加状态的女性(例如，年龄<25岁的女性以及年龄≥25岁但有新性伴侣、多个性伴侣、有并发性伴侣的性伴侣或患有STI的性伴侣)；以及 • 对妊娠期间未

筛查*C.trachomatis*的孕妇(如有风险或未接受产前保健)在分娩时进行筛查；照护母亲和新生儿的医生及其他人员应沟通以确保对分娩时进行的实验室检测结果进行随访，如为阳性，应及时为新生儿和母亲提供适龄治疗。产前衣原体筛查已确认且结果为阴性的母亲所生的新生儿不属于感染高危人群。

诊断考虑

诊断新生儿衣原体眼炎的敏感且特异的方法包括组织培养和非培养检测(例如，DFA试验和NAAT)。DFA是唯一经FDA批准用于检测结膜拭子中衣原体的非培养试验。NAAT未获FDA批准用于检测结膜拭子中的衣原体，临床实验室应根据CLIA法规验证该程序。用于培养分离和非培养检测的标本应通过使用Dacron(DuPont)头拭子或制造商检测试剂盒指定的拭子，从外翻的眼睑获取；对于培养和DFA，标本必须含有结膜细胞，而不仅仅是渗出物。对接受衣原体结膜炎评估的新生儿，其眼部标本还应检测淋病奈瑟菌(见由淋病奈瑟菌引起的新生儿眼炎)。

治疗

衣原体感染推荐治疗方案
新生儿

红霉素碱或乙基琥珀酸酯 50 mg/kg 体重/天
口服，每日分4次服用，共14天*

* 已有报告称口服红霉素和阿奇霉素与年龄<6周婴儿的婴儿肥厚性幽门狭窄(IHPS)之间存在关联。接受上述任一抗菌药物治疗的婴儿应随访IHPS的体征和症状。

尽管关于使用阿奇霉素治疗新生儿衣原体感染的数据有限，但现有数据表明短期疗程可能有效(834)。单纯局部抗生素治疗不足以治疗由衣原体引起的新生儿眼炎，且在给予全身治疗时无需局部治疗。

随访

由于红霉素治疗新生儿眼炎的有效率约为80%，可能需要第二个疗程(*834*, *835*)。关于

the efficacy of azithromycin for ophthalmia neonatorum are limited. Therefore, follow-up of infants is recommended to determine whether the initial treatment was effective. The possibility of concomitant chlamydial pneumonia should be considered (see Infant Pneumonia Caused by *C. trachomatis*).

Management of Mothers and Their Sex Partners

Mothers of infants who have ophthalmia caused by chlamydia and the sex partners of these women should be evaluated and presumptively treated for chlamydia (see Chlamydial Infection Among Adolescents and Adults).

Infant Pneumonia Caused by *C. trachomatis*

Chlamydial pneumonia among infants typically occurs at age 1–3 months and is a subacute pneumonia. Characteristic signs of chlamydial pneumonia among infants include a repetitive staccato cough with tachypnea and hyperinflation and bilateral diffuse infiltrates on a chest radiograph. In addition, peripheral eosinophilia (≥400 cells/mm^3) occurs frequently. Because clinical presentations differ, all infants aged 1–3 months suspected of having pneumonia, especially those whose mothers have a history of, are at risk for (e.g., aged <25 years and those aged ≥25 years who have a new sex partner, more than one sex partner, a sex partner with concurrent partners, or a sex partner who has an STI), or suspected of having a chlamydial infection should be tested for *C. trachomatis* and treated if infected.

Diagnostic Considerations

Specimens for chlamydial testing should be collected from the nasopharynx. Tissue culture is the definitive standard diagnostic test for chlamydial pneumonia. Nonculture tests (e.g., DFA and NAAT) can be used. DFA is the only nonculture FDA-cleared test for detecting *C. trachomatis* from nasopharyngeal specimens; however, DFA of nasopharyngeal specimens has a lower sensitivity and specificity than culture. NAATs are not cleared by FDA for detecting chlamydia from nasopharyngeal specimens, and clinical laboratories should verify the procedure according to CLIA regulations (*553*). Tracheal aspirates and lung biopsy specimens, if collected, should be tested for *C. trachomatis*.

Treatment

Because test results for chlamydia often are unavailable at the time initial treatment decisions are being made, treatment for *C. trachomatis* pneumonia frequently is based on clinical and radiologic findings, age of the infant (i.e., 1–3 months), and risk for chlamydia in the mother (i.e., aged <25 years, history of chlamydial infection, multiple sex partners, a sex partner with a concurrent partner, or a sex partner with a history of an STI). In the absence of laboratory results in a situation with a high degree of suspicion of chlamydial infection and the mother is unlikely to return with the infant for follow-up, exposed infants can be presumptively treated with the shorter-course regimen of azithromycin 20 mg/kg body weight/day orally, 1 dose daily for 3 days.

Recommended Regimen for Chlamydial Pneumonia Among Infants
Erythromycin base or ethyl succinate 50 mg/kg body weight/day orally divided into 4 doses daily for 14 days

Alternative Regimen
Azithromycin suspension 20 mg/kg body weight/day orally, 1 dose daily for 3 days

Follow-Up

Because erythromycin effectiveness in treating pneumonia caused by *C. trachomatis* is approximately 80%, a second course of therapy might be required (*836*). Data regarding effectiveness of azithromycin in treating chlamydial pneumonia are limited. Follow-up of infants is recommended to determine whether the pneumonia has resolved, although certain infants with chlamydial pneumonia continue to have abnormal pulmonary function tests later during childhood.

Management of Mothers and Their Sex Partners

Mothers of infants who have chlamydial pneumonia and the sex partners of these women should be evaluated, tested, and presumptively treated for chlamydia (see Chlamydial Infection Among Adolescents and Adults).

Chlamydial Infection Among Infants and Children

Sexual abuse should be considered a cause of chlamydial infection among infants and children. However, perinatally transmitted *C. trachomatis* infection of the nasopharynx, urogenital tract, and rectum can persist for 2–3 years (see Sexual Assault or Abuse of Children).

Diagnostic Considerations

NAATs can be used to test vaginal and urine specimens from girls and urine in boys (see Sexual Assault or Abuse of Children). Data are lacking regarding use of NAATs for specimens from extragenital sites (rectum and pharynx) among boys and girls (*553*); other nonculture tests (e.g., DFA) are not recommended because of specificity concerns. Although data regarding NAATs for specimens from extragenital sites for children are more limited and performance is test dependent (*553*), no evidence supports that NAAT performance

阿奇霉素治疗新生儿眼炎有效性的数据有限。因此，建议对婴儿进行随访以确定初始治疗是否有效。应考虑合并衣原体肺炎的可能性(见由*C.trachomatis*引起的婴儿肺炎)。

母亲及其性伴侣的管理

患有衣原体所致眼炎的婴儿的母亲及这些女性的性伴侣应接受评估并推定治疗衣原体(见青少年和成人衣原体感染)。

由沙眼衣原体引起的婴儿肺炎

婴儿衣原体肺炎通常发生于1-3月龄，为亚急性肺炎。婴儿衣原体肺炎的特征性体征包括伴呼吸急促的重复性断续咳嗽，以及胸部X线片上的过度充气和双侧弥漫性浸润。此外，外周血嗜酸性粒细胞增多(≥400 cells/mm ^{3})经常发生。由于临床表现不同，所有疑似肺炎的1-3月龄婴儿，尤其是其母亲有衣原体感染史、处于衣原体感染风险(例如，年龄<25岁,以及年龄≥25岁且有新性伴、有多个性伴、性伴有同时存在的性伴,或性伴有STI)或疑似衣原体感染者,均应检测沙眼衣原体，如感染则进行治疗。

诊断考虑

衣原体检测标本应从鼻咽部采集。组织培养是衣原体肺炎的确定性标准诊断试验。可使用非培养检测(例如，DFA和NAAT)。DFA是唯一经FDA批准用于检测鼻咽部标本中沙眼衣原体的非培养试验；然而，鼻咽部标本的DFA敏感性和特异性低于培养。NAAT未获FDA批准用于检测鼻咽部标本中的衣原体，临床实验室应根据CLIA法规验证该程序(553)。气管抽吸物和肺活检标本如采集，应检测沙眼衣原体。

治疗

由于在做出初始治疗决定时衣原体检测结果往往不可获得，*C.trachomatis*肺炎的治疗常基于临床和影像学发现、婴儿年龄(即1-3个月)以及母亲衣原体感染风险(即年龄<25岁、衣原体感染史、多个性伴侣、有并发性伴侣的性伴侣或有STI史的性伴侣)。在高度怀疑衣原体感染且母亲不太可能带婴儿回来随访的情况下，若无实验室结果，暴露婴儿可推定使用较短疗程方案治疗：阿奇霉素20 mg/kg体重/天口服，每日1次，共3天。

衣原体肺炎推荐治疗方案 婴儿
红霉素碱或乙基琥珀酸酯 50 mg/kg体重/天口服，每日分4次给药，共14天

替代方案
阿奇霉素混悬液 20 mg/kg体重/天口服，每日1次，共3天

随访

由于红霉素治疗*C.trachomatis*所致肺炎的有效率约为80%，可能需要第二个疗程(836)。关于阿奇霉素治疗衣原体肺炎有效性的数据有限。建议对婴儿进行随访以确定肺炎是否消退，尽管某些衣原体肺炎婴儿在儿童期后期仍存在肺功能检查异常。

母亲及其性伴侣的管理

患有衣原体肺炎的婴儿的母亲及这些女性的性伴侣应接受评估、检测并推定治疗衣原体(见青少年和成人衣原体感染)。

衣原体感染在婴儿和儿童

性虐待应被视为婴儿和儿童衣原体感染的原因之一。然而，围产期传播的*C.trachomatis*鼻咽部、泌尿生殖道和直肠感染可持续2-3年(见儿童性侵犯或虐待)。

诊断考虑

NAAT可用于检测女孩的阴道和尿液标本以及男孩的尿液标本(见儿童性侵犯或虐待)。关于在男孩和女孩中使用NAAT检测生殖器外部位(直肠和咽部)标本的数据尚缺乏(553)；由于特异性方面的顾虑，不推荐使用其他非培养检测(如DFA)。尽管关于儿童生殖器外部位标本NAAT的数据较为有限且性能取决于具体检测方法(553)，但尚无证据支持NAAT性能

for detecting *C. trachomatis* for extragenital sites among children would differ from that among adults. Because of the implications of a diagnosis of *C. trachomatis* infection in a child, only CLIA-validated, FDA-cleared NAAT should be used for extragenital site specimens (*837*).

Recommended Regimens for Chlamydial Infection Among Infants and Children

For infants and children weighing <45 kg: Erythromycin base or ethyl succinate 50 mg/kg body weight/day orally divided into 4 doses daily for 14 days

Data are limited regarding the effectiveness and optimal dose of azithromycin for treating chlamydial infection among infants and children weighing <45 kg.

For children weighing ≥45 kg but aged <8 years: Azithromycin 1 g orally in a single dose

For children aged ≥8 years: Azithromycin 1 g orally in a single dose
or
Doxycycline 100 mg orally 2 times/day for 7 days

Other Management Considerations

See Sexual Assault or Abuse of Children.

Follow-Up

A test of cure to detect therapeutic failure ensures treatment effectiveness and should be obtained at a follow-up visit approximately 4 weeks after treatment is completed.

Gonococcal Infections

Gonococcal Infection Among Adolescents and Adults

In the United States, an estimated 1,568,000 new *N. gonorrhoeae* infections occur each year (*141*,*838*), and gonorrhea is the second most commonly reported bacterial communicable disease. Urethral infections caused by *N. gonorrhoeae* can produce symptoms among men that cause them to seek curative treatment soon enough to prevent sequelae, but often not soon enough to prevent transmission to others. Among women, gonococcal infections are commonly asymptomatic or might not produce recognizable symptoms until complications (e.g., PID) have occurred. PID can result in tubal scarring that can lead to infertility or ectopic pregnancy.

Annual screening for *N. gonorrhoeae* infection is recommended for all sexually active women aged <25 years and for older women at increased risk for infection (e.g., those aged ≥25 years who have a new sex partner, more than one sex partner, a sex partner with concurrent partners, or a sex partner who has an STI) (*149*). Additional risk factors for gonorrhea include inconsistent condom use among persons who are not in mutually monogamous relationships, previous or coexisting STIs, and exchanging sex for money or drugs. Clinicians should consider the communities they serve and consult local public health authorities for guidance regarding identifying groups at increased risk. Gonococcal infection, in particular, is concentrated in specific geographic locations and communities. MSM at high risk for gonococcal infection (e.g., those with multiple anonymous partners or substance abuse) or those at risk for HIV acquisition should be screened at all anatomic sites of exposure every 3–6 months (see Men Who Have Sex with Men). At least annual screening is recommended for all MSM. Screening for gonorrhea among heterosexual men and women aged >25 years who are at low risk for infection is not recommended (*149*). A recent travel history with sexual contacts outside the United States should be part of any gonorrhea evaluation.

Diagnostic Considerations

Specific microbiologic diagnosis of *N. gonorrhoeae* infection should be performed for all persons at risk for or suspected of having gonorrhea; a specific diagnosis can potentially reduce complications, reinfections, and transmission. Culture, NAAT, and POC NAAT, such as GeneXpert (Cepheid), are available for detecting genitourinary infection with *N. gonorrhoeae* (*149*); culture requires endocervical (women) or urethral (men) swab specimens. Culture is also available for detecting rectal, oropharyngeal, and conjunctival gonococcal infection. NAATs and POC NAATs) allow for the widest variety of FDA-cleared specimen types, including endocervical and vaginal swabs and urine for women, urethral swabs and urine for men, and rectal swabs and pharyngeal swabs for men and women (www.accessdata.fda.gov/cdrh_docs/reviews/K121710.pdf). However, product inserts for each NAAT manufacturer should be consulted carefully because collection methods and specimen types vary. Certain NAATs that have been demonstrated to detect commensal *Neisseria* species might have comparable low specificity when testing oropharyngeal specimens for *N. gonorrhoeae* (*553*). NAAT sensitivity for detecting *N. gonorrhoeae* from urogenital and nongenital anatomic sites is superior to culture but varies by NAAT type (*553*,*800*–*803*). For urogenital infections, optimal specimen types for gonorrhea screening using NAATs include first-void urine for men and vaginal swab specimens for women (*553*). Patient-collected samples can be used in place of provider-collected samples in clinical settings when testing by NAAT for urine (men and women), vaginal swabs, rectal swabs, and oropharyngeal swabs after patient instructions have been provided (*209*,*806*,*839*–*842*). Patient-collected specimens

儿童生殖器外部位检测*C.trachomatis*的方法可能与成人不同。由于儿童*C.trachomatis*感染诊断的影响，生殖器外部位标本应仅使用经CLIA验证、FDA批准的NAAT(837)。

婴儿和儿童衣原体感染的推荐方案

对于体重[空白]kg的婴儿和儿童：红霉素碱或乙基琥珀酸酯 50 mg/kg体重/天口服，每日分4次给药，共14天

关于阿奇霉素治疗体重<45 kg婴儿和儿童衣原体感染的有效性和最佳剂量的数据有限。

对于体重≥45 kg但年龄[空白]岁的儿童：阿奇霉素 1 g口服，单次给药

对于年龄≥8岁的儿童：阿奇霉素口服1 g，单次给药
或
多西环素 100 mg 口服每日2次连用7天

其他管理考虑

参见《儿童性侵犯或虐待》。

随访

治愈检测以发现治疗失败可确保治疗有效性，应在治疗完成后约4周的随访就诊时进行。

淋球菌感染

淋球菌感染在.....中青少年和成人

在美国，估计每年发生1,568,000例新的*N.gonorrhoeae*感染(*141*, *838*)，淋病是报告的第二常见细菌性传染病。由*N.gonorrhoeae*引起的尿道感染可在男性中产生症状，促使其尽早就医以获得治愈性治疗从而预防后遗症，但往往不够及时以预防传播给他人。在女性中，淋球菌感染通常无症状，或可能在并发症(如PID)发生后才产生可识别的症状。PID可导致输卵管瘢痕形成，进而导致不孕或异位妊娠。

建议对所有性活跃的年龄<25岁女性以及感染风险增加的年龄较大女性(例如,年龄≥25岁但有新性伴侣、多个性伴侣、有并发性伴侣的性伴侣或患有STI的性伴侣的女性)进行年度*N.gonorrhoeae*感染筛查(149)。淋病的其他危险因素包括非相互单一性伴侣关系中不安全套使用、既往或共存STI以及以性换取金钱或毒品。临床医生应考虑其所服务的社区，并咨询当地公共卫生机构以获取关于识别高风险群体的指导。淋球菌感染尤其集中在特定地理位置和社区。淋球菌感染高风险的MSM(如拥有多个匿名伴侣或物质滥用者)或有HIV感染风险者应每3-6个月在所有暴露解剖部位进行筛查(见男男性行为人群)。建议所有MSM至少每年筛查一次。不建议对感染低风险的>25岁异性恋男性和女性进行淋病筛查(149)。近期有美国境外性接触史的旅行史应作为任何淋病评估的一部分。

诊断考虑

对所有有淋病风险或疑似淋病者应进行*N.gonorrhoeae*感染的特异性微生物学诊断；特异性诊断可潜在减少并发症、再感染和传播。培养、NAAT和POC NAAT(如GeneXpert(Cepheid))可用于检测*N.gonorrhoeae*的泌尿生殖道感染(149)；培养需要宫颈内(女性)或尿道(男性)拭子标本。培养也可用于检测直肠、口咽和结膜淋球菌感染。NAAT和POC NAAT可支持FDA批准的最多种类标本类型，包括女性的宫颈内拭子和阴道拭子及尿液、男性的尿道拭子和尿液，以及男性和女性的直肠拭子和咽拭子(www.accessdata.fda.gov/cdrh_docs/reviews/K121710.pdf)。然而，应仔细查阅各NAAT生产商的说明书，因为采集方法和标本类型各不相同。某些已被证明可检测共生*Neisseria*菌种的NAAT在检测口咽标本中的*N.gonorrhoeae*时可能具有相当低的特异性(553)。NAAT检测泌尿生殖道和非生殖器解剖部位*N.gonorrhoeae*的敏感性优于培养，但因NAAT类型而异(*553*, *800 - 803*)。对于泌尿生殖道感染，使用NAAT进行淋病筛查的最佳标本类型包括男性的首段尿和女性的阴道拭子标本(553)。在临床环境中，在向患者提供指导后，患者自采样本可替代医务人员采集样本用于NAAT检测尿液(男性和女性)、阴道拭子、直肠拭子和口咽拭子(*209*, *806*, *839 - 842*)。患者自采标本

are reasonable alternatives to provider-collected swabs for gonorrhea screening by NAAT.

In cases of suspected or documented treatment failure, clinicians should perform both culture and antimicrobial susceptibility testing because NAATs cannot provide antimicrobial susceptibility results. Because *N. gonorrhoeae* has demanding nutritional and environmental growth requirements, optimal recovery rates are achieved when specimens are inoculated directly and when the growth medium is promptly incubated in an increased carbon dioxide (CO_2) environment (*553*). Nonnutritive swab transport systems are available that might maintain gonococcal viability for <48 hours in ambient temperatures (*843–845*).

Because of its high specificity (>99%) and sensitivity (>95%), a Gram stain of urethral discharge or secretions that demonstrate polymorphonuclear leukocytes with intracellular gram-negative diplococci can be considered diagnostic for infection with *N. gonorrhoeae* among symptomatic men. However, because of lower sensitivity, a negative Gram stain should not be considered sufficient for ruling out infection among asymptomatic men. Infection detection by using Gram stain of endocervical, pharyngeal, and rectal specimens also is insensitive and is not recommended. MB or GV stain of urethral secretions is an alternative POC diagnostic test with performance characteristics similar to Gram stain. Gonococcal infection is diagnosed among symptomatic men by documenting the presence of a WBC-containing intracellular purple diplococci in MB or GV smears.

Antimicrobial-Resistant *N. gonorrhoeae*

Gonorrhea treatment is complicated by the ability of *N. gonorrhoeae* to develop resistance to antimicrobials (*846–848*). In 1986, the Gonococcal Isolate Surveillance Project (GISP), a national sentinel surveillance system, was established to monitor trends in antimicrobial susceptibilities of urethral *N. gonorrhoeae* strains in the United States (*849*). The epidemiology of antimicrobial resistance guides decisions about gonococcal treatment recommendations and has evolved because of shifts in antimicrobial resistance patterns. During 2007, emergence of fluoroquinolone-resistant *N. gonorrhoeae* in the United States prompted CDC to cease recommending fluoroquinolones for gonorrhea treatment, leaving cephalosporins as the only remaining class of antimicrobials available for gonorrhea treatment in the United States (*850*). Reflecting concern about emerging gonococcal resistance, CDC's 2010 STD treatment guidelines recommended dual therapy for gonorrhea with a cephalosporin plus either azithromycin or doxycycline, even if NAAT for *C. trachomatis* was negative at the time of treatment (*851*). However, during 2006–2011, the minimum concentrations of cefixime needed to inhibit in vitro growth of the *N. gonorrhoeae* strains circulating in the United States and other countries increased, demonstrating that cefixime effectiveness might be waning (*851*). In addition, treatment failures with cefixime or other oral cephalosporins were reported in Asia (*852–855*), Europe (*856–860*), South Africa (*861*), and Canada (*862*,*863*). During that time, case reports of ceftriaxone treatment failures for pharyngeal infections reported in Australia (*864*,*865*), Japan (*866*), and Europe were concerning (*856*,*867*). Consequently, CDC no longer recommends cefixime as a first-line regimen for gonorrhea treatment in the United States (*868*). Since 2013, the proportion of GISP isolates that demonstrate reduced susceptibility (minimal inhibitory concentration [MIC] ≥2.0 μg/mL) to azithromycin has increased almost tenfold, to 5.1% in 2019 (*141*). Unlike the appearance of ciprofloxacin resistance in the early 2000s, and cefixime reduced-susceptibility isolates during 2010–2011, emergence of azithromycin resistance is not concentrated among certain populations (e.g., MSM in the western United States). Azithromycin has unique pharmacokinetic properties that might predispose to resistance due to its prolonged half-life (*869*,*870*). With the exception of a small cluster of gonorrhea strains with azithromycin resistance and reduced susceptibility to cefixime and ceftriaxone among seven patients during 2016, all gonorrhea strains identified by GISP are susceptible to either or both azithromycin and ceftriaxone or cefixime. In addition, since 2013, antimicrobial stewardship has become an urgent public health concern in the United States as described in *Antimicrobial Resistant Threats in the United States* (*871*). Emergence of azithromycin resistance is not isolated to *N. gonorrhoeae*; it has also been demonstrated in *M. genitalium* and such enteric pathogens as *Shigella* and *Campylobacter* (see *Mycoplasma genitalium*; Proctitis, Proctocolitis, and Enteritis). Finally, concern exists regarding azithromycin treatment efficacy for chlamydia (see Chlamydial Infections).

Dual therapy for gonococcal infection with ceftriaxone and azithromycin recommended in previous guidance might have mitigated emergence of reduced susceptibility to ceftriaxone in *N. gonorrhoeae*; however, concerns regarding potential harm to the microbiome and the effect on other pathogens diminishes the benefits of maintaining dual therapy. Consequently, only ceftriaxone is recommended for treating gonorrhea in the United States (*872*). Clinicians remaining vigilant for treatment failures is paramount, and CDC plans to continue to monitor for changing ceftriaxone MICs until additional antimicrobials or a vaccine is available. In cases in which chlamydial infection has not been excluded, patients should also receive antichlamydial therapy. CDC and state health departments participate in CDC-supported gonorrhea surveillance activities

是NAAT淋病筛查中由医务人员采集拭子的合理替代方法。

在疑似或已记录的治疗失败病例中，临床医生应同时进行培养和抗菌药物敏感性试验，因为NAAT无法提供抗菌药物敏感性结果。由于*N.gonorrhoeae*对营养和环境生长条件要求苛刻，当标本直接接种且生长培养基及时在增加二氧化碳(CO2)环境中孵育时可获得最佳回收率(553)。现有非营养性拭子运输系统可在环境温度下维持淋球菌活力<48小时(*843 - 845*)。

由于尿道分泌物或分泌物的革兰染色具有高特异性(>99%)和高敏感性(>95%)，显示多形核白细胞内有革兰阴性双球菌，在症状性男性中可被认为对*N.gonorrhoeae*感染具有诊断意义。然而，由于敏感性较低，革兰染色阴性不应被认为足以排除无症状男性的感染。使用宫颈内膜、咽部和直肠标本的革兰染色进行感染检测也不敏感，不推荐使用。尿道分泌物的MB或GV染色是一种替代POC诊断检测，其性能特征与革兰染色相似。在症状性男性中，通过记录MB或GV涂片中白细胞内紫色双球菌的存在来诊断淋球菌感染。

抗微生物药物耐药性淋病奈瑟菌

淋病治疗因*N.gonorrhoeae*对抗菌药物产生耐药的能力而变得复杂(*846 - 848*)。1986年，建立了淋球菌分离株监测项目(GISP)，这是一个国家哨点监测系统，用于监测美国尿道*N.gonorrhoeae*菌株的抗菌药物敏感性趋势(849)。抗菌药物耐药性的流行病学指导淋球菌治疗建议的决策，并因抗菌药物耐药模式的变化而演变。2007年期间，美国出现氟喹诺酮耐药*N.gonorrhoeae*促使CDC停止推荐氟喹诺酮类用于淋病治疗，使头孢菌素类成为美国淋病治疗中唯一剩余的可用抗菌药物类别(850)。反映对新兴淋球菌耐药性的担忧，CDC 2010年STD治疗指南推荐淋病采用头孢菌素联合阿奇霉素或多西环素的双重治疗，即使治疗时*C.trachomatis*的NAAT为阴性(851)。然而，在2006-2011年期间，抑制在美国和其他国家流行的*N.gonorrhoeae*菌株体外生长所需的最低头孢克肟浓度增加，表明头孢克肟的有效性可能正在减弱(851)。此外，亚洲(*852 - 855*)、欧洲(*856 - 860*)、南非(861)和加拿大(*862*, *863*)报告了头孢克肟或其他口服头孢菌素治疗失败。在此期间，澳大利亚(*864*, *865*)、日本(866)和欧洲报告的咽部感染头孢曲松治疗失败病例报告令人担忧(*856*, *867*)。因此，CDC不再推荐头孢克肟作为美国淋病治疗的一线方案(868)。自2013年以来，GISP分离株中对阿奇霉素敏感性降低(最低抑菌浓度[MIC] ≥2.0 μ g/mL)的比例增加了近十倍，2019年达到5.1%(141)。与2000年代初出现的环丙沙星耐药以及2010-2011年期间头孢克肟敏感性降低分离株不同，阿奇霉素耐药的出现并未集中在某些人群中(例如，美国西部的MSM)。阿奇霉素具有独特的药代动力学特性，由于其半衰期延长，可能易导致耐药(*869*, *870*)。除2016年7名患者中出现的一小群对阿奇霉素耐药且对头孢克肟和头孢曲松敏感性降低的淋病菌株外，GISP鉴定的所有淋病菌株对阿奇霉素和头孢曲松或头孢克肟中的一种或两种均敏感。此外，自2013年以来，抗菌药物管理已成为美国紧迫的公共卫生问题，如*antimicrobial Resistant Threats in the United States*所述(871) .阿奇霉素耐药性的出现并非仅限于*N.gonorrhoeae*；也已在*M.genitalium*以及诸如*Shigella*和*Campylobacter*等肠道病原体中得到证实(见*Mycoplasma genitalium*；直肠炎、直肠结肠炎和肠炎)。最后，关于阿奇霉素治疗衣原体有效性的担忧仍然存在(见衣原体感染)。

先前指南推荐的头孢曲松和阿奇霉素双重治疗淋球菌感染可能减轻了*N.gonorrhoeae*中对头孢曲松敏感性降低的出现；然而，对微生物组潜在危害和对其他病原体影响的担忧削弱了维持双重治疗的益处。因此，美国仅推荐头孢曲松用于治疗淋病(872)。临床医生对治疗失败保持警惕至关重要，CDC计划继续监测头孢曲松MIC的变化，直到有额外的抗菌药物或疫苗可用。在未排除衣原体感染的情况下，患者还应接受抗衣原体治疗。CDC和州卫生部门参与CDC支持的淋病监测活动

(https://www.cdc.gov/std/gisp) and can provide the most current information regarding gonococcal susceptibility.

Criteria for resistance to cefixime and ceftriaxone have not been defined by the Clinical and Laboratory Standards Institute (CLSI). However, isolates with cefixime or ceftriaxone MICs ≥0.5 μg/mL are considered to have decreased susceptibility (*873*). In the United States, the proportion of isolates in GISP demonstrating decreased susceptibility to ceftriaxone or cefixime has remained low; during 2019, <0.1% of isolates with decreased susceptibility (MIC ≥0.5 μg/mL) to ceftriaxone or cefixime were identified (*141*). Because increasing MICs might predict resistance emergence, GISP established lower cephalosporin MIC threshold values that are lower than the susceptibility breakpoints set by CLSI to provide greater sensitivity in detecting decreasing gonococcal susceptibility for surveillance purposes. The percentage of isolates with cefixime MICs ≥0.25 μg/mL increased from 0.1% during 2006 to 1.4% during 2011 (*851*,*874*) and declined to 0.3% during 2019 (*141*). The percentage of isolates with ceftriaxone MICs ≥0.125 μg/mL increased from <0.1% in 2006 to 0.4% in 2011 and decreased to 0.1% in 2019 (*141*). Isolates with high-level cefixime and ceftriaxone MICs (MICs = 1.5–8.0 μg/mL and MICs = 1.5–4.0 μg/mL, respectively) have been identified in Japan (*866*), France (*867*,*875*), Spain (*876*,*877*), the United Kingdom, and Australia (*878*,*879*). Decreased susceptibility of *N. gonorrhoeae* to cephalosporins and other antimicrobials is expected to continue; state and local surveillance for antimicrobial resistance is crucial for guiding local therapy recommendations (*846*,*847*). Although approximately 3% of all U.S. men who have gonococcal infections are sampled through GISP, surveillance by clinicians also is crucial. Clinicians who diagnose *N. gonorrhoeae* infection in a person with suspected cephalosporin treatment failure should perform culture and AST of relevant clinical specimens, consult an infectious disease specialist or an STD clinical expert (https://www.stdccn.org/render/Public) for guidance in clinical management, and report the case to CDC through state and local public health authorities within 24 hours. Isolates should be saved and sent to CDC through local and state public health laboratory mechanisms. Health departments should prioritize notification and culture evaluation for sexual partners of persons with *N. gonorrhoeae* infection thought to be associated with cephalosporin treatment failure or persons whose isolates demonstrate decreased susceptibility to cephalosporin. Agar dilution is the reference standard and preferred method of antimicrobial susceptibility testing with *N. gonorrhoeae*. Antibiotic gradient strips, such as Etest (bioMérieux), can be used and are considered an acceptable alternative for quantitative antimicrobial susceptibility testing with *N. gonorrhoeae* when manufacturer instructions are followed. Disc diffusion only provides qualitative susceptibility results.

Uncomplicated Gonococcal Infection of the Cervix, Urethra, or Rectum

Recommended Regimen for Uncomplicated Gonococcal Infection of the Cervix, Urethra, or Rectum Among Adults and Adolescents

Ceftriaxone 500 mg* IM in a single dose for persons weighing <150 kg

If chlamydial infection has not been excluded, treat for chlamydia with doxycycline 100 mg orally 2 times/day for 7 days.

* For persons weighing ≥150 kg, 1 g ceftriaxone should be administered.

Although clinical data confirm that a single injection of ceftriaxone 250 mg is >99% (95% confidence interval [CI]: 97.6%–99.7%) effective in curing anogenital gonorrhea of circulating isolates (MIC = 0.03 μg/mL), a higher dose is likely necessary for isolates with elevated MICs (*880*,*881*). Effective treatment of uncomplicated urogenital gonorrhea with ceftriaxone requires concentrations higher than the strain MIC for approximately 24 hours; although individual variability exists in the pharmacokinetics of ceftriaxone, a 500-mg dose of ceftriaxone is expected to achieve in approximately 50 hours MIC >0.03 μg/mL (*880*,*881*). The pharmacokinetics of ceftriaxone might be different in the pharynx with longer times higher than the strain MIC likely needed to prevent selection of mutant strains in the pharynx (*882*).

Single-dose injectable cephalosporin regimens, other than ceftriaxone, that are safe and have been effective against uncomplicated urogenital and anorectal gonococcal infections in the past include ceftizoxime (500 mg IM), cefoxitin (2 g IM with probenecid 1 g orally), and cefotaxime (500 mg IM). None of these injectable cephalosporins offer any advantage over ceftriaxone 250 mg for urogenital infection, and efficacy for pharyngeal infection is less certain (*883*,*884*). Because the ceftriaxone dose has been increased and the pharmacokinetics of other cephalosporins have not been evaluated, these dosing regimens might be at a disadvantage over ceftriaxone 500 mg.

Alternative Regimens if Ceftriaxone Is Not Available

Gentamicin 240 mg IM in a single dose
plus
Azithromycin 2 g orally in a single dose
or
Cefixime* 800 mg orally in a single dose

* If chlamydial infection has not been excluded, providers should treat for chlamydia with doxycycline 100 mg orally 2 times/day for 7 days.

In one clinical trial, dual treatment with single doses of IM gentamicin 240 mg plus oral azithromycin 2 g cured 100% of cases (lower one-sided 95% CI bound: 98.5%) and

(https://www.cdc.gov/std/gisp)，并能提供关于淋球菌敏感性的最新信息。

临床和实验室标准研究所(CLSI)尚未定义头孢克肟和头孢曲松耐药的标准。然而，头孢克肟或头孢曲松MIC ≥0.5 μg/mL的分离株被认为敏感性降低(873)。在美国，GISP中显示对头孢曲松或头孢克肟敏感性降低的分离株比例一直较低；2019年期间，鉴定出对头孢曲松或头孢克肟敏感性降低(MIC ≥0.5 μg/mL)的分离株<0.1%(141)。由于MIC升高可能预测耐药的出现,GISP建立了低于CLSI设定的敏感性折点的较低头孢菌素MIC阈值,以在监测目的下检测淋球菌敏感性下降时提供更高的敏感性。头孢克肟MIC ≥0.25 μg/mL的分离株百分比从2006年的0.1%增加到2011年的1.4%(*851*, *874*)，并在2019年降至0.3%(141)。头孢曲松MIC ≥0.125 μg/mL的分离株百分比从2006年的<0.1%增加到2011年的0.4%,并在2019年降至0.1%(141)。在日本(866)、法国(*867*, *875*)、西班牙(*876*, *877*)、英国和澳大利亚(*878*, *879*)已鉴定出具有高水平头孢克肟和头孢曲松MIC的分离株(MIC分别为1.5-8.0 μg/mL和1.5-4.0 μg/mL)。*N.gonorrhoeae*对头孢菌素和其他抗菌药物敏感性降低预计将继续；州和地方抗菌药物耐药监测对于指导当地治疗建议至关重要(*846*, *847*)。尽管通过GISP采样了约3%的所有感染淋球菌的美国男性，但临床医生的监测也至关重要。临床医生在怀疑头孢菌素治疗失败的人中诊断*N.gonorrhoeae*感染时，应进行相关临床标本的培养和AST，咨询传染病专家或STD临床专家(https://www.stdccn.org/render/Public)以获取临床管理指导，并在24小时内通过州和地方公共卫生当局向CDC报告病例。分离株应保存并通过地方和州公共卫生实验室机制发送至CDC。卫生部门应优先对被认为与头孢菌素治疗失败相关的*N.gonorrhoeae*感染者的性伴或分离株显示对头孢菌素敏感性降低者的性伴进行通知和培养评估。琼脂稀释法是*N.gonorrhoeae*抗菌药物敏感性试验的参考标准和首选方法。可使用抗生素梯度条，如Etest(bioMérieux)，并被认为是定量抗菌药物敏感性试验可接受的替代方法

按照生产商说明操作时，淋病奈瑟菌。纸片扩散法仅提供定性药敏结果。

无并发症的宫颈、尿道或直肠淋球菌感染

成人和青少年宫颈、尿道或直肠无并发症淋球菌感染的推荐方案

青少年

头孢曲松 500 mg* IM，单次给药，用于体重<150 kg者。如未排除衣原体感染,使用多西环素100 mg口服,2次/天,共7天,治疗衣原体。

* 对于体重≥150 kg的人员，应给予1 g ceftriaxone。

尽管临床数据证实，单次注射头孢曲松 250 mg 对治愈循环分离株(MIC = 0.03 μg/mL)引起的肛门生殖器淋病有效率达 >99%(95% 置信区间[CI]:97.6%-99.7%)，但对于 MIC 升高的分离株(*880*,*881*)，可能需要更高剂量。使用头孢曲松有效治疗无并发症泌尿生殖道淋病需要在约 24 小时内维持高于菌株 MIC 的浓度；尽管头孢曲松的药代动力学存在个体差异，但预计 500 mg 剂量头孢曲松可在约 50 小时内达到 MIC >0.03 μg/mL(*880*,*881*)。头孢曲松在咽部的药代动力学可能不同，可能需要更长时间维持高于菌株 MIC 的浓度，以防止咽部筛选出突变株(882)。

除头孢曲松外，过去对无并发症泌尿生殖道和肛门直肠淋球菌感染安全且有效的单剂注射头孢菌素方案包括头孢唑肟(500 mg IM)、头孢西丁(2 g IM 加丙磺舒 1 g 口服)和头孢噻肟(500 mg IM)。这些注射用头孢菌素在泌尿生殖道感染方面均未优于头孢曲松 250 mg，且对咽部感染的疗效较不确定(*883*,*884*)。由于头孢曲松剂量已增加，且其他头孢菌素的药代动力学尚未评估，这些给药方案可能劣于头孢曲松 500 mg。

头孢曲松不可用时的替代方案

庆大霉素 240 mg IM，单次给药
加
阿奇霉素 2 g，单次口服
或
头孢克肟* 800 mg 口服，单次给药

* 如果沙眼衣原体感染尚未排除，医务人员应针对该感染进行治疗
衣原体感染使用多西环素100 mg口服，每日2次，共7天。

在一项临床试验中，单剂IM庆大霉素240 mg加口服阿奇霉素2 g联合治疗治愈了100%的病例(单侧95% CI下限：98.5%)，并且

can be considered an alternative to ceftriaxone for persons with cephalosporin allergy (*885*). This trial was not powered enough to provide reliable estimates of the efficacy of these regimens for treatment of rectal or pharyngeal infection; however, this regimen cured the few extragenital infections among study participants. Notably, gastrointestinal adverse events, primarily vomiting <1 hour after dosing, occurred among 3%–4% of persons treated with gentamicin plus azithromycin, necessitating retreatment with ceftriaxone and azithromycin. A similar trial that studied gentamicin 240 mg plus azithromycin 1 g determined lower cure rates at extragenital sites; 80% (95% CI: 72%–88%) of pharyngeal and 90% (95% CI: 84%–95%) of rectal infections were cured with this regimen (*886*). Gemifloxacin plus azithromycin has been studied and is no longer recommended as an alternative regimen because of limited availability, cost, and antimicrobial stewardship concerns (*885*).

An 800-mg oral dose of cefixime should be considered only as an alternative cephalosporin regimen because it does not provide as high, nor as sustained, bactericidal blood levels as a 500-mg IM dose of ceftriaxone. Furthermore, it demonstrates limited efficacy for treatment of pharyngeal gonorrhea (92.3% cure; 95% CI: 74.9%–99.1%); in older clinical studies, cefixime cured 97.5% of uncomplicated urogenital and anorectal gonococcal infections (95% CI: 95.4%–99.8%) (*883*,*884*). The increase in the prevalence of isolates obtained through GISP with elevated cefixime MICs might indicate early stages of development of clinically significant gonococcal resistance to cephalosporins. Changes in cefixime MICs can result in decreasing effectiveness of cefixime for treating urogenital gonorrhea. Furthermore, as cefixime becomes less effective, continued used of cefixime might hasten the development of resistance to ceftriaxone, a safe, well-tolerated, injectable cephalosporin and the last antimicrobial known to be highly effective in a single dose for treatment of gonorrhea at all anatomic infection sites. Other oral cephalosporins (e.g., cefpodoxime and cefuroxime) are not recommended because of inferior efficacy and less favorable pharmacodynamics (*883*).

Monotherapy with azithromycin 2 g orally as a single dose has been demonstrated to be 99.2% effective against uncomplicated urogenital gonorrhea (95% CI: 97.3%–99.9%) (*883*). However, monotherapy is not recommended because of concerns about the ease with which *N. gonorrhoeae* can develop resistance to macrolides, the high proportion of isolates with azithromycin decreased susceptibility, and documented azithromycin treatment failures (*859*). Strains of *N. gonorrhoeae* circulating in the United States are not adequately susceptible to penicillin, tetracycline, and older macrolides (e.g., erythromycin), and thus use of these antimicrobials cannot be recommended.

Spectinomycin is effective (98.2% in curing uncomplicated urogenital and anorectal gonococcal infections) but has poor efficacy for pharyngeal infections (*883*,*887*). It is unavailable in the United States, and the gentamicin alternative regimen has replaced the need for spectinomycin, if a cephalosporin allergy exists, in the United States.

Uncomplicated Gonococcal Infection of the Pharynx

The majority of gonococcal infections of the pharynx are asymptomatic and can be relatively common among certain populations (*800*,*801*,*888*–*890*). Although these infections rarely cause complications, they have been reported to be a major source of community transmission and might be a driver of antimicrobial resistance (*891*,*892*). Gonococcal infections of the pharynx are more difficult to eradicate than infections at urogenital and anorectal sites (*862*). Few antimicrobial regimens reliably cure >90% of gonococcal pharyngeal infections (*883*,*884*). Providers should ask their patients with urogenital or rectal gonorrhea about oral sexual exposure; if reported, pharyngeal testing should be performed.

Recommended Regimen for Uncomplicated Gonococcal Infection of the Pharynx Among Adolescents and Adults

Ceftriaxone 500 mg* IM in a single dose for persons weighing <150 kg

* For persons weighing ≥150 kg, 1 g ceftriaxone should be administered.

If chlamydial infection is identified when pharyngeal gonorrhea testing is performed, treat for chlamydia with doxycycline 100 mg orally 2 times/day for 7 days. No reliable alternative treatments are available for pharyngeal gonorrhea. For persons with an anaphylactic or other severe reaction (e.g., Stevens Johnson syndrome) to ceftriaxone, consult an infectious disease specialist for an alternative treatment recommendation.

Other Management Considerations

To maximize adherence with recommended therapies and reduce complications and transmission, medication for gonococcal infection should be provided on-site and directly observed. If medications are unavailable when treatment is indicated, linkage to an STI treatment facility should be provided for same-day treatment. To minimize disease transmission, persons treated for gonorrhea should be instructed to abstain from sexual activity for 7 days after treatment and until all sex partners are treated (7 days after receiving treatment and resolution of symptoms, if present). All persons who receive a diagnosis of gonorrhea should be tested for other STIs, including chlamydia, syphilis, and HIV.

对于头孢菌素过敏者，可考虑作为头孢曲松的替代方案(885)。该试验的把握度不足以提供这些方案治疗直肠或咽部感染疗效的可靠估计；然而，该方案治愈了研究参与者中少数生殖器外感染。值得注意的是，接受庆大霉素加阿奇霉素治疗者中有 3%-4% 发生胃肠道不良事件，主要为给药后<1 小时呕吐,需要以头孢曲松和阿奇霉素再治疗。一项研究庆大霉素 240 mg 加阿奇霉素 1 g 的类似试验确定生殖器外部位治愈率较低;该方案治愈了 80%(95% CI:72%-88%)的咽部感染和 90%(95% CI:84%-95%)的直肠感染(886)。吉米沙星加阿奇霉素已被研究,但由于可及性有限、成本及抗菌药物管理方面的考虑,不再推荐作为替代方案(885)。

头孢克肟 800 mg 口服剂量仅应作为替代头孢菌素方案考虑，因为其提供的杀菌血药浓度不如头孢曲松 500 mg IM 剂量高，也不如后者持久。此外，其治疗咽部淋病的疗效有限(治愈率 92.3%;95% CI:74.9%-99.1%)；在较早的临床研究中，头孢克肟治愈了 97.5% 的无并发症泌尿生殖道和肛门直肠淋球菌感染(95% CI:95.4%-99.8%)(*883*,*884*)。通过 GISP 获得的头孢克肟 MIC 升高分离株患病率增加，可能提示对头孢菌素具有临床意义的淋球菌耐药性正处于早期发展阶段。头孢克肟 MIC 的变化可导致头孢克肟治疗泌尿生殖道淋病的有效性下降。此外，随着头孢克肟有效性降低，继续使用头孢克肟可能加速对头孢曲松耐药性的发展；头孢曲松是一种安全、耐受性良好的注射用头孢菌素，也是已知最后一种单剂对所有解剖部位淋病感染高度有效的抗菌药物。其他口服头孢菌素(如头孢泊肟和头孢呋辛)因疗效较差和药效学较不理想而不推荐(883)。

已证明阿奇霉素 2 g 口服单剂单药治疗对无并发症泌尿生殖道淋病的有效率为 99.2%(95% CI:97.3%-99.9%)(883)。然而，不推荐单药治疗，原因是担心*N.gonorrhoeae*易于对大环内酯类产生耐药性、阿奇霉素敏感性降低的分离株比例高，以及已记录的阿奇霉素治疗失败(859)。在美国循环的*N.gonorrhoeae*菌株对青霉素、四环素和较老的大环内酯类(如红霉素)不够敏感，因此不能推荐使用这些抗菌药物。

大观霉素有效(治愈无并发症泌尿生殖道和肛门直肠淋球菌感染的有效率为98.2%)，但对咽部感染疗效差(*883*,*887*)。该药在美国不可获得；在美国，若存在头孢菌素过敏，庆大霉素替代方案已取代了对大观霉素的需求。

咽部无并发症淋球菌感染

大多数咽部淋球菌感染是无症状的，在某些人群中可能相对常见(*800*, *801*, *888 - 890*)。尽管这些感染很少引起并发症，但据报道它们是社区传播的主要来源，并可能是抗菌药物耐药的驱动因素(*891*, *892*)。咽部淋球菌感染比泌尿生殖道和肛门直肠部位的感染更难根除(862)。很少有抗菌药物方案能可靠地治愈>90%的咽部淋球菌感染(*883*, *884*)。医务人员应询问泌尿生殖道或直肠淋病患者是否有口交暴露史；如有报告，应进行咽部检测。

青少年和成人咽部无并发症淋球菌感染的推荐方案

头孢曲松 500 mg* 单次肌内注射，适用于体重<150 kg者

* 对于体重≥150 kg的人员，应给予1 g ceftriaxone。

如果在进行咽部淋病检测时发现衣原体感染，使用多西环素100 mg口服，2次/天，共7天，治疗衣原体。咽部淋病没有可靠的替代治疗。对于对头孢曲松有过敏反应或其他严重反应(如Stevens Johnson综合征)者，请咨询感染病专科医生以获取替代治疗建议。

其他管理考虑

为最大限度地提高对推荐治疗的依从性并减少并发症和传播，淋球菌感染的药物应在现场提供并直接观察服药。如果指示治疗时药物不可用，应联系STI治疗机构以便当日治疗。为尽量减少疾病传播，应指导接受淋病治疗者在治疗后7天内且在所有性伴接受治疗之前避免性活动(接受治疗后7天且症状消退，如有症状)。所有被诊断为淋病者均应检测其他STI，包括衣原体、梅毒和HIV。

Those persons whose HIV test results are negative should be offered HIV PrEP.

Follow-Up

A test of cure (i.e., repeat testing after completion of therapy) is unnecessary for persons who receive a diagnosis of uncomplicated urogenital or rectal gonorrhea who are treated with any of the recommended or alternative regimens. Any person with pharyngeal gonorrhea should return 7–14 days after initial treatment for a test of cure by using either culture or NAAT; however, testing at 7 days might result in an increased likelihood of false-positive tests. If the NAAT is positive, effort should be made to perform a confirmatory culture before retreatment, especially if a culture was not already collected. All positive cultures for test of cure should undergo antimicrobial susceptibility testing. Symptoms that persist after treatment should be evaluated by culture for *N. gonorrhoeae* (with or without simultaneous NAAT) and antimicrobial susceptibility. Persistent urethritis, cervicitis, or proctitis also might be caused by other organisms (see Urethritis; Cervicitis; Proctitis).

A high prevalence of *N. gonorrhoeae* infection has been observed among men and women previously treated for gonorrhea (*137*,*753*,*754*,*893*). The majority of these infections result from reinfection caused by failure of sex partners to receive treatment or the initiation of sexual activity with a new infected partner, indicating a need for improved patient education and treatment of sex partners. Men or women who have been treated for gonorrhea should be retested 3 months after treatment regardless of whether they believe their sex partners were treated; scheduling the follow-up visit at the time of treatment is encouraged. If retesting at 3 months is not possible, clinicians should retest whenever persons next seek medical care <12 months after initial treatment.

Management of Sex Partners

Recent sex partners (i.e., persons having sexual contact with the infected patient <60 days preceding onset of symptoms or gonorrhea diagnosis) should be referred for evaluation, testing, and presumptive treatment. If the patient's last potential sexual exposure was >60 days before onset of symptoms or diagnosis, the most recent sex partner should be treated.

If health department partner-management strategies (e.g., disease intervention specialists) are impractical or unavailable for persons with gonorrhea and partners' access to prompt clinical evaluation and treatment is limited, EPT can be delivered to the partner by the patient or a collaborating pharmacy as permitted by law (see Partner Services). Treatment of the sexual partner with cefixime 800 mg as a single dose is recommended, provided that concurrent chlamydial infection has been excluded. If a chlamydia test result has not been documented, the partner may be treated with a single dose of oral cefixime 800 mg plus oral doxycycline 100 mg 2 times/day for 7 days. If adherence with multiday dosing is a considerable concern, azithromycin 1 g can be considered but has lower treatment efficacy among persons with rectal chlamydia (see Chlamydial Infections). Provision of medication by EPT should be accompanied by written materials (*125*,*127*) for educating partners about gonorrhea, their exposure to gonorrhea, and the importance of therapy. These materials should also educate partners about seeking clinical evaluation for adverse reactions or complications and general follow-up when able. Educational materials for female partners should include information about the importance of seeking medical evaluation for PID, especially if symptomatic; undertreatment of PID among female partners and missed opportunities for diagnosing other STIs among women are of concern. MSM with gonorrhea have a high risk for coexisting infections (especially undiagnosed HIV) among their partners, and they might have partners without HIV who could benefit from PrEP. Data are also limited regarding the effectiveness of EPT in reducing persistent or recurrent gonorrhea among MSM (*133*,*135*); thus, shared clinical decision-making regarding EPT for MSM is recommended (see Partner Services). To avoid reinfection, sex partners should be instructed to abstain from condomless sexual intercourse for 7 days after they and their sex partners have completed treatment and after resolution of symptoms, if present.

Suspected Cephalosporin Treatment Failure

Cephalosporin treatment failure is the persistence of *N. gonorrhoeae* infection despite recommended cephalosporin treatment; such failure is indicative of infection with cephalosporin-resistant gonorrhea among persons whose partners were treated and whose risk for reinfection is low. Suspected treatment failure has been reported among persons receiving oral and injectable cephalosporins (*852*–*855*,*857*,*859*,*861*,*863*,*864*,*867*,*875*,*894*). Treatment failure should be considered for persons whose symptoms do not resolve within 3–5 days after recommended treatment and report no sexual contact during the posttreatment follow-up period and persons with a positive test of cure (i.e., positive culture >72 hours or positive NAAT >7 days after receiving recommended treatment) when no sexual contact is reported during the posttreatment follow-up period (*874*). Treatment failure should also be considered for persons who have a positive culture on test of cure, if obtained, if evidence exists of decreased susceptibility to cephalosporins on antimicrobial susceptibility testing, regardless of whether sexual contact is reported during the posttreatment follow-up period.

HIV检测结果阴性者应提供HIV PrEP。

随访

对于被诊断为无并发症泌尿生殖道或直肠淋病且接受任何推荐方案或替代方案治疗者，无需进行治愈检测(即完成治疗后重复检测)。任何咽部淋病患者应在初始治疗后7-14天返回，通过培养或NAAT进行治愈检测；然而，在7天时检测可能导致假阳性检测的可能性增加。如果NAAT为阳性，应在再次治疗前努力进行确认性培养，特别是如果尚未采集培养。所有治愈检测阳性培养均应进行抗菌药物敏感性检测。治疗后持续存在的症状应通过培养检测*N.gonorrhoeae*(可同时进行或不进行NAAT)和抗菌药物敏感性进行评估。持续性尿道炎、宫颈炎或直肠炎也可能由其他微生物引起(见尿道炎；宫颈炎；直肠炎)。

在既往接受过淋病治疗的男性和女性中观察到*N.gonorrhoeae*感染的高患病率(*137*, *753*, *754*, *893*)。这些感染大多数是由于性伴未接受治疗或与新感染伴开始性活动而导致的再感染，表明需要改进患者教育和性伴治疗。接受过淋病治疗的男性或女性应在治疗后3个月重新检测，无论其是否认为性伴已接受治疗；鼓励在治疗时安排随访就诊。如果3个月时无法重新检测，临床医生应在初始治疗后<12个月内患者下次寻求医疗照护时重新检测。

性伴侣的管理

最近的性伴侣（即在症状出现或淋病诊断前60天内与感染患者有性接触的人）应被转介进行评估、检测和推定治疗。如果患者最后一次潜在的性接触发生在症状出现或诊断前超过60天，则应治疗最近的性伴侣。

如果卫生部门性伴管理策略(如疾病干预专家)对淋病患者不可行或不可用，且性伴及时获得临床评估和治疗的机会有限，则可由患者或合作药房依法向性伴提供EPT(见性伴服务)。推荐性伴接受cefixime 800 mg单次剂量治疗，前提是已排除合并衣原体感染。如果衣原体检测结果尚未已有记录，其性伴可接受单剂口服头孢克肟 800 mg 加口服多西环素 100 mg 每日2次，共7天的治疗。如果对多日给药的依从性存在重大顾虑，可考虑阿奇霉素 1 g，但其对直肠衣原体感染者的治疗效果较低(见衣原体感染)。通过 EPT 提供药物时应附有书面材料(*125*,*127*)，用于教育性伴了解淋病、其淋病暴露情况以及治疗的重要性。这些材料还应教育性伴在有能力时寻求临床评估以排查不良反应或并发症以及进行一般随访。针对女性性伴的教育材料应包括寻求医疗评估以排查 PID 的重要性的信息，尤其是在有症状时；女性性伴中 PID 治疗不足以及女性中诊断其他 STI 的机会被错过令人担忧。患淋病的 MSM 其性伴中共存感染(尤其是未诊断的 HIV)的风险较高，且他们可能有未感染 HIV 的性伴可从 PrEP 中获益。关于 EPT 在减少 MSM 中持续性或复发性淋病方面的有效性，数据也有限(*133*,*135*)；因此，建议就 MSM 的 EPT 进行共同临床决策(见性伴服务)。为避免再感染，应指导性伴在其及其性伴完成治疗并症状消退(如有)后7天内避免无安全套性交。

疑似头孢菌素治疗失败

头孢菌素治疗失败是指尽管接受了推荐的头孢菌素治疗，*N.gonorrhoeae*感染仍持续存在；此类失败表明，在性伴已接受治疗且再感染风险较低的人群中，感染了对头孢菌素耐药的淋病。在接受口服和注射头孢菌素的人群中已有疑似治疗失败的报道(*852*-*855*,*857*,*859*,*861*,*863*,*864*,*867*,*875*,*894*)。对于症状在推荐治疗后3-5天内未缓解且报告在治疗后随访期内无性接触者，以及在报告治疗后随访期内无性接触的情况下治愈检测阳性者(即接受推荐治疗后>72小时培养阳性或>7天 NAAT 阳性)，应考虑治疗失败(874)。对于治愈检测(如进行)培养阳性者，如果抗菌药物敏感性试验存在头孢菌素敏感性降低的证据，无论治疗后随访期内是否报告性接触，也应考虑治疗失败。

The majority of suspected treatment failures in the United States are likely to be reinfections rather than actual treatment failures (*137*,*753*,*754*,*894*). However, in cases in which reinfection is unlikely and treatment failure is suspected, before retreatment, relevant clinical specimens should be obtained for culture (preferably with simultaneous NAAT) and antimicrobial susceptibility testing if *N. gonorrhoeae* is isolated. Phenotypic antimicrobial susceptibility testing should be performed by using Etest or agar dilution. All isolates of suspected treatment failures should be sent to CDC for antimicrobial susceptibility testing by agar dilution; local laboratories should store isolates for possible further testing if needed. Testing or storage of specimens or isolates should be facilitated by the state or local health department according to local public health protocol. Instructions for shipping isolates to CDC are available at https://www.cdc.gov/std/gonorrhea/arg/specimen_shipping_instructions1-29-08.pdf.

For persons with suspected cephalosporin treatment failure, the treating clinician should consult an infectious disease specialist, the National Network of STD Clinical Prevention Training Center clinical consultation line (https://www.stdccn.org/render/Public), the local or state health department STI program, or CDC (telephone: 800-232-4636) for advice about obtaining cultures, antimicrobial susceptibility testing and treatment. Suspected treatment failure should be reported to CDC through the local or state health department <24 hours after diagnosis.

Patients with suspected treatment failures should first be retreated routinely with the initial regimen used (ceftriaxone 500 mg IM), with the addition of doxycycline if chlamydia infection exists, because reinfections are more likely than actual treatment failures. However, in situations with a higher likelihood of treatment failure than reinfection, relevant clinical specimens should be obtained for culture (preferably with simultaneous NAAT) and antimicrobial susceptibility testing before retreatment. Dual treatment with single doses of IM gentamicin 240 mg plus oral azithromycin 2 g can be considered, particularly when isolates are identified as having elevated cephalosporin MICs (*885*,*886*,*895*). Persons with suspected treatment failure after treatment with the alternative regimen (cefixime or gentamicin) should be treated with ceftriaxone 500 mg as a single IM dose or as a single dose with or without an antichlamydial agent on the basis of chlamydia infection status. A test of cure at relevant clinical sites should be obtained 7–14 days after retreatment; culture is the recommended test, preferably with simultaneous NAAT, and antimicrobial susceptibility testing of *N. gonorrhoeae* if isolated. Clinicians should ensure that the patients' sex partners from the preceding 60 days are evaluated promptly with culture and presumptively treated by using the same regimen used for the patients.

Special Considerations

Drug Allergy, Intolerance, and Adverse Reactions

The risk for penicillin cross-reactivity is highest with first-generation cephalosporins but is rare (<1%) with third-generation cephalosporins (e.g., ceftriaxone and cefixime) (*631*,*680*,*896*). Clinicians should first thoroughly assess a patient's allergy history, including type of reaction, associated medications, and previous prescription records. If IgE-mediated penicillin allergy is strongly suspected, dual treatment with single doses of IM gentamicin 240 mg plus oral azithromycin 2 g can be administered (*885*,*886*). If a patient is asymptomatic and the treating facility is able to perform gyrase A (*gyrA*) testing to identify ciprofloxacin susceptibility (wild type), oral ciprofloxacin 500 mg in a single dose can be administered. Providers treating persons with IgE-mediated cephalosporin or penicillin allergy should refer to the section of these guidelines regarding evaluation (see Management of Persons Who Have a History of Penicillin Allergy).

Pregnancy

Pregnant women infected with *N. gonorrhoeae* should be treated with ceftriaxone 500 mg in a single IM dose plus treatment for chlamydia if infection has not been excluded. When cephalosporin allergy or other considerations preclude treatment with this regimen, consultation with an infectious disease specialist or an STD clinical expert is recommended. Gentamicin use is cautioned during pregnancy because of risk for neonatal birth defects, nephrotoxicity, or ototoxicity (*897*) (https://www.stdccn.org/render/Public).

HIV Infection

Persons who have gonorrhea and HIV infection should receive the same treatment regimen as those who do not have HIV.

Gonococcal Conjunctivitis

In the only published study of the treatment regarding gonococcal conjunctivitis among adults, all 12 study participants responded to a single 1-g IM injection of ceftriaxone (*898*). Because gonococcal conjunctivitis is uncommon and data regarding treatment of gonococcal conjunctivitis among adults are limited, consultation with an infectious disease specialist should be considered.

美国大多数疑似治疗失败很可能是再感染而非实际治疗失败(*137*,*753*,*754*,*894*)。然而，在再感染不太可能且怀疑治疗失败的病例中，再次治疗前应采集相关临床标本进行培养(最好同时进行 NAAT)，如果分离出*N.gonorrhoeae*，则进行抗菌药物敏感性试验。表型抗菌药物敏感性试验应采用 Etest 或琼脂稀释法进行。所有疑似治疗失败的分离株应送至 CDC 通过琼脂稀释法进行抗菌药物敏感性试验；当地实验室应储存分离株以备需要时可能进行进一步检测。标本或分离株的检测或储存应由州或地方卫生部门根据当地公共卫生方案予以协助。将分离株运送至 CDC 的说明可在 https://www.cdc.gov/std/gonorrhea/ arg/specimen_shipping_Instructions1-29-08.pdf 获取。

对于疑似头孢菌素治疗失败者，治疗临床医生应咨询感染病专科医生、National Network of STD Clinical Prevention Training Center 临床咨询热线(https://www.stdccn.org/render/Public)、地方或州卫生部门 STI 项目或 CDC(电话：800-232-4636)，以获取关于采集培养、抗菌药物敏感性试验和治疗的建议。疑似治疗失败应在诊断后<24小时内通过地方或州卫生部门向 CDC 报告。

疑似治疗失败的患者应首先常规使用初始方案(ceftriaxone 500 mg IM)再次治疗，如果存在衣原体感染则加用多西环素，因为再感染比实际治疗失败更可能。然而，在治疗失败可能性高于再感染的情况下，再次治疗前应采集相关临床标本进行培养(最好同时进行 NAAT)和抗菌药物敏感性试验。可考虑单剂 IM gentamicin 240 mg 加口服 azithromycin 2 g 的双重治疗，尤其是当分离株被鉴定为头孢菌素 MIC 升高时(*885*,*886*,*895*)。使用替代方案(cefixime 或 gentamicin)治疗后疑似治疗失败者，应接受 ceftriaxone 500 mg 单次 IM 剂量治疗，或根据衣原体感染状况给予单次剂量联合或不联合抗衣原体药物。应在再次治疗后7-14天在相关临床部位进行治愈检测；培养是推荐的检测方法，最好同时进行 NAAT，如果分离出*N.gonorrhoeae*，则进行抗菌药物敏感性试验。临床医生应确保及时通过培养评估患者前60天内的性伴并假定采用与患者相同的治疗方案进行治疗。

特殊考虑

药物过敏、不耐受及不良反应

青霉素交叉反应的风险在第一代头孢菌素中最高，但在第三代头孢菌素(如ceftriaxone和cefixime)中罕见(<1%)(*631*,*680*,*896*)。临床医生应首先全面评估患者的过敏史，包括反应类型、相关药物及既往处方记录。若高度怀疑IgE介导的青霉素过敏，可采用单剂IM gentamicin 240 mg加口服 azithromycin 2 g的双重治疗(*885*,*886*)。若患者无症状且治疗机构能够进行gyrase A(*gyrA*)检测以确定ciprofloxacin敏感性(野生型)，可给予单剂口服ciprofloxacin 500 mg。治疗IgE介导的头孢菌素或青霉素过敏患者的医务人员应参阅本指南中关于评估的部分(见Management of Persons Who Have a History of penicillin Allergy)。

妊娠

感染淋病奈瑟菌的孕妇应接受头孢曲松500 mg单次IM剂量治疗；如未排除感染，还应治疗衣原体。当头孢菌素过敏或其他考虑妨碍采用该方案治疗时，建议咨询感染病专科医生或STD临床专家。妊娠期使用庆大霉素需谨慎，因为存在新生儿出生缺陷、肾毒性或耳毒性风险(897)(https://www.stdccn.org/render/Public)。

HIV感染

患淋病且感染HIV者应接受与未感染HIV者相同的治疗方案。

淋球菌性结膜炎

在唯一已发表的关于成人淋球菌性结膜炎治疗的研究中，全部12名研究参与者均对单次1-g IM注射头孢曲松有反应(898)。由于淋球菌性结膜炎不常见，且关于成人淋球菌性结膜炎治疗的数据有限，应考虑咨询感染病专科医生。

Recommended Regimen for Gonococcal Conjunctivitis Among Adolescents and Adults
Ceftriaxone 1 g IM in a single dose
Providers should consider one-time lavage of the infected eye with saline solution.

Management of Sex Partners

Patients should be instructed to refer their sex partners for evaluation and treatment (see Gonococcal Infections, Management of Sex Partners).

Disseminated Gonococcal Infection

Infrequently, *N. gonorrhoeae* can cause disseminated infection. Disseminated gonococcal infection (DGI) frequently results in petechial or pustular acral skin lesions, asymmetric polyarthralgia, tenosynovitis, or oligoarticular septic arthritis (*899–901*). Rarely, DGI is complicated by perihepatitis associated with gonococcal PID, endocarditis, or meningitis. Certain strains of *N. gonorrhoeae* that cause DGI can cause minimal genital inflammation, and urogenital or anorectal infections are often asymptomatic among DGI patients. If DGI is suspected, NAATs or culture specimens from all exposed urogenital and extragenital sites should be collected and processed, in addition to disseminated sites of infection (e.g., skin, synovial fluid, blood, or CSF). All *N. gonorrhoeae* isolates should be tested for antimicrobial susceptibility. Risk factors for dissemination have included female sex, menstruation, pregnancy, and terminal complement deficiency (*899*); however, reports are increasing among men (*900,901*). Persons receiving eculizumab, a monoclonal antibody that inhibits terminal complement activation, also might be at higher risk for DGI (*902*).

Hospitalization and consultation with an infectious disease specialist are recommended for initial therapy, especially for persons who might not comply with treatment, have an uncertain diagnosis, or have purulent synovial effusions or other complications. Examination for clinical evidence of endocarditis and meningitis should be performed.

Treatment of Arthritis and Arthritis-Dermatitis Syndrome

Recommended Regimen for Gonococcal-Related Arthritis and Arthritis-Dermatitis Syndrome
Ceftriaxone 1 g IM or IV every 24 hours
If chlamydial infection has not been excluded, providers should treat for chlamydia with doxycycline 100 mg orally 2 times/day for 7 days.

Alternative Regimens
Cefotaxime 1 g IV every 8 hours *or* **Ceftizoxime** 1 g every 8 hours
If chlamydial infection has not been excluded, providers should treat for chlamydia with doxycycline 100 mg orally 2 times/day for 7 days.

When treating for the arthritis-dermatitis syndrome, the provider can switch to an oral agent guided by antimicrobial susceptibility testing 24–48 hours after substantial clinical improvement, for a total treatment course of >7 days.

Treatment of Gonococcal Meningitis and Endocarditis

Recommended Regimen for Gonococcal Meningitis and Endocarditis
Ceftriaxone 1–2 g IV every 24 hours
If chlamydial infection has not been excluded, providers should treat for chlamydia with doxycycline 100 mg orally 2 times/day for 7 days.

No recent studies have been published regarding treatment of DGI involving the CNS or cardiovascular system. The duration of treatment for DGI in these situations has not been systematically studied and should be determined in consultation with an infectious disease specialist. Treatment for DGI should be guided by the results of antimicrobial susceptibility testing. Length of treatment should be determined based on clinical presentation. Therapy for meningitis should be continued with recommended parenteral therapy for 10–14 days. Parenteral antimicrobial therapy for endocarditis should be administered for >4 weeks. Treatment of gonococcal perihepatitis should be managed in accordance with the recommendations for PID in these guidelines.

Management of Sex Partners

Gonococcal infection frequently is asymptomatic among sex partners of persons who have DGI. Providers should instruct patients to refer partners with whom they have had sexual contact during the previous 60 days for evaluation, testing, and presumptive treatment (see Gonococcal Infections, Management of Sex Partners).

Gonococcal Infection Among Neonates

Prenatal screening and treatment of pregnant women for gonorrhea is the best method for preventing *N. gonorrhoeae* infection among neonates. Gonococcal infection among neonates results from perinatal exposure to the mother's infected cervix. It is usually an acute illness that manifests 2–5 days after birth. Prevalence of infection among neonates depends on the prevalence of infection among pregnant women and whether pregnant women are screened and treated for gonorrhea during

青少年和成人淋球菌性结膜炎的推荐方案
头孢曲松 1 g 单次肌内注射
医务人员应考虑用生理盐水对感染眼进行一次冲洗。

性伴侣的管理

应指导患者让其性伴侣前来接受评估和治疗(见淋球菌感染，性伴侣管理)。

播散性淋球菌感染

少数情况下，淋病奈瑟菌可引起播散性感染。播散性淋球菌感染(DGI)常导致瘀点或脓疱性肢端皮肤病变、不对称性多关节痛、腱鞘炎或少关节化脓性关节炎(*899 - 901*)。罕见情况下，DGI可并发与淋球菌性PID相关的肝周炎、心内膜炎或脑膜炎。某些引起DGI的淋病奈瑟菌菌株可引起轻微生殖道炎症，且DGI患者中的泌尿生殖道或肛门直肠感染常无症状。若怀疑DGI，除播散性感染部位(如皮肤、滑液、血液或CSF)外，还应采集并处理所有暴露的泌尿生殖道及生殖道外部位的NAATs或培养标本。所有淋病奈瑟菌分离株均应进行抗菌药物敏感性检测。播散的危险因素包括女性、月经期、妊娠及终末补体缺陷(899)；然而，男性中的报告正在增加(*900,901*)。接受eculizumab(一种抑制终末补体激活的单克隆抗体)治疗者也可能处于DGI较高风险中(902)。

建议初始治疗时住院并咨询感染病专家，尤其是可能不依从治疗、诊断不明确或存在化脓性滑膜积液或其他并发症的患者。应检查心内膜炎和脑膜炎的临床证据。

关节炎及关节炎-皮炎的治疗综合征

淋球菌相关关节炎及关节炎-皮炎综合征的推荐方案
头孢曲松1g肌注或静注每24小时
如果尚未排除衣原体感染，医务人员应使用多西环素100 mg口服，每日2次，共7天，治疗衣原体。

替代方案
头孢噻肟 1 g 静脉注射，每8小时一次 或 **头孢唑肟** 1 g 每8小时一次
如果尚未排除衣原体感染，医务人员应使用多西环素100 mg口服，每日2次，共7天，治疗衣原体。

治疗关节炎-皮炎综合征时，在临床明显改善后24-48小时，医务人员可根据抗菌药物敏感性试验结果改用口服药物，总疗程>7天。

淋球菌性脑膜炎和心内膜炎的治疗

淋球菌性脑膜炎推荐治疗方案及心内膜炎
头孢曲松 1-2 g IV 每24小时
如果尚未排除衣原体感染，医务人员应使用多西环素100 mg口服，每日2次，共7天，治疗衣原体。

近期尚无关于涉及CNS或心血管系统DGI治疗的研究发表。这些情况下DGI的治疗疗程尚未经系统研究，应与感染病专科医师会诊后确定。DGI的治疗应以抗菌药物敏感性检测结果为指导。疗程应根据临床表现确定。脑膜炎的治疗应继续采用推荐的胃肠外治疗10-14天。心内膜炎的胃肠外抗菌药物治疗应给药>4周。淋球菌性肝周炎的治疗应按照本指南中PID的建议进行管理。

性伴侣的管理

在DGI患者的性伴侣中，淋球菌感染常无症状。医务人员应指导患者让其在过去60天内有过性接触的伴侣前来接受评估、检测和推定治疗(见淋球菌感染，性伴侣管理)。

淋球菌感染在新生儿中

对孕妇进行产前筛查和治疗淋病是预防新生儿*N.gonorrhoeae*感染的最佳方法。新生儿淋球菌感染由围产期暴露于母亲感染的宫颈所致。通常为急性疾病，在出生后2-5天发病。新生儿感染患病率取决于孕妇感染患病率以及孕妇在

pregnancy. The most severe manifestations of *N. gonorrhoeae* infection among neonates are ophthalmia neonatorum and sepsis, which can include arthritis and meningitis. Less severe manifestations include rhinitis, vaginitis, urethritis, and scalp infection at sites of previous fetal monitoring.

Preventing Ophthalmia Neonatorum Caused by *N. gonorrhoeae*

Ocular prophylaxis and preventive gonorrhea screening and treatment of infected pregnant women are especially important because ophthalmia neonatorum can result in perforation of the globe of the eye and blindness (*903*). Ocular prophylaxis for gonococcal ophthalmia neonatorum has a long history of preventing sight-threatening gonococcal ocular infections. Cases in the United States are uncommon, which is likely attributable to gonorrhea screening programs for women, including pregnant women, that have contributed substantially to reduction in ophthalmia neonatorum (*904*). Neonatal ocular prophylaxis with erythromycin, the only agent available in the United States, is required by law in most states and is recommended because of safety, low cost, and ease of administration. It can contribute to preventing gonococcal blindness because not all pregnant women are screened for gonorrhea. The USPSTF recommends ocular prophylaxis with erythromycin ointment for all newborns <24 hours after birth (*903*). In addition to continuing routine ocular prophylaxis, prevention should focus on prenatal screening for *N. gonorrhoeae,* including

- screening pregnant women at risk (e.g., women aged <25 years and those aged ≥25 years who have a new sex partner, more than one sex partner, a sex partner with concurrent partners, a sex partner who has an STI, or live in a community with high rates of gonorrhea) for *N. gonorrhoeae* infection at the first prenatal visit;
- treating all pregnant women with *N. gonorrhoeae* infection during pregnancy and retesting in 3 months, in the third trimester or at time of delivery (sex partners should be tested and treated);
- retesting pregnant women in the third trimester who initially tested negative but remained at increased risk for acquiring infection (e.g., women aged <25 years and those aged ≥25 years who have a new sex partner, more than one sex partner, a sex partner with concurrent partners, a sex partner who has an STI, or live in a community with high rates of gonorrhea); and
- screening for gonorrhea at delivery for women not tested during pregnancy and at risk for infection (e.g., women aged <25 years and those aged ≥25 years who have a new sex partner, more than one sex partner, a sex partner with concurrent partners, a sex partner who has an STI, or live in a community with high rates of gonorrhea) or received no prenatal care; providers caring for the mother and the newborn should communicate to ensure follow-up on the results of laboratory tests performed at delivery, and if positive, prompt appropriate treatment of the newborn and mother.

Erythromycin is the only ophthalmic ointment recommended for use among neonates. Silver nitrate and tetracycline ophthalmic ointments are no longer manufactured in the United States, bacitracin is ineffective, and povidone iodine has not been studied adequately (*905*,*906*). Gentamicin ophthalmic ointment has been associated with severe ocular reactions (*907*,*908*). If erythromycin ointment is unavailable, infants at risk for exposure to *N. gonorrhoeae,* especially those born to a mother at risk for gonococcal infection or with no prenatal care, can be administered ceftriaxone 25–50 mg/kg body weight IV or IM, not to exceed 250 mg in a single dose.

Recommended Regimen to Prevent Ophthalmia Neonatorum Caused by *N. gonorrhoeae*

Erythromycin 0.5% ophthalmic ointment in each eye in a single application at birth

Erythromycin ophthalmic ointment should be instilled into both eyes of neonates as soon as possible after delivery, regardless of whether they are delivered vaginally or by cesarean delivery. Ideally, ointment should be applied by using single-use tubes or ampules rather than multiple-use tubes. If prophylaxis is delayed (i.e., not administered in the delivery room), a monitoring system should be established to ensure that all newborns receive prophylaxis <24 hours after delivery.

Diagnostic Considerations

Newborns at increased risk for gonococcal ophthalmia include those who did not receive ophthalmic prophylaxis and whose mothers had no prenatal care, have a history of STIs during pregnancy, or have a history of substance misuse. Gonococcal ophthalmia is strongly suspected when intracellular gram-negative diplococci are identified on Gram stain of conjunctival exudate, justifying presumptive treatment for gonorrhea after appropriate cultures and antimicrobial susceptibility testing for *N. gonorrhoeae* are performed. Presumptive treatment for *N. gonorrhoeae* might be indicated for newborns at increased risk for gonococcal ophthalmia who have increased WBCs (no GNID) in a Gram-stained smear of conjunctival exudate. Nongonococcal causes of neonatal ophthalmia include *Moraxella catarrhalis* and other *Neisseria* species, which are organisms that are indistinguishable from *N. gonorrhoeae* on Gram-stained smear but can be differentiated in the microbiology laboratory.

妊娠期间是否接受淋病筛查和治疗。新生儿*N.gonorrhoeae*感染最严重的表现为新生儿眼炎和脓毒症，后者可包括关节炎和脑膜炎。较轻的表现包括鼻炎、阴道炎、尿道炎以及既往胎儿监测部位的头部感染。

预防由淋病奈瑟菌引起的新生儿眼炎

眼部预防以及感染孕妇的预防性淋病筛查和治疗尤为重要，因为新生儿眼炎可导致眼球穿孔和失明(903)。针对淋球菌性新生儿眼炎的眼部预防在预防威胁视力的淋球菌眼部感染方面有着悠久历史。美国病例不常见，这可能归因于女性(包括孕妇)淋病筛查规划，该规划对减少新生儿眼炎起到了重大作用(904)。使用erythromycin进行新生儿眼部预防是美国唯一可用的药物，多数州法律要求进行，并且因其安全性、低成本及易于给药而受到推荐。它有助于预防淋球菌性失明，因为并非所有孕妇都接受淋病筛查。USPSTF推荐对所有新生儿在出生后<24小时内使用erythromycin眼膏进行眼部预防(903)。除继续常规眼部预防外,预防应侧重于产前筛查淋病奈瑟菌，包括

- 对有风险的孕妇进行筛查(例如，年龄在<25岁以及≥25岁且有新性伴侣、多于一个性伴侣、性伴侣有同时存在的其他伴侣、性伴侣有STI,或居住在淋病高发社区者)进行

  N. 妊娠首次产前检查时进行淋病奈瑟菌感染筛查；
- 治疗所有感染淋病奈瑟菌的孕妇
  妊娠期间以及3个月后复检，在妊娠晚期或分娩时(性伴侣应接受检测和治疗);

- 对妊娠晚期孕妇进行复检，这些孕妇
  初始检测阴性但仍处于感染获得风险增加状态者(例如，<25岁以及≥25岁且有新性伴侣、多于一个性伴侣、性伴侣有同时存在的其他伴侣、性伴侣有STI,或居住在淋病高发社区的女性);以及

- 对未进行检测的孕妇在分娩时进行淋病筛查
  妊娠期间且有感染风险者(例如，<25岁以及≥25岁且有新性伴侣、多于一个性伴侣、性伴侣有同时存在的其他伴侣、性伴侣有STI,或居住在淋病高发社区)或未接受产前保健者；照护母亲和新生儿的医务人员应相互沟通，以确保对分娩时进行的实验室检查结果进行随访，如为阳性，应及时对新生儿和母亲进行适当治疗。

Erythromycin是唯一推荐用于新生儿的眼膏。Silver nitrate和tetracycline眼膏在美国已不再生产，bacitracin无效，povidone iodine尚未得到充分研究(*905*,*906*)。Gentamicin眼膏与严重眼部反应相关(*907*,*908*)。若Erythromycin眼膏不可用，对有暴露于淋病奈瑟菌风险的婴儿，尤其是母亲有淋球菌感染风险或未接受产前保健者，可给予ceftriaxone 25-50 mg/kg体重IV或IM，单次剂量不超过250 mg。

预防由N.gonorrhoeae引起的新生儿眼炎的推荐方案

红霉素0.5%眼膏，出生时单次应用于每只眼

无论新生儿为阴道分娩还是剖宫产分娩，应尽快在其双眼内滴入红霉素眼膏。理想情况下，应使用单次使用管或安瓿而非多次使用管涂抹眼膏。如果预防延迟(即未在产房给予)，应建立监测系统以确保所有新生儿在出生后<24小时内接受预防。

诊断考虑

淋球菌性眼炎风险增加的新生儿包括未接受眼部预防且母亲未接受产前保健、妊娠期间有STIs史或有物质滥用史者。当结膜渗出物Gram染色发现细胞内革兰阴性双球菌时，强烈怀疑淋球菌性眼炎，在完成适当培养及针对淋病奈瑟菌的抗菌药物敏感性检测后，有理由进行淋病推定治疗。对于淋球菌性眼炎风险增加且结膜渗出物Gram染色涂片显示WBCs增多(无GNID)的新生儿，可能适合针对淋病奈瑟菌进行推定治疗。新生儿眼炎的非淋球菌病因包括*Moraxella catarrhalis*及其他*Neisseria*菌种，这些微生物在Gram染色涂片上与淋病奈瑟菌无法区分，但可在微生物学实验室中加以鉴别。

Treatment of Gonococcal Ophthalmia Neonatorum

Recommended Regimen for Gonococcal Ophthalmia Neonatorum
Ceftriaxone 25–50 mg/kg body weight IV or IM in a single dose, not to exceed 250 mg

One dose of ceftriaxone is adequate therapy for gonococcal ophthalmia. Ceftriaxone should be administered cautiously to neonates with hyperbilirubinemia, especially those born prematurely. Cefotaxime 100 mg/kg body weight IV or IM as a single dose can be administered for those neonates unable to receive ceftriaxone because of simultaneous administration of IV calcium. Topical antibiotic therapy alone is inadequate and unnecessary if systemic treatment is administered.

Other Management Considerations

Chlamydial testing should be performed simultaneously from the inverted eyelid specimen (see Ophthalmia Neonatorum Caused by *C. trachomatis*). Newborns who have gonococcal ophthalmia should be evaluated for signs of disseminated infection (e.g., sepsis, arthritis, and meningitis). Newborns who have gonococcal ophthalmia should be managed in consultation with an infectious disease specialist.

Management of Mothers and Their Sex Partners

Mothers of newborns with ophthalmia neonatorum caused by *N. gonorrhoeae* should be evaluated, tested, and presumptively treated for gonorrhea, along with their sex partners (see Gonococcal Infection Among Adolescents and Adults).

Disseminated Gonococcal Infection and Gonococcal Scalp Abscesses Among Neonates

DGI might present as sepsis, arthritis, or meningitis and is a rare complication of neonatal gonococcal infection. Localized gonococcal infection of the scalp can result from fetal monitoring through scalp electrodes. Detecting gonococcal infection among neonates who have sepsis, arthritis, meningitis, or scalp abscesses requires cultures of blood, CSF, or joint aspirate. Specimens obtained from the conjunctiva, vagina, oropharynx, and rectum are useful for identifying the primary site or sites of infection. Antimicrobial susceptibility testing of all isolates should be performed. Positive Gram-stained smears of abscess exudate, CSF, or joint aspirate provide a presumptive basis for initiating treatment for *N. gonorrhoeae*.

Treatment

Recommended Regimens for Disseminated Gonococcal Infection Among Neonates
Ceftriaxone 25–50 mg/kg body weight/day IV or IM in a single daily dose for 7 days, with a duration of 10–14 days if meningitis is documented *or* **Cefotaxime** 25 mg/kg body weight/day IV or IM every 12 hours for 7 days, with a duration of 10–14 days if meningitis is documented

Ceftriaxone should be administered cautiously to neonates with hyperbilirubinemia, especially those born prematurely. Cefotaxime 100 mg/kg body weight IV or IM as a single dose can be administered for those neonates unable to receive ceftriaxone because of simultaneous administration of IV calcium.

Other Management Considerations

Chlamydial testing should be performed simultaneously among neonates with gonococcal infection (see Chlamydial Infection Among Neonates). Neonates who have DGI should be managed in consultation with an infectious disease specialist.

Management of Mothers and Their Sex Partners

Mothers of newborns who have DGI or scalp abscesses caused by *N. gonorrhoeae* should be evaluated, tested, and presumptively treated for gonorrhea, along with their sex partners (see Gonococcal Infection Among Adolescents and Adults).

Neonates Born to Mothers Who Have Gonococcal Infection

Neonates born to mothers who have untreated gonorrhea are at high risk for infection. Neonates should be tested for gonorrhea at exposed sites (e.g., conjunctiva, vagina, rectum, and oropharynx) and treated presumptively for gonorrhea.

Treatment in the Absence of Signs of Gonococcal Infection

Recommended Regimen for Neonates Without Signs of Gonococcal Infection
Ceftriaxone 20–50 mg/kg body weight IV or IM in a single dose, not to exceed 250 mg

Other Management Considerations

Ceftriaxone should be administered cautiously to neonates with hyperbilirubinemia, especially those born prematurely. Cefotaxime 100 mg/kg body weight IV or IM as a single dose can be administered for those neonates unable to receive ceftriaxone because of simultaneous administration of IV calcium. Age-appropriate chlamydial testing should be

新生儿淋球菌性眼炎的治疗

新生儿淋球菌性眼炎推荐治疗方案
头孢曲松 25-50 mg/kg 体重，静脉注射或肌内注射，单次给药，不超过 250 mg

单剂头孢曲松足以治疗淋球菌性眼炎。对高胆红素血症新生儿，尤其是早产儿，应谨慎使用头孢曲松。因同时静脉输注钙剂而无法使用头孢曲松的新生儿，可单次静脉注射或肌内注射头孢噻肟 100 mg/kg 体重。若已进行全身治疗，则无需也不应仅使用局部抗生素治疗。

其他管理考虑

应同时从翻转眼睑标本进行衣原体检测(见由沙眼衣原体引起的新生儿眼炎)。患淋球菌性眼炎的新生儿应评估是否有播散性感染体征(如脓毒症、关节炎和脑膜炎)。患淋球菌性眼炎的新生儿应咨询感染病专科医生进行管理。

母亲及其性伴侣的管理

由淋病奈瑟菌引起新生儿眼炎的新生儿母亲应接受评估、检测并推定治疗淋病，其性伴侣也应如此(见青少年和成人淋球菌感染)。

播散性淋球菌感染与新生儿淋球菌性头皮脓肿

DGI 可表现为脓毒症、关节炎或脑膜炎，是新生儿淋球菌感染的罕见并发症。通过头皮电极进行胎儿监测可导致头皮局部淋球菌感染。检测

对于出现败血症、关节炎、脑膜炎或头皮脓肿的新生儿，淋球菌感染需要做血液、CSF或关节穿刺液的培养。从结膜、阴道、口咽和直肠获取的标本有助于确定原发感染部位。应对所有分离株进行抗菌药物敏感性试验。脓肿渗出液、CSF或关节穿刺液的革兰染色涂片阳性为启动针对*N.gonorrhoeae*的治疗提供了推定依据。

治疗

新生儿播散性淋球菌感染推荐方案
头孢曲松 25-50 mg/kg 体重/日，静脉注射或肌内注射，每日单次给药，疗程 7 天；若存在脑膜炎，疗程为 10-14 天 已记录 或 **头孢噻肟** 25 mg/kg 体重/日，静脉注射或肌内注射，每 12 小时一次，疗程 7 天；若确诊脑膜炎，疗程为 10-14 天

对高胆红素血症新生儿，尤其是早产儿，应谨慎使用头孢曲松。因同时静脉输注钙剂而无法使用头孢曲松的新生儿，可单次静脉注射或肌内注射头孢噻肟 100 mg/kg 体重。

其他管理考虑

患淋球菌感染的新生儿应同时进行衣原体检测(见新生儿衣原体感染)。患 DGI 的新生儿应咨询感染病专科医生进行管理。

母亲及其性伴侣的管理

患 DGI 或由淋病奈瑟菌引起头皮脓肿的新生儿母亲应接受评估、检测并推定治疗淋病，其性伴侣也应如此(见青少年和成人淋球菌感染)。

感染淋病母亲所生新生儿

母亲患未治疗淋病的新生儿感染风险高。应对新生儿暴露部位(如结膜、阴道、直肠和口咽部)进行淋病检测，并推定治疗淋病。

无淋球菌感染体征时的治疗感染

无淋球菌感染体征新生儿的推荐治疗方案
头孢曲松 20-50 mg/kg 体重，静脉注射或肌内注射，单次给药，不超过 250 mg

其他管理考虑

对高胆红素血症新生儿，尤其是早产儿，应谨慎使用头孢曲松。因同时静脉输注钙剂而无法使用头孢曲松的新生儿，可单次静脉注射或肌内注射头孢噻肟 100 mg/kg 体重。应同时进行适龄衣原体检测

performed simultaneously among neonates with gonococcal infection (see Chlamydial Infection Among Neonates). Follow-up examination is not required.

Management of Mothers and Their Sex Partners

Mothers who have gonorrhea and their sex partners should be evaluated, tested, and presumptively treated for gonorrhea (see Gonococcal Infection Among Adolescents and Adults).

Gonococcal Infection Among Infants and Children

Sexual abuse is the most frequent cause of gonococcal infection among infants and children (see Sexual Assault or Abuse of Children). For preadolescent girls, vaginitis is the most common manifestation of this infection; gonococcal-associated PID after vaginal infection can be less common among preadolescents than adults. Among sexually abused children, anorectal and pharyngeal infections with *N. gonorrhoeae* are frequently asymptomatic.

Diagnostic Considerations

Culture can be used to test urogenital and extragenital sites for girls and boys. NAAT can be used to test for *N. gonorrhoeae* from vaginal and urine specimens from girls and urine for boys (see Sexual Assault or Abuse of Children). Although data regarding NAAT from extragenital sites (rectum and pharynx) among children are more limited, and performance is test dependent, no evidence supports that performance of NAAT for detection of *N. gonorrhoeae* among children differs from that among adults (*553*). Because of the implications of a *N. gonorrhoeae* diagnosis in a child, only validated FDA-cleared NAAT assays should be used with extragenital specimens. Consultation with an expert is necessary before using NAAT to minimize the possibility of cross-reaction with nongonococcal *Neisseria* species and other commensals (e.g., *N. meningitidis*, *Neisseria sicca*, *Neisseria lactamica*, *Neisseria cinerea*, or *M. catarrhalis*) and to ensure correct interpretation of results.

Gram stains are inadequate for evaluating prepubertal children for gonorrhea and should not be used to diagnose or exclude gonorrhea. If evidence of DGI exists, gonorrhea culture and antimicrobial susceptibility testing should be obtained from relevant clinical sites (see Disseminated Gonococcal Infection).

Recommended Regimen for Uncomplicated Gonococcal Vulvovaginitis, Cervicitis, Urethritis, Pharyngitis, or Proctitis Among Infants and Children Weighing ≤45 kg

Ceftriaxone 25–50 mg/kg body weight IV or IM in a single dose, not to exceed 250 mg IM

Recommended Regimen for Uncomplicated Gonococcal Vulvovaginitis, Cervicitis, Urethritis, Pharyngitis, or Proctitis Among Children Weighing >45 kg

Treat with the regimen recommended for adults
(see Gonococcal Infections)

Recommended Regimen for Bacteremia or Arthritis Among Children Weighing ≤45 kg

Ceftriaxone 50 mg/kg body weight (maximum dose: 2 g) IM or IV in a single dose daily every 24 hours for 7 days

Recommended Regimen for Bacteremia or Arthritis Among Children Weighing >45 kg

Ceftriaxone 1 g IM or IV in a single dose daily every 24 hours for 7 days

Other Management Considerations

Follow-up cultures are unnecessary. Only parenteral cephalosporins (i.e., ceftriaxone) are recommended for use among children. All children identified as having gonococcal infections should be tested for *C. trachomatis*, syphilis, and HIV (see Sexual Assault or Abuse of Children).

Mycoplasma genitalium

M. genitalium causes symptomatic and asymptomatic urethritis among men and is the etiology of approximately 15%–20% of NGU, 20%–25% of nonchlamydial NGU, and 40% of persistent or recurrent urethritis (*697*,*909*,*910*). Infection with *C. trachomatis* is common in selected geographic areas (*911*–*913*), although *M. genitalium* is often the sole pathogen. Data are insufficient to implicate *M. genitalium* infection with chronic complications among men (e.g., epididymitis, prostatitis, or infertility). The consequences of asymptomatic infection with *M. genitalium* among men are unknown.

Among women, *M. genitalium* has been associated with cervicitis, PID, preterm delivery, spontaneous abortion, and infertility, with an approximately twofold increase in the risk for these outcomes among women infected with *M. genitalium* (*766*). *M. genitalium* infections among women are also frequently asymptomatic, and the consequences associated with asymptomatic *M. genitalium* infection are unknown.

M. genitalium can be detected among 10%–30% of women with clinical cervicitis (*767*,*770*,*772*,*914*–*916*). The existing evidence between *M. genitalium* and cervicitis is mostly supportive of a causal association. Elevated proinflammatory cytokines have been demonstrated among women with *M. genitalium*, with return to baseline levels after clearance of the pathogen (*917*).

患淋球菌感染的新生儿应同时进行适龄衣原体检测(见新生儿衣原体感染)。无需随访检查。

母亲及其性伴侣的管理

患淋病的母亲及其性伴侣应接受评估、检测并推定治疗淋病(见青少年和成人淋球菌感染)。

淋球菌感染在.....中
婴儿和儿童

性虐待是婴幼儿和儿童淋球菌感染最常见的原因(见儿童性侵犯或虐待)。对于青春期前女孩，阴道炎是该感染最常见的表现；青春期前女孩阴道感染后发生淋球菌相关 PID 的可能性低于成人。在受性虐待的儿童中，淋病奈瑟菌的肛门直肠和咽部感染常无症状。

诊断考虑

培养可用于检测女童和男童的泌尿生殖道及生殖道外部位。NAAT可用于检测女童阴道和尿液标本及男童尿液中的*N.gonorrhoeae*(见儿童性侵犯或虐待)。尽管关于儿童生殖道外部位(直肠和咽部)NAAT的数据较为有限，且性能取决于具体检测方法，但无证据支持儿童中检测*N.gonorrhoeae*的NAAT性能与成人不同(553)。鉴于儿童中*N.gonorrhoeae*诊断的implications，生殖道外标本仅应使用经FDA批准的经验证NAAT检测。使用NAAT前必须咨询专家，以尽量减少与非淋球菌*Neisseria*菌种及其他共生菌(如*N.meningitidis*、*Neisseria sicca*、*Neisseria lactamica*、*Neisseria cinerea*或*M.catarrhalis*)交叉反应的可能性，并确保正确解读结果。

革兰染色不足以评估青春期前儿童的淋病，不应使用其诊断或排除淋病。若存在 DGI 证据，应从相关临床部位获取淋病培养和抗菌药物敏感性试验(见播散性淋球菌感染)。

体重 ≤45 kg 婴幼儿和儿童无并发症淋球菌性外阴阴道炎、宫颈炎、尿道炎、咽炎或直肠炎推荐方案

头孢曲松 25-50 mg/kg 体重，静脉注射或肌内注射，单次给药，肌内注射不超过 250 mg

体重 >45 kg 儿童无并发症淋球菌性外阴阴道炎、宫颈炎、尿道炎、咽炎或直肠炎推荐方案

按成人推荐方案治疗(见淋球菌感染)

体重 ≤45 kg 儿童菌血症或关节炎推荐方案

头孢曲松 50 mg/kg 体重(最大剂量：2 g)，肌内注射或静脉注射，每日单次给

体重 >45 kg 儿童菌血症或关节炎推荐方案

头孢曲松 1 g，肌内注射或静脉注射，每日单次给药，每 24 小时一次，疗程 7 天

其他管理考虑

无需随访培养。儿童仅推荐使用肠外头孢菌素(即头孢曲松)。所有确诊淋球菌感染的儿童均应检测沙眼衣原体、梅毒和 HIV(见儿童性侵犯或虐待)。

支原体生殖支原体

*M.genitalium*在男性中引起有症状和无症状的尿道炎，是约15%-20%的NGU、20%-25%的非衣原体性NGU和40%的持续性或复发性尿道炎的病因(*697*, *909*, *910*)。*C.trachomatis*感染在特定地理区域常见(*911 - 913*)，尽管*M.genitalium*常为唯一病原体。数据不足以表明*M.genitalium*感染与男性慢性并发症(如附睾炎、前列腺炎或不孕)相关。男性中*M.genitalium*无症状感染的后果尚不清楚。

在女性中，生殖支原体与宫颈炎、PID、早产、自然流产和不孕相关，感染生殖支原体的女性发生这些结局的风险约增加两倍(766)。女性生殖支原体感染也常无症状，无症状生殖支原体感染相关后果尚不清楚。

在 10%-30% 的临床宫颈炎女性中可检出生殖支原体(*767*、*770*、*772*、*914 - 916*)。现有证据大多支持生殖支原体与宫颈炎之间存在因果关联。感染生殖支原体的女性已证实促炎细胞因子升高，病原体清除后恢复至基线水平(917) 。

M. genitalium is identified in the cervix or endometrium of women with PID more often than in women without PID (*918–924*). Prevalence of *M. genitalium* among women with PID ranges from 4% to 22% (*925*,*926*) and was reported as 60% in one study of women with postabortal PID (*918*). The association with PID is supported by early studies among nonhuman primates that determined that endosalpingitis develops after inoculation with *M. genitalium* (*927*). Recent studies evaluating the lower and upper genital tract using highly sensitive *M. genitalium* NAAT assays or the role of *M. genitalium* in histologically defined endometritis have reported significantly elevated risk for PID (*928*). However, most studies of *M. genitalium* and PID, even those that controlled extensively for other infections and behavioral and biologic risk, are cross-sectional. The few prospective studies that have evaluated the role of *M. genitalium* in establishing subsequent PID demonstrated increased PID risk; however, these were not statistically significant associations, often because of a lack of statistical power. No clinical trial data are available that demonstrate that treating *M. genitalium* cervical infection prevents development of PID or endometritis. Although data regarding the benefits of testing women with PID for *M. genitalium* and the importance of directing treatment against this organism are limited, the associations of *M. genitalium* with cervicitis and PID in cross-sectional studies using NAAT testing are consistent (*928*).

Data from case-control serologic studies (*929–931*) and a meta-analysis of clinical studies (*766*) indicate a potential role in causing infertility. However, seroassays are suboptimal and inconclusive. Similarly, evidence for a role for *M. genitalium* infection during pregnancy as a cause of perinatal complications, including preterm delivery, spontaneous abortion, or low birthweight, are conflicting because evidence is insufficient to attribute cause (*766*,*932–934*). Data are limited regarding ectopic pregnancy and neonatal *M. genitalium* infection (*935*,*936*).

Rectal infection with *M. genitalium* has been reported among 1%–26% of MSM (*937–940*) and among 3% of women (*941*). Rectal infections often are asymptomatic, although higher prevalence of *M. genitalium* has been reported among men with rectal symptoms. Similarly, although asymptomatic *M. genitalium* has been detected in the pharynx, no evidence exists of it causing oropharyngeal symptoms or systemic disease.

Urogenital *M. genitalium* infection is associated with HIV among both men and women (*942–944*); however, the data are from case-control and cross-sectional studies. Risk for HIV infection is increased among women with *M. genitalium*, and evidence indicates that HIV shedding occurs more often among persons with *M. genitalium* and HIV infection who are not taking ART than among persons without *M. genitalium* (*942*,*944*).

Antimicrobial Resistance

Resistance to azithromycin has been rapidly increasing and has been confirmed in multiple studies. Prevalence of molecular markers for macrolide resistance, which highly correlates with treatment failure, ranges from 44% to 90% in the United States, Canada, Western Europe, and Australia (*697*,*702*,*945–953*). Treatment with azithromycin alone has been reported to select for resistance (*705*,*954*,*955*), with treatment of macrolide-susceptible infections with a 1-g dose of azithromycin resulting in selection of resistant-strain populations in 10%–12% of cases. The prevalence of quinolone resistance markers is much lower (*697*,*956–959*). The first clinical treatment failures after moxifloxacin were associated specifically with the S83I mutation in the *parC* gene (*954*,*960*). Prevalence of the S83I mutation in the United States ranges from 0% to 15% (*947*); however, correlation with fluoroquinolone treatment failure is less consistent than that with mutations associated with macrolide resistance (*953*,*961*,*962*). Clinically relevant quinolone resistance often is associated with coexistent macrolide resistance (*954*).

Diagnostic Considerations

M. genitalium is an extremely slow-growing organism. Culture can take up to 6 months, and technical laboratory capacity is limited to research settings. NAAT for *M. genitalium* is FDA cleared for use with urine and urethral, penile meatal, endocervical, and vaginal swab samples (https://www.hologic.com/package-inserts/diagnostic-products/aptima-mycoplasma-genitalium-assay). Molecular tests for macrolide (i.e., azithromycin) or quinolone (i.e., moxifloxacin) resistance markers are not commercially available in the United States. However, molecular assays that incorporate detection of mutations associated with macrolide resistance are under evaluation.

Men with recurrent NGU should be tested for *M. genitalium* using an FDA-cleared NAAT. If resistance testing is available, it should be performed and the results used to guide therapy. Women with recurrent cervicitis should be tested for *M. genitalium*, and testing should be considered among women with PID. Testing should be accompanied with resistance testing, if available. Screening of asymptomatic *M. genitalium* infection among women and men or extragenital testing for *M. genitalium* is not recommended. In clinical practice, if testing is unavailable, *M. genitalium* should be suspected in cases of persistent or recurrent urethritis or cervicitis and considered for PID.

在PID女性中，*M.genitalium*在宫颈或子宫内膜中被检出的频率高于无PID的女性(*918 - 924*)。PID女性中*M.genitalium*的患病率为4%至22%(*925*, *926*)，在一项针对流产后PID女性的研究中报告为60%(918)。与非人灵长类动物的早期研究支持其与PID的关联，这些研究确定接种*M.genitalium*后发生输卵管内膜盐(927)。近期使用高灵敏度*M.genitalium* NAAT检测评估下生殖道和上生殖道的研究，或关于*M.genitalium*在组织学定义的子宫内膜炎中作用的研究，报告PID风险显著升高(928)。然而，大多数关于*M.genitalium*与PID的研究，即使是广泛控制了其他感染及行为学和生物学风险因素的研究，均为横断面研究。少数评估*M.genitalium*在随后发生PID中作用的前瞻性研究显示PID风险增加；然而，这些关联无统计学显著性，通常是由于缺乏统计效能。尚无临床试验数据证明治疗*M.genitalium*宫颈感染可预防PID或子宫内膜炎的发生。尽管关于对PID女性进行*M.genitalium*检测的益处以及针对该病原体定向治疗重要性的数据有限，但使用NAAT检测的横断面研究中*M.genitalium*与宫颈炎和PID的关联是一致的(928)。

来自病例对照血清学研究(*929 - 931*)和一项临床研究荟萃分析(766)的数据表明其在不孕病因中可能起作用。然而，血清学检测欠佳且结论不确定。同样，关于妊娠期*M.genitalium*感染作为围产期并发症(包括早产、自然流产或低出生体重)病因的证据相互矛盾，因为证据不足以归因(*766*, *932 - 934*)。关于异位妊娠和新生儿*M.genitalium*感染的数据有限(*935*, *936*)。

已报告生殖支原体直肠感染见于 1%-26% 的 MSM(*937 - 940*)以及 3% 的女性(941)。直肠感染常无症状，尽管有报告称在有直肠症状的男性中生殖支原体患病率更高。同样，尽管在咽部检测到无症状生殖支原体，但尚无证据表明其会引起口咽症状或全身性疾病。

泌尿生殖道生殖支原体感染在男性和女性中均与HIV相关(*942 - 944*)；然而，数据来自病例对照和横断面研究。感染生殖支原体的女性HIV感染风险增加，且有证据表明，在未接受ART的生殖支原体合并HIV感染者中，HIV排毒的发生频率高于无生殖支原体者(*942*, *944*)。

抗菌药物耐药性

阿奇霉素耐药性迅速增加，并已在多项研究中得到证实。大环内酯类耐药分子标记的流行率与治疗失败高度相关，在美国、加拿大、西欧和澳大利亚为44%至90%(*697*, *702*, *945 - 953*)。据报道，单用阿奇霉素治疗可筛选出耐药性(*705*, *954*, *955*)，对大环内酯类敏感感染使用1-g剂量阿奇霉素治疗可在10%-12%的病例中选择出耐药株群体。喹诺酮类耐药标记的流行率要低得多(*697*, *956 - 959*)。莫西沙星治疗后的首批临床治疗失败特别与*parC*基因的S83I突变相关(*954*, *960*)。S83I突变在美国的流行率为0%至15%(947)；然而，其与氟喹诺酮类治疗失败的相关性不如与大环内酯类耐药相关突变那样一致(*953*, *961*, *962*)。临床相关的喹诺酮类耐药常与共存的大环内酯类耐药相关(954)。

诊断注意事项

生殖支原体是一种生长极其缓慢的微生物。培养可能需要长达6个月，且技术实验室能力仅限于研究环境。用于生殖支原体的NAAT已获FDA批准用于尿液及尿道、阴茎龟头、宫颈内和阴道拭子样本(https://www.hologic.com/package- inserts/diagnostic-products/aptima-mycoplasma-genitalium-assay)。针对大环内酯类(即阿奇霉素)或喹诺酮类(即莫西沙星)耐药标记的分子检测在美国尚无商业化产品。然而，包含大环内酯类耐药相关突变检测的分子 assay 正在评估中。

复发性NGU男性应使用FDA批准的NAAT检测生殖支原体。如有耐药检测，应进行检测并使用结果指导治疗。复发性宫颈炎女性应检测生殖支原体,PID女性应考虑检测。如有可能，检测应伴随耐药检测。不建议对女性和男性无症状生殖支原体感染进行筛查，也不建议对生殖支原体进行生殖器外检测。在临床实践中，如无法进行检测，在持续性或复发性尿道炎或宫颈炎病例中应怀疑生殖支原体，并在PID中予以考虑。

Treatment

M. genitalium lacks a cell wall, and thus antibiotics targeting cell-wall biosynthesis (e.g., ß-lactams including penicillins and cephalosporins) are ineffective against this organism. Because of the high rates of macrolide resistance with treatment failures (*707*) and efficient selection of additional resistance, a 1-g dose of azithromycin should not be used.

Two-stage therapy approaches, ideally using resistance-guided therapy, are recommended for treatment. Resistance-guided therapy has demonstrated cure rates of >90% and should be used whenever possible (*759*,*963*); however, it requires access to macrolide-resistance testing. As part of this approach, doxycycline is provided as initial empiric therapy, which reduces the organism load and facilitates organism clearance, followed by macrolide-sensitive *M. genitalium* infections treated with high-dose azithromycin; macrolide-resistant infections are treated with moxifloxacin (*964*,*965*).

Recommended Regimens if *M. genitalium* Resistance Testing Is Available

If macrolide sensitive: Doxycycline 100 mg orally 2 times/day for 7 days, followed by **azithromycin** 1 g orally initial dose, followed by 500 mg orally once daily for 3 additional days (2.5 g total)

If macrolide resistant: Doxycycline 100 mg orally 2 times/day for 7 days followed by **moxifloxacin** 400 mg orally once daily for 7 days

Recommended Regimen if *M. genitalium* Resistance Testing Is Not Available

If *M. genitalium* is detected by an FDA-cleared NAAT: Doxycycline 100 mg orally 2 times/day for 7 days, followed by **moxifloxacin** 400 mg orally once daily for 7 days

Although the majority of *M. genitalium* strains are sensitive to moxifloxacin, resistance has been reported, and adverse side effects and cost should be considered with this regimen. In settings without access to resistance testing and when moxifloxacin cannot be used, an alternative regimen can be considered, based on limited data: doxycycline 100 mg orally 2 times/day for 7 days, followed by azithromycin (1 g orally on day 1 followed by 500 mg once daily for 3 days) and a test of cure 21 days after completion of therapy (*963*). Because of the high prevalence of macrolide resistance and high likelihood of treatment failure, this regimen should be used only when a test of cure is possible, and no other alternatives exist. If symptomatic treatment failure or a positive test of cure occurs after this regimen, expert consultation is recommended. Data are limited regarding use of minocycline in instances of treatment failure (*966*).

Recommended PID treatment regimens are not effective against *M. genitalium*. Initial empiric therapy for PID, which includes doxycycline 100 mg orally 2 times/day for 14 days, should be provided at the time of presentation for care. If *M. genitalium* is detected, a regimen of moxifloxacin 400 mg orally once daily for 14 days has been effective in eradicating the organism. Nevertheless, no data have been published that assess the benefits of testing women with PID for *M. genitalium,* and the importance of directing treatment against this organism is unknown.

Follow-Up

Test of cure is not recommended for asymptomatic persons who received treatment with a recommended regimen. In settings in which *M. genitalium* testing is available, persons with persistent urethritis, cervicitis, or PID accompanied by detection of *M. genitalium* should be treated with moxifloxacin.

Management of Sex Partners

Recent studies report a high concordance of *M. genitalium* among partners of males, females, and MSM; however, no studies have determined whether reinfection is reduced with partner treatment (*940*,*967*,*968*). Sex partners of patients with symptomatic *M. genitalium* infection can be tested, and those with a positive test can be treated to possibly reduce the risk for reinfection. If testing the partner is not possible, the antimicrobial regimen that was provided to the patient can be provided.

Special Considerations

HIV Infection

Persons who have *M. genitalium* and HIV infection should receive the same treatment regimen as those persons without HIV.

Diseases Characterized by Vulvovaginal Itching, Burning, Irritation, Odor, or Discharge

The majority of women will have a vaginal infection, characterized by discharge, itching, burning, or odor, during their lifetime. With the availability of complementary and alternative therapies and over-the-counter medications for candidiasis, symptomatic women often seek these products before or in addition to an evaluation by a medical provider.

Obtaining a medical history alone has been reported to be insufficient for accurate diagnosis of vaginitis and can lead to inappropriate administration of medication (*969*). Therefore, a careful history, examination, and laboratory testing to determine the etiology of any vaginal symptoms are warranted. Information regarding sexual behaviors and

治疗

生殖支原体缺乏细胞壁，因此靶向细胞壁生物合成的抗生素(例如β-内酰胺类，包括青霉素类和头孢菌素类)对该微生物无效。由于大环内酯类耐药率高导致治疗失败(707)以及额外耐药性的有效选择，不应使用1 g单剂量的阿奇霉素。

推荐采用两阶段治疗策略，理想情况下使用耐药指导治疗。耐药指导治疗已证明治愈率>90%，应尽可能使用(*759*, *963*)；然而，它需要获得大环内酯类耐药检测。作为该方法的一部分，多西环素作为初始经验性治疗提供，可降低微生物负荷并促进微生物清除，随后对大环内酯类敏感的生殖支原体感染使用高剂量阿奇霉素治疗；大环内酯类耐药感染使用莫西沙星治疗(*964*, *965*)。

如果生殖支原体耐药检测可用的

若大环内酯类敏感：多西环素 100 mg口服，每日2次，共7天，随后**阿奇霉素** 1 g口服初始剂量，随后
500 mg口服，每日一次，再服3天(总剂量2.5 g)

若大环内酯类耐药：多西环素 100 mg口服，每日2次，共7天，随后**莫西沙星** 400 mg口服，每日1次，共7天

无法进行生殖支原体耐药检测时的推荐方案

若通过FDA批准的NAAT检测到生殖支原体：多西环素 100 mg口服，每日2次，共7天，随后**莫西沙星** 400 mg口服，每日1次，共7天

尽管大多数生殖支原体菌株对莫西沙星敏感，但已有耐药性报道，使用该方案时应考虑不良反应和费用。在无法进行耐药检测且不能使用莫西沙星的情况下，可基于有限数据考虑替代方案：多西环素100 mg口服，每日2次，共7天，随后阿奇霉素(第1天口服1 g，之后500 mg每日一次，共3天)，并在完成治疗后21天进行治愈检测(963)。由于大环内酯类耐药率高且治疗失败可能性大，该方案仅应在可进行治愈检测且无其他替代方案时使用。若该方案治疗后出现有症状的治疗失败或治愈检测阳性，建议咨询专家。关于米诺环素用于治疗失败的数据有限(966)。

推荐的PID治疗方案对生殖支原体无效。PID的初始经验性治疗包括多西环素100 mg口服，每日2次，共14天，应在就诊时提供。若生殖支原体被检出，莫西沙星400 mg口服，每日1次，共14天的方案已有效根除该微生物。然而，尚无已发表数据评估对PID女性进行生殖支原体检测的益处，且针对该微生物指导治疗的重要性尚不清楚。

随访

对于接受推荐方案治疗的无症状者，不建议进行治愈检测。在可进行生殖支原体检测的环境中，伴有生殖支原体检出的持续性尿道炎、宫颈炎或PID患者应使用莫西沙星治疗。

管理的性伴侣

近期研究报告显示，男性、女性及MSM的性伴侣中生殖支原体的一致性较高；然而，尚无研究确定伴侣治疗是否能减少再感染(*940*, *967*, *968*)。有症状生殖支原体感染患者的性伴侣可接受检测，检测阳性者可接受治疗，以可能降低再感染风险。若无法对伴侣进行检测，可给予与患者相同的抗菌治疗方案。

特殊注意事项

HIV感染

感染生殖支原体且合并HIV感染者应接受与无HIV感染者相同的治疗方案。

以外阴阴道瘙痒、灼烧感、刺激、异味或分泌物为特征的疾病

大多数女性在其一生中会患有阴道感染，其特征为分泌物、瘙痒、灼烧感或异味。随着补充和替代疗法以及非处方药物用于念珠菌病的可及性，有症状的女性常在就医评估之前或之外寻求这些产品。

据报道，仅获取病史不足以准确诊断阴道炎，并可能导致不适当的用药(969)。因此，有必要进行仔细的病史采集、检查和实验室检测以确定任何阴道症状的病因。关于性行为和

practices, sex of sex partners, menses, vaginal hygiene practices (e.g., douching), and self-treatment with oral and intravaginal medications or other products should be elicited. The infections most frequently associated with vaginal symptoms are BV (i.e., replacement of the vaginal flora by an overgrowth of anaerobic bacteria including *G. vaginalis*, *Prevotella bivia*, *A. vaginae*, *Megasphaera* type 1, and numerous other fastidious or uncultivated anaerobes), trichomoniasis, and vulvovaginal candidiasis (VVC). Cervicitis can also cause an abnormal vaginal discharge. Although VVC is usually not sexually transmitted, it is included in this section because it is frequently diagnosed among women who have vaginal symptoms or are being evaluated for an STI.

Multiple diagnostic methods are available for identifying the etiology of vaginal symptoms. Clinical laboratory testing can identify the vaginitis cause in the majority of women and is discussed in detail in the sections of this report dedicated to each condition. In the clinician's office, the cause of vaginal symptoms can often be determined by pH, a potassium hydroxide (KOH) test, and microscopic examination of a wet mount of fresh samples of vaginal discharge. The pH of the vaginal secretions can be measured by pH paper; an elevated pH (i.e., >4.5) is common with BV or trichomoniasis (although trichomoniasis can also be present with a normal vaginal pH). Because pH testing is not highly specific, vaginal discharge should be further examined microscopically by first diluting one sample in 1 or 2 drops of 0.9% normal saline solution on one slide and a second sample in 10% KOH solution (samples that emit an amine odor immediately upon application of KOH suggest BV or trichomoniasis). Coverslips are then placed on the slides, and they are examined under a microscope at low and high power. The saline-solution specimen might display motile trichomonads or clue cells (i.e., epithelial cells with borders obscured by small anaerobic bacteria), which are characteristic of BV. The KOH specimen typically is used to identify hyphae or blastospores observed with candidiasis. However, absence of trichomonads in saline or fungal elements in KOH samples does not rule out these infections because the sensitivity of microscopy is approximately 50% compared with NAAT (trichomoniasis) or culture (yeast) (*670*). Presence of WBCs without evidence of trichomonads or yeast might also indicate cervicitis (see Cervicitis).

In settings where pH paper, KOH, and microscopy are unavailable, a broad range of clinical laboratory tests, described in the diagnosis section for each disease, can be used. Presence of objective signs of vulvovaginal inflammation in the absence of vaginal pathogens after laboratory testing indicates the possibility of mechanical, chemical, allergic, or other noninfectious causes of vulvovaginal signs or symptoms. For women with persistent symptoms and no clear etiology, referral to a specialist should be considered.

Bacterial Vaginosis

BV is a vaginal dysbiosis resulting from replacement of normal hydrogen peroxide and lactic-acid–producing *Lactobacillus* species in the vagina with high concentrations of anaerobic bacteria, including *G. vaginalis*, *Prevotella* species, *Mobiluncus* species, *A. vaginae*, and other BV-associated bacteria. A notable feature is the appearance of a polymicrobial biofilm on vaginal epithelial cells (*970*). Certain women experience transient vaginal microbial changes, whereas others experience them for longer intervals (*971*). BV is a highly prevalent condition and the most common cause of vaginal discharge worldwide (*972*). However, in a nationally representative survey, the majority of women with BV were asymptomatic (*310*).

BV is associated with having multiple male sex partners, female partners, sexual relationships with more than one person (*973*), a new sex partner, lack of condom use (*974*), douching (*975*,*976*), and HSV-2 seropositivity (*977*). Male circumcision reduces the risk for BV among women (*978*). In addition, BV prevalence increases during menses (*979*,*980*). Women who have never been sexually active are rarely affected (*981*). The cause of the microbial alteration that precipitates BV is not fully understood, and whether BV results from acquisition of a single sexually transmitted pathogen is unknown. BV prevalence has been reported to increase among women with copper-containing IUDs (*972*,*982*). Hormonal contraception does not increase risk for BV (*983*) and might protect against BV development (*983*,*984*). Vitamin D deficiency has not been reported to be a risk factor for BV (*985*).

Women with BV are at increased risk for STI acquisition, such as HIV, *N. gonorrhoeae*, *C. trachomatis*, *T. vaginalis* (*977*), *M. genitalium* (*986*), HPV (*987*), and HSV-2 (*988*); complications after gynecologic surgery; complications of pregnancy; and recurrence of BV (*971*,*989*–*991*). BV also increases HIV infection acquisition (*992*) because specific BV-associated bacteria can increase susceptibility to HIV (*993*,*994*) and the risk for HIV transmission to male sex partners (*187*). Evaluation of short-term valacyclovir suppression among women with HSV-2 did not decrease the risk for BV, despite effective suppression of HSV-2 (*995*).

Although BV-associated bacteria can be identified on male genitalia (*996*,*997*), treatment of male sex partners has not been beneficial in preventing the recurrence of BV (*998*). Among WSW, a high level of BV concordance occurs between sex partners (*292*); however, no studies have evaluated treatment of female sex partners of WSW to prevent BV recurrence.

应询问性行为方式、性伴侣性别、月经、阴道卫生习惯(如冲洗)以及口服和阴道内药物或其他产品的自行治疗情况。与阴道症状最常相关的感染是BV(即阴道菌群被厌氧菌过度生长所替代，包括阴道加德纳菌、*Prevotella bivia*、*A.vaginae*、*Megasphaera*1型以及众多其他苛养或不可培养的厌氧菌)、滴虫感染和外阴阴道念珠菌病(VVC)。宫颈炎也可引起异常阴道分泌物。尽管VVC通常不是性传播的，但因其常在有阴道症状或正在接受STI评估的女性中被诊断，故纳入本节。

有多种诊断方法可用于确定阴道症状的病因。临床实验室检测可在大多数女性中确定阴道炎的病因，本报告各疾病专节中有详细讨论。在临床医生诊室中，阴道症状的病因常可通过pH、氢氧化钾(KOH)试验以及新鲜阴道分泌物湿片显微镜检查来确定。阴道分泌物的pH可用pH试纸测定；pH升高(即>4.5)常见于BV或滴虫感染(尽管滴虫感染也可表现为阴道pH正常)。由于pH检测特异性不高，应进一步对阴道分泌物进行显微镜检查：先将一份样本稀释于1或2滴0.9%生理盐水中置于一张玻片上，另一份样本稀释于10% KOH溶液中(滴加KOH后立即散发胺味的样本提示BV或滴虫感染)。然后盖上盖玻片，在低倍和高倍显微镜下检查。生理盐水标本可能显示活动的滴虫或线索细胞(即边界被小厌氧菌遮蔽的上皮细胞)，为BV的特征。KOH标本通常用于识别念珠菌病所见菌丝或芽生孢子。然而，生理盐水中未见滴虫或KOH样本中未见真菌成分并不能排除这些感染，因为与NAAT(滴虫感染)或培养(酵母菌)相比，显微镜检查的敏感性约为50%(670)。存在WBC但无滴虫或酵母菌证据也可能提示宫颈炎(见宫颈炎)。

在无法获得pH试纸、KOH和显微镜检查的环境中，可使用各疾病诊断部分所述的各种临床实验室检测。实验室检测后无阴道病原体但存在外阴阴道炎症的客观体征，提示可能存在机械性、化学性、过敏性或其他非感染性原因导致的外阴阴道体征或症状。

女阴阴道体征或症状的其他非感染性病因。对于症状持续且病因不明确的女性，应考虑转诊至专科医生。

细菌性阴道病

BV是一种阴道菌群失调，由阴道内正常产生过氧化氢和乳酸的乳杆菌菌种被高浓度厌氧菌替代所致，包括阴道加德纳菌、*Prevotella*菌种、*Mobiluncus*菌种、*A.vaginae*及其他BV相关细菌。一个显著特征是阴道上皮细胞上出现多种微生物生物膜(970)。某些女性经历短暂的阴道微生物变化，而另一些女性则经历较长时间的变化(971)。BV是一种高度流行的疾病，也是全球阴道分泌物最常见的原因(972)。然而，在一项全国代表性调查中，大多数BV女性无症状(310)。

BV与拥有多个男性性伴侣、女性性伴侣、与超过一人发生性关系(973)、新性伴侣、未使用安全套(974)、阴道冲洗(*975*, *976*)以及HSV-2血清阳性(977)相关。男性包皮环切可降低女性BV风险(978)。此外，BV患病率在月经期升高(*979*, *980*)。从未有性生活的女性很少受影响(981)。诱发BV的微生物改变的病因尚未完全明了，BV是否源于获得单一性传播病原体尚不清楚。据报道，使用含铜IUD的女性BV患病率升高(*972*, *982*)。激素避孕不增加BV风险(983)，并可能预防BV发生(*983*, *984*)。尚未有报道称维生素D缺乏是BV的危险因素(985)。

患有BV的女性获得STI的风险增加，如HIV、*N.gonorrhoeae*、*C.trachomatis*、*T.vaginalis*(977)、*M.genitalium*(986)、HPV(987)和HSV-2(988)；妇科手术后并发症；妊娠并发症；以及BV复发(*971*, *989 - 991*)。BV还增加HIV感染获得风险(992)，因为特定的BV相关细菌可增加对HIV的易感性(*993*, *994*)以及将HIV传播给男性性伴侣的风险(187)。对HSV-2女性进行短期valacyclovir抑制评估并未降低BV风险，尽管HSV-2得到有效抑制(995)。

尽管BV相关细菌可在男性生殖器上被鉴定(*996*, *997*)，但治疗男性性伴侣在预防BV复发方面并无益处(998)。在WSW中，性伴侣之间BV一致性较高(292)；然而，尚无研究评估治疗WSW的女性性伴侣以预防BV复发。

Diagnostic Considerations

BV can be diagnosed by using clinical criteria (i.e., Amsel's diagnostic criteria) (*999*) or by determining the Nugent score from a vaginal Gram stain (*1000*). Vaginal Gram stain, considered the reference standard laboratory method for diagnosing BV, is used to determine the relative concentration of lactobacilli (i.e., long gram-positive rods), small gram-negative and gram-variable rods (i.e., *G. vaginalis* or *Bacteroides*), and curved gram-negative rods (i.e., *Mobiluncus*) characteristic of BV. A Nugent score of 0–3 is consistent with a *Lactobacillus*-predominant vaginal microbiota, 4–6 with intermediate microbiota (emergence of *G. vaginalis*), and 7–10 with BV. Clinical diagnosis of BV by Amsel criteria requires at least three of the following four symptoms or signs:

- Homogeneous, thin discharge (milklike consistency) that smoothly coats the vaginal walls
- Clue cells (e.g., vaginal epithelial cells studded with adherent bacteria) on microscopic examination
- pH of vaginal fluid >4.5
- A fishy odor of vaginal discharge before or after addition of 10% KOH (i.e., the whiff test)

Detection of at least three Amsel criteria has been correlated with results by Gram stain (*1001*). The sensitivity and specificity of the Amsel criteria are 37%–70% and 94%–99%, respectively, compared with the Nugent score (*1002*).

In addition to the Amsel criteria, multiple POC tests are available for BV diagnosis. The Osom BV Blue test (Sekisui Diagnostics) detects vaginal sialidase activity (*1003*,*1004*). The Affirm VP III (Becton Dickinson) is an oligonucleotide probe test that detects high concentrations of *G. vaginalis* nucleic acids (>5 x 10^5 CFU of *G. vaginalis*/mL of vaginal fluid) for diagnosing BV, *Candida* species, and *T. vaginalis.* This test has been reported to be most useful for symptomatic women in conjunction with vaginal pH measurement and presence of amine odor (sensitivity of 97%); specificity is 81% compared with Nugent. Finally, the FemExam Test Card (Cooper Surgical) measures vaginal pH, presence of trimethylamine (a metabolic by-product of *G. vaginalis*), and proline aminopeptidase (*1005*). Sensitivity is 91% and specificity is 61%, compared with Nugent. This test has primarily been studied in resource-poor settings (*1005*), and although it has been reported to be beneficial compared with syndromic management, it is not a preferred diagnostic method for BV diagnosis.

Multiple BV NAATs are available for BV diagnosis among symptomatic women (*1002*). These tests are based on detection of specific bacterial nucleic acids and have high sensitivity and specificity for BV (i.e., *G. vaginalis*, *A. vaginae*, BVAB2, or *Megasphaera* type 1) (*1006*) and certain lactobacilli (i.e., *Lactobacillus crispatus*, *Lactobacillus jensenii*, and *Lactobacillus gasseri*). They can be performed on either clinician- or self-collected vaginal specimens with results available in <24 hours, depending on the availability of the molecular diagnostic platform (*1002*). Five quantitative multiplex PCR assays are available: Max Vaginal Panel (Becton Dickinson) (*1007*), Aptima BV (Hologic), NuSwab VG (LabCorp) (*1008*), OneSwab BV Panel PCR with Lactobacillus Profiling by qPCR (Medical Diagnostic Laboratories) (*1009*), and SureSwab BV (Quest Diagnostics). Two of these assays are FDA cleared (BD Max Vaginal Panel and Aptima BV), and the other three are laboratory-developed tests.

The Max Vaginal Panel provides results by an algorithmic analysis of molecular DNA detection of *Lactobacillus* species (*L. crispatus* and *L. jensenii*) in addition to *G. vaginalis*, *A. vaginae*, BVAB2, and *Megasphaera* type 1. This test has 90.5% sensitivity and 85.8% specificity for BV diagnosis, compared with Amsel criteria and Nugent score. It also provides results for *Candida* species and *T. vaginalis*. The Aptima BV detects *G. vaginalis*, *A. vaginae*, and certain *Lactobacillus* species including *L. crispatus*, *L. jensenii*, and *L. gasseri,* with sensitivity and specificity ranging from 95.0% to 97.3% and 85.8% to 89.6%, respectively (using either clinician- or patient-collected vaginal swabs). The three laboratory-developed tests (NuSwab VG, OneSwab BV Panel PCR with Lactobacillus Profiling by qPCR, and SureSwab BV) have to be internally validated before use for patient care yet have good sensitivity and specificity, similar to FDA-cleared assays. BV NAATs should be used among symptomatic women only (e.g., women with vaginal discharge, odor, or itch) because their accuracy is not well defined for asymptomatic women. Despite the availability of BV NAATs, traditional methods of BV diagnosis, including the Amsel criteria, Nugent score, and the Affirm VP III assay, remain useful for diagnosing symptomatic BV because of their lower cost and ability to provide a rapid diagnosis. Culture of *G. vaginalis* is not recommended as a diagnostic tool because it is not specific. Cervical Pap tests have no clinical utility for diagnosing BV because of their low sensitivity and specificity.

Treatment

Treatment for BV is recommended for women with symptoms. Established benefits of therapy among nonpregnant women are to relieve vaginal symptoms and signs of infection. Other potential benefits of treatment include reduction in the risk for acquiring *C. trachomatis, N. gonorrhoeae*, *T. vaginalis*, *M. genitalium*, HIV, HPV, and HSV-2 (*971*,*986*–*988*,*990*,*1010*). No data are available that directly compare the efficacy of oral and topical medications for treating BV.

诊断考虑

BV可通过使用临床标准(即Amsel诊断标准)(999)或通过阴道革兰染色确定Nugent评分(1000)来诊断。阴道革兰染色被认为是诊断BV的参考标准实验室方法，用于确定乳杆菌(即长革兰阳性杆菌)、小革兰阴性和革兰可变杆菌(即*G.vaginalis*或*Bacteroides*)以及BV特征性弯曲革兰阴性杆菌(即*Mobiluncus*)的相对浓度。Nugent评分0-3与*Lactobacillus*为主的阴道微生物群一致，4-6为中间型微生物群(*G.vaginalis*出现),7-10为BV。通过Amsel标准临床诊断BV需要以下四种症状或体征中至少三项：

- 均匀、稀薄的分泌物(类似牛奶的稠度)，其顺利涂布阴道壁
- 线索细胞(例如，表面布满细菌的阴道上皮细胞)黏附细菌)显微镜检查
- 阴道分泌物 pH 值 >4.5
- 添加前或添加后阴道分泌物有鱼腥味10% KOH(即嗅试验)

检出至少三项Amsel标准与革兰染色结果相关(1001)。与Nugent评分相比，Amsel标准的敏感性和特异性分别为37%-70%和94%-99%(1002)。

除Amsel标准外，多种POC检测可用于BV诊断。Osom BV Blue检测(Sekisui Diagnostics)检测阴道唾液酸酶活性(*1003*,*1004*)。Affirm VP III(Becton Dickinson)是一种寡核苷酸探针检测，可检测高浓度的*G.vaginalis*核酸(>5 x 10^5 CFU的*G.vaginalis*/ mL阴道液)，用于诊断BV、*Candida*菌种和*T.vaginalis*。据报道，该检测对症状性女性结合阴道pH测量和胺气味存在最为有用(敏感性97%)；与Nugent相比特异性为81%。最后，FemExam检测卡(Cooper Surgical)测量阴道pH、三甲胺(*G.vaginalis*的代谢副产物)的存在和脯氨酸氨肽酶(1005)。与Nugent相比，敏感性为91%，特异性为61%。该检测主要在资源匮乏环境中进行了研究(1005)，尽管据报道与综合征管理相比有益，但它不是BV诊断的首选诊断方法。

多种BV NAAT可用于有症状女性的BV诊断(1002)。这些检测基于特定细菌核酸的检测，对BV具有高敏感性和特异性(即阴道加德纳菌、阴道阿托波菌、BVAB2或巨球藻属1型)(1006)以及某些乳杆菌(即、*Lactobacillus crispatus*、*Lactobacillus jensenii*和*Lactobacillus gasseri*)。可在临床医生采集或自行采集的阴道标本上进行，结果可在<24小时内获得,取决于分子诊断平台的可及性(1002)。现有五种定量多重PCR检测:Max Vaginal Panel(Becton Dickinson)(1007)、Aptima BV(Hologic)、NuSwab VG(LabCorp)(1008)、OneSwab BV Panel PCR with Lactobacillus Profiling by qPCR(Medical diagnostic Laboratories)(1009)和SureSwab BV(Quest Diagnostics)。其中两种检测已获FDA许可(BD Max Vaginal Panel和Aptima BV),另外三种为实验室自建检测。

Max Vaginal Panel通过算法分析*Lactobacillus*菌种(*L.crispatus*和*L.jensenii*)以及*G.vaginalis*、*A.vaginae*、BVAB2和*Megasphaera*1型的分子DNA检测结果提供结果。与Amsel标准和Nugent评分相比，该检测诊断BV的敏感性为90.5%，特异性为85.8%。它还提供*Candida*菌种和*T.vaginalis*的结果。Aptima BV检测*G.vaginae*以及某些*Lactobacillus*菌种，包括*L.crispatus*、*L.jensenii*和*L.gasseri,*，敏感性和特异性分别为95.0%至97.3%和85.8%至89.6%(使用临床医生采集或患者自采的阴道拭子)。三种实验室自建检测(NuSwab VG、OneSwab BV Panel PCR with Lactobacillus Profiling by qPCR和SureSwab BV)在用于患者诊疗前须经内部验证，但具有良好的敏感性和特异性，与FDA许可的检测相似。BV NAAT应仅用于有症状的女性(如有阴道分泌物、异味或瘙痒的女性)，因为其在无症状女性中的准确性尚未充分确定。尽管已有BV NAAT，传统BV诊断方法，包括Amsel标准、Nugent评分和Affirm VP III检测，仍可用于诊断有症状BV，因为其成本较低且能提供快速诊断。不推荐将*G.vaginalis*培养作为诊断工具，因为其不具特异性。宫颈Pap涂片对诊断BV无临床效用，因为其敏感性和特异性低。

治疗

建议对有症状的女性进行BV治疗。非妊娠女性治疗的既定益处是缓解阴道症状和感染体征。治疗的其他潜在益处包括降低获得*C.trachomatis*、*N.gonorrhoeae*、*T.vaginalis*、*M.genitalium*、HIV、HPV和HSV-2的风险(*971*,*986*-*988*,*990*,*1010*)。目前没有直接比较口服和外用药物治疗BV疗效的数据。

Recommended Regimens for Bacterial Vaginosis

Metronidazole 500 mg orally 2 times/day for 7 days
or
Metronidazole gel 0.75% one full applicator (5 g) intravaginally, once daily for 5 days
or
Clindamycin cream 2% one full applicator (5 g) intravaginally at bedtime for 7 days

A review regarding alcohol consumption during metronidazole treatment reported no in vitro studies, animal models, reports of adverse effects, or clinical studies providing convincing evidence of a disulfiram-like interaction between alcohol and metronidazole (*1011*). The previous warning against simultaneous use of alcohol and metronidazole was based on laboratory experiments and individual case histories in which the reported reactions were equally likely to have been caused by alcohol alone or by adverse effects of metronidazole.

Metronidazole does not inhibit acetaldehyde dehydrogenase, as occurs with disulfiram. Ethanol alone or ethanol-independent side effects of metronidazole might explain the suspicion of disulfiram-like effects. Thus, refraining from alcohol use while taking metronidazole (or tinidazole) is unnecessary. Clindamycin cream is oil based and might weaken latex condoms and diaphragms for 5 days after use (refer to clindamycin product labeling for additional information).

Women should be advised to refrain from sexual activity or to use condoms consistently and correctly during the BV treatment regimen. Douching might increase the risk for relapse, and no data support use of douching for treatment or symptom relief.

Alternative Regimens

Clindamycin 300 mg orally 2 times/day for 7 days
or
Clindamycin ovules 100 mg intravaginally once at bedtime for 3 days*
or
Secnidazole 2 g oral granules in a single dose†
or
Tinidazole 2 g orally once daily for 2 days
or
Tinidazole 1 g orally once daily for 5 days

* Clindamycin ovules use an oleaginous base that might weaken latex or rubber products (e.g., condoms and diaphragms). Use of such products within 72 hours after treatment with clindamycin ovules is not recommended.
† Oral granules should be sprinkled onto unsweetened applesauce, yogurt, or pudding before ingestion. A glass of water can be taken after administration to aid in swallowing.

Alternative regimens include secnidazole oral granules (*1012–1014*), multiple oral tinidazole regimens (*1015*), or clindamycin (oral or intravaginal) (*1016*). In a phase 3 clinical trial of secnidazole 2 g oral granules versus placebo, BV clinical cure rates at days 21–30 were 53% in the secnidazole arm compared with 19% in the placebo arm (p<0.001) (*1013*). Secnidazole is listed as an alternative regimen, due to its higher cost and lack of long-term outcomes compared with recommended BV treatments. A patient savings card for secnidazole is available at https://www.solosec.com/savings-card.

Additional BV treatment regimens include metronidazole 1.3% vaginal gel in a single dose (*1017*,*1018*) and clindamycin phosphate (Clindesse) 2% vaginal cream in a single dose (*1019*). In a phase 3 clinical trial of metronidazole 1.3% vaginal gel versus placebo, BV clinical cure rates at day 21 were 37.2% in the metronidazole 1.3% vaginal gel arm, compared with 26.6% in the placebo arm (p = 0.01) (*1018*). A patient savings card for metronidazole 1.3% vaginal gel is available at https://nuvessa.com/nuvessa_files/19_Nuvessa_WEB_Card_032819.pdf. In a multicenter, randomized, single-blind, parallel-group study of Clindesse 2% vaginal cream single dose versus clindamycin 2% vaginal cream at bedtime for 7 days among 540 women with BV, no statistically significant difference existed between groups in clinical cure at days 21–30 (64.3% versus 63.2%; p = 0.95) (*1019*); however, this study had methodologic problems. A patient savings card for Clindesse 2% vaginal cream is available at https://www.clindesse.com/pdf/CLINDESSE_SavingsCard.pdf.

BV biofilm disrupting agents (i.e., TOL-463) (*1020*) are being investigated to determine their role in enhancing the likelihood of BV cure relative to approved therapies. Studies have evaluated the clinical and microbiologic efficacy of intravaginal *Lactobacillus* and other probiotic formulations to treat BV and restore normal vaginal microbiota (*1021–1025*); overall, no studies support these products as an adjunctive or replacement therapy for women with BV.

Other Management Considerations

All women with BV should be tested for HIV and other STIs.

Follow-Up

Follow-up visits are unnecessary if symptoms resolve. Because persistent or recurrent BV is common, women should be advised to return for evaluation if symptoms recur. Limited data are available regarding optimal management strategies for women with persistent or recurrent BV. Using a different recommended treatment regimen can be considered for women who have a recurrence; however, retreatment with the same recommended regimen is an acceptable approach for treating persistent or recurrent BV after the first occurrence (*1026*). For women with multiple recurrences after completion of a recommended regimen, either 0.75% metronidazole gel or 750 mg metronidazole vaginal suppository twice weekly for >3 months has been reported to reduce recurrences, although this benefit does not

细菌性阴道病的推荐治疗方案

甲硝唑 500 mg 口服每日2次共7天
或
甲硝唑凝胶0.75%一满涂药器(5 g)阴道内给药，每日1次，共5天
或
克林霉素乳膏2%一满涂药器(5 g)阴道内给药，睡前使用，共7天

一项关于甲硝唑治疗期间饮酒的综述报告称，没有体外研究、动物模型、不良反应报告或临床研究提供令人信服的证据表明酒精与甲硝唑之间存在双硫仑样相互作用(1011)。先前关于禁止同时使用酒精和甲硝唑的警告是基于实验室实验和个别病例史，其中报告的反应同样可能由单独酒精或甲硝唑的不良反应引起。

甲硝唑不抑制乙醛脱氢酶，这与双硫仑不同。单独乙醇或甲硝唑的非乙醇依赖性副作用可能解释了对双硫仑样效应的怀疑。因此，服用甲硝唑(或替硝唑)期间无需戒酒。克林霉素乳膏为油基，使用后5天内可能削弱乳胶避孕套和子宫帽(更多信息请参阅克林霉素产品标签)。

应建议女性在BV治疗方案期间避免性活动或持续正确使用避孕套。阴道冲洗可能增加复发风险，且无数据支持使用阴道冲洗进行治疗或缓解症状。

替代方案

Clindamycin 300 mg 口服每日2次共7天
或
克林霉素卵形栓 100 mg阴道内给药，睡前1次，共3天*
或
塞克硝唑 2 g口服颗粒剂，单次给药†
或
替硝唑 2 g 口服，每日一次，连用 2 天
或
替硝唑 1 g 口服，每日一次，共 5 天

* 克林霉素ovules使用油性基质，可能削弱乳胶或橡胶制品(例如避孕套和子宫帽)。使用克林霉素卵形栓治疗后72小时内不应使用此类产品推荐。
† 口服颗粒应撒在无糖苹果酱、酸奶上，或布丁后吞服。给药后可饮用一杯水以帮助吞咽。

替代方案包括塞克硝唑口服颗粒(*1012 - 1014*)、多种口服替硝唑方案(1015)或克林霉素(口服或阴道内)(1016)。在一项塞克硝唑2 g口服颗粒与安慰剂对照的3期临床试验中，第21-30天BV临床治愈率在塞克硝唑组为53%

而安慰剂组为19%(p<0.001)(1013)。塞克硝唑被列为替代方案,原因是其成本较高且与推荐的BV治疗相比缺乏长期结局数据。塞克硝唑患者储蓄卡可在https://www.solosec.com/savings-card获取。

其他BV治疗方案包括甲硝唑1.3%阴道凝胶单剂(*1017*,*1018*)和克林霉素磷酸酯(Clindesse)2%阴道乳膏单剂(1019)。在一项甲硝唑1.3%阴道凝胶与安慰剂的3期临床试验中，第21天甲硝唑1.3%阴道凝胶组的BV临床治愈率为37.2%，而安慰剂组为26.6%(p = 0.01)(1018)。甲硝唑1.3%阴道凝胶的患者节省卡可在https:// nuvessa.com/nuvessa_files/19_Nuvessa_WEB_Card_032819. pdf获取。在一项多中心、随机、单盲、平行组研究中，540名BV女性中比较Clindesse 2%阴道乳膏单剂与克林霉素2%阴道乳膏睡前使用7天，第21-30天临床治愈率组间无统计学显著差异(64.3% versus 63.2%;p = 0.95)(1019)；然而，该研究存在方法学问题。Clindesse 2%阴道乳膏的患者节省卡可在https://www.clindesse.com/ pdf/CLINDESSE_savings card.pdf获取。

BV生物膜破坏剂(即TOL-463)(1020)正在研究中，以确定其相对于已批准疗法在提高BV治愈可能性方面的作用。研究评估了阴道内乳杆菌及其他益生菌制剂治疗BV和恢复正常阴道微生物群的临床和微生物学疗效(*1021 - 1025*)；总体而言，尚无研究支持这些产品作为BV女性的辅助或替代疗法。

其他管理考虑

所有患有BV的女性都应接受HIV和其他STI的检测。

随访

如果症状缓解，则无需随访。由于持续性或复发性BV常见，应建议女性如果症状复发则返回评估。关于持续性或复发性BV女性的最佳管理策略数据有限。对于复发的女性，可考虑使用不同的推荐方案；然而，对于首次发生后持续性或复发性BV，使用相同推荐方案再治疗是可接受的方法(1026)。对于完成推荐方案后多次复发的女性，据报道0.75%甲硝唑凝胶或750 mg甲硝唑阴道栓每周两次使用>3个月可减少复发，尽管这种益处并不

persist when suppressive therapy is discontinued (*1027*,*1028*). Limited data indicate that for women with multiple recurrences, an oral nitroimidazole (metronidazole or tinidazole 500 mg 2 times/day for 7 days), followed by intravaginal boric acid 600 mg daily for 21 days and suppressive 0.75% metronidazole gel twice weekly for 4–6 months, might be an option for women with recurrent BV (*1029*). Monthly oral metronidazole 2 g administered with fluconazole 150 mg has also been evaluated as suppressive therapy; this regimen reduced the BV incidence and promoted colonization with normal vaginal microbiota (*1030*). A randomized controlled trial of a dendrimer-based microbicide 1% vaginal gel (Astodrimer) also reported favorable results in prolonging the time to BV recurrence, compared with placebo (*1031*). In addition, a clinical trial of *L. crispatus* CTV-05 (Lactin-V), administered vaginally in 4 consecutive daily doses for 4 days in week 1 followed by twice weekly doses for 10 weeks (after initial treatment with 5 days of 0.75% vaginal metronidazole gel), reported a substantially lower incidence of BV recurrence at 12 weeks in the Lactin-V arm, compared with placebo (*1032*); however this medication is not yet FDA cleared or commercially available. High-dose Vitamin D supplementation has not been determined to decrease BV recurrence in randomized controlled trials (*1033*) and is not recommended.

Management of Sex Partners

Data from earlier clinical trials indicate that a woman's response to therapy and the likelihood of relapse or recurrence are not affected by treatment of her sex partner (*998*). Therefore, routine treatment of sex partners is not recommended. However, a pilot study reported that male partner treatment (i.e., metronidazole 400 mg orally 2 times/day in conjunction with 2% clindamycin cream applied topically to the penile skin 2 times/day for 7 days) of women with recurrent BV had an immediate and sustained effect on the composition of the vaginal microbiota, with an overall decrease in bacterial diversity at day 28 (*1034*). Male partner treatment also had an immediate effect on the composition of the penile microbiota; however, this was not as pronounced at day 28, compared with that among women. A phase 3 multicenter randomized double-blinded trial evaluating the efficacy of a 7-day oral metronidazole regimen versus placebo for treatment of male sex partners of women with recurrent BV did not find that male partner treatment reduced BV recurrence in female partners, although women whose male partners adhered to multidose metronidazole were less likely to experience treatment failure (*1035*).

Special Considerations

Drug Allergy, Intolerance, or Adverse Reactions

Intravaginal clindamycin cream is preferred in case of allergy or intolerance to metronidazole or tinidazole. Intravaginal metronidazole gel can be considered for women who are not allergic to metronidazole but do not tolerate oral metronidazole.

Pregnancy

BV treatment is recommended for all symptomatic pregnant women because symptomatic BV has been associated with adverse pregnancy outcomes, including premature rupture of membranes, preterm birth, intra-amniotic infection, and postpartum endometritis (*989*,*991*,*1036*). Studies have been undertaken to determine the efficacy of BV treatment among this population, including two trials demonstrating that oral metronidazole was efficacious during pregnancy by using the 250 mg 3 times/day regimen (*1037*,*1038*); however, oral metronidazole administered as a 500 mg 2 times/day regimen can also be used. One trial involving a limited number of participants revealed treatment with oral metronidazole 500 mg 2 times/day for 7 days to be equally effective as metronidazole gel 0.75% for 5 days, with cure rates of 70% by using Amsel criteria to define cure (*1039*). Another trial demonstrated a cure rate of 85% by using Gram-stain criteria after treatment with oral clindamycin 300 mg 2 times/day for 7 days (*1040*–*1043*).

Although older studies indicated a possible link between using vaginal clindamycin during pregnancy and adverse outcomes for the newborn, newer data demonstrate that this treatment approach is safe for pregnant women (*1044*). Although metronidazole crosses the placenta, no evidence of teratogenicity or mutagenic effects among infants has been reported in multiple cross-sectional, case-control, and cohort studies of pregnant women (*1041*–*1043*). These data indicate that metronidazole therapy poses low risk during pregnancy. Data from human studies are limited regarding the use of tinidazole in pregnancy; however, animal data demonstrate that such therapy poses moderate risk. Thus, tinidazole should be avoided during pregnancy (*431*). Data are insufficient regarding efficacy and adverse effects of secnidazole, Clindesse 2% vaginal cream, metronidazole 1.3% vaginal gel, and 750-mg vaginal metronidazole tablets during pregnancy; thus, their use should be avoided.

Oral therapy has not been reported to be superior to topical therapy for treating symptomatic BV in effecting cure or preventing adverse outcomes of pregnancy. Pregnant women can be treated with any of the recommended regimens for nonpregnant women, in addition to the alternative regimens of oral clindamycin and clindamycin ovules.

在停止抑制性治疗时持续存在(*1027*, *1028*)。有限数据表明，对于多次复发的女性，口服硝基咪唑类(甲硝唑或替硝唑500 mg，每日2次，共7天)，随后阴道内硼酸

每日600 mg，持续21天，以及抑制性0.75%甲硝唑凝胶每周两次，持续4-6个月，可能是复发性BV女性的一个选择(1029)。每月口服甲硝唑2 g联合氟康唑150 mg也已作为抑制性疗法进行评估；该方案降低了BV发生率并促进了正常阴道微生物群的定植(1030)。一项基于树枝状聚合物的1%阴道凝胶(Astodrimer)杀菌剂的随机对照试验也报告了与安慰剂相比在延长BV复发时间方面的有利结果(1031)。此外，一项关于*L.crispatus* CTV-05(Lactin-V)的临床试验，在第1周连续4天每日阴道给药4剂，随后每周两次给药10周(在初始使用0.75%阴道甲硝唑凝胶5天治疗后)，报告Lactin-V组在12周时BV复发率显著低于安慰剂组(1032)；然而该药物尚未获得FDA批准或商业供应。随机对照试验尚未确定高剂量维生素D补充剂可降低BV复发(1033)，因此不推荐使用。

性伴侣的管理

早期临床试验的数据表明，女性对治疗的反应以及复发或再发的可能性不受其性伴侣治疗的影响(998)。因此，不推荐常规治疗性伴侣。然而，一项初步研究报告，对复发性BV女性的男性伴侣进行治疗(即口服甲硝唑400 mg每日2次，联合2%克林霉素乳膏每日2次局部涂抹于阴茎皮肤，持续7天)对阴道微生物群的组成产生了即时和持续的影响，第28天时细菌多样性总体下降(1034)。男性伴侣治疗对阴茎微生物群的组成也产生了即时影响；然而，与女性相比，第28天时的效果不那么明显。一项评估7天口服甲硝唑方案与安慰剂治疗复发性BV女性男性性伴侣疗效的3期多中心随机双盲试验未发现男性伴侣治疗降低了女性伴侣的BV复发率，尽管男性伴侣坚持多剂量甲硝唑治疗的女性出现治疗失败的可能性较低(1035)。

特殊考虑

药物过敏、不耐受或不良反应

对甲硝唑或替硝唑过敏或不耐受时，首选阴道内克林霉素乳膏。对甲硝唑不过敏但不能耐受口服甲硝唑的女性可考虑阴道内甲硝唑凝胶。

妊娠

推荐所有有症状的妊娠女性接受BV治疗，因为有症状的BV与不良妊娠结局相关，包括胎膜早破、早产、羊膜腔内感染和产后子宫内膜炎(*989*,*991*,*1036*)。已开展研究以确定该人群中BV治疗的疗效，包括两项试验证明口服甲硝唑在妊娠期间使用250 mg每日3次方案有效(*1037*,*1038*)；然而，口服甲硝唑500 mg每日2次方案也可使用。一项涉及有限参与者的试验显示，口服甲硝唑500 mg每日2次持续7天与0.75%甲硝唑凝胶持续5天同样有效，使用Amsel标准定义治愈的治愈率为70%(1039)。另一项试验显示，口服克林霉素300 mg每日2次持续7天后，使用革兰染色标准的治愈率为85%(*1040 - 1043*)。

尽管较早的研究表明妊娠期间使用阴道克林霉素与新生儿不良结局之间可能存在关联，但较新的数据表明这种治疗方法对妊娠女性是安全的(1044)。尽管甲硝唑可穿过胎盘，但在多项针对妊娠女性的横断面、病例对照和队列研究中，未报告婴儿致畸性或致突变效应的证据(*1041 - 1043*)。这些数据表明甲硝唑治疗在妊娠期间风险较低。关于妊娠期间使用替硝唑的人类研究数据有限；然而，动物数据表明此类治疗具有中等风险。因此，妊娠期间应避免使用替硝唑(431)。关于塞克硝唑、Clindesse 2%阴道乳膏、甲硝唑1.3%阴道凝胶的疗效和不良反应数据不足，以及

妊娠期使用750-mg甲硝唑阴道片；因此，应避免使用。

口服治疗在治愈或预防妊娠不良结局方面，尚未有报告显示优于局部治疗用于治疗有症状的BV。孕妇可使用非孕妇的任何推荐方案，以及口服克林霉素和克林霉素栓剂的替代方案。

Treatment of asymptomatic BV among pregnant women at high risk for preterm delivery (i.e., those with a previous preterm birth or late miscarriage) has been evaluated by multiple studies, which have yielded mixed results. Seven trials have evaluated treatment of pregnant women with asymptomatic BV at high risk for preterm delivery: one revealed harm (*1045*), two reported no benefit (*1046*,*1047*), and four demonstrated benefit (*1037*,*1038*,*1048*,*1049*).

Treatment of asymptomatic BV among pregnant women at low risk for preterm delivery has not been reported to reduce adverse outcomes of pregnancy in a large multicenter randomized controlled trial (*1050*). Therefore, routine screening for BV among asymptomatic pregnant women at high or low risk for preterm delivery for preventing preterm birth is not recommended.

Metronidazole is secreted in breast milk. With maternal oral therapy, breastfed infants receive metronidazole in doses that are less than those used to treat infections among infants, although the active metabolite adds to the total infant exposure. Plasma levels of the drug and metabolite are measurable but remain less than maternal plasma levels (https://www.ncbi.nlm.nih.gov/books/NBK501922/?report=classic). Although multiple reported case series identified no evidence of metronidazole-associated adverse effects for breastfed infants, certain clinicians recommend deferring breastfeeding for 12–24 hours after maternal treatment with a single 2-g dose of metronidazole (*1051*). Lower doses produce a lower concentration in breast milk and are considered compatible with breastfeeding (*1052*,*1053*).

HIV Infection

BV appears to recur with higher frequency among women who have HIV infection (*1054*). Women with HIV infection and BV should receive the same treatment regimen as those who do not have HIV.

Trichomoniasis

Trichomoniasis is estimated to be the most prevalent nonviral STI worldwide, affecting approximately 3.7 million persons in the United States (*838*,*1055*). Because trichomoniasis is not a reportable disease (*1056*), and no recommendations are available for general screening for *T. vaginalis*, the epidemiology of trichomoniasis has largely come from population-based and clinic-based surveillance studies. The U.S. population-based *T. vaginalis* prevalence is 2.1% among females and 0.5% among males, with the highest rates among Black females (9.6%) and Black males (3.6%), compared with non-Hispanic White women (0.8%) and Hispanic women (1.4%) (*1057*,*1058*). Unlike chlamydia and gonorrhea, *T. vaginalis* prevalence rates are as high among women aged >24 years as they are for women aged <24 years (*1057*). Among persons attending nine geographically diverse STD clinics, the trichomonas prevalence was 14.6% among women (*1059*), and a study of STD clinic attendees in Birmingham, Alabama, identified a prevalence of 27% among women and 9.8% among men (*1060*). Symptomatic women have a four times higher rate of infection than asymptomatic women (26% versus 6.5%) (*1061*). Rates are also high among incarcerated persons of both sexes at 9%–32% of incarcerated women (*386*,*387*,*391*,*392*,*1062*) and 3.2%–8% of incarcerated men (*388*). Women with a history of incarceration are two to five times more likely to have *T. vaginalis* (*387*,*388*,*1063*,*1064*). Other risk factors for *T. vaginalis* include having two or more sex partners during the previous year, having less than a high school education, and living below the national poverty level (*1065*). Women with BV are at higher risk for *T. vaginalis* (*1066*). Male partners of women with trichomoniasis are likely to have infection (*1067*), although the prevalence of trichomoniasis among MSM is low (*179*,*1068*).

The majority of persons who have trichomoniasis (70%–85%) either have minimal or no genital symptoms, and untreated infections might last from months to years (*137*,*1069*,*1070*). Men with trichomoniasis sometimes have symptoms of urethritis, epididymitis, or prostatitis, and women with trichomoniasis sometimes have vaginal discharge, which can be diffuse, malodorous, or yellow-green with or without vulvar irritation, and might have a strawberry-appearing cervix, which is observed more often on colposcopy than on physical examination (*1071*). Although many persons might be unaware of their infection, it is readily passed between sex partners during penile-vaginal sex (*1072*) or through transmission of infected vaginal fluids or fomites among women who have sex with women (*275*,*294*).

Among persons who are sexually active, the best way to prevent genital trichomoniasis is through consistent and correct use of condoms (external or internal) (*18*). Partners of men who have been circumcised might have a somewhat reduced risk for *T. vaginalis* infection (*1072*,*1073*). Douching is not recommended because it might increase the risk for vaginal infections, including trichomoniasis (*1074*).

T. vaginalis causes reproductive morbidity and has been reported to be associated with a 1.4-times greater likelihood of preterm birth, premature rupture of membranes, and infants who are small for gestational age (*1075*). *T. vaginalis* was also determined to be associated with a 2.1-fold increased risk for cervical cancer in a meta-analysis (*1076*). Another meta-analysis of six studies reported a slightly elevated but not statistically significant association between *T. vaginalis* and prostate cancer (*1077*).

多项研究已对早产高风险(即有既往早产或晚期流产史)妊娠女性中无症状BV的治疗进行了评估，结果不一。七项试验评估了早产高风险妊娠女性中无症状BV的治疗：一项显示有害(1045)，两项报告无获益(*1046*,*1047*)，四项显示获益(*1037*,*1038*,*1048*,*1049*)。

在一项大型多中心随机对照试验中，尚未有报告显示治疗早产低风险孕妇的无症状BV可减少妊娠不良结局(1050)。因此，不建议对早产高风险或低风险的无症状孕妇进行常规BV筛查以预防早产。

甲硝唑可分泌至乳汁中。母亲口服治疗时，母乳喂养婴儿所接受的甲硝唑剂量低于用于治疗婴儿感染的剂量，尽管活性代谢物会增加婴儿的总暴露量。药物及代谢物的血浆水平可测得，但仍低于母亲血浆水平(https://www.ncbi.nlm.nih.gov/books/NBK501922/?report=classic)。尽管多项已报告的病例系列未发现甲硝唑相关不良影响对母乳喂养婴儿的证据，某些临床医生建议在母亲单次2-g剂量甲硝唑治疗后推迟母乳喂养12-24小时(1051)。较低剂量在母乳中产生较低浓度，被认为与母乳喂养兼容(*1052*, *1053*)。

HIV感染

BV在HIV感染女性中似乎复发频率更高(1054)。HIV感染合并BV的女性应接受与无HIV感染者相同的治疗方案。

滴虫感染

滴虫感染估计是全球最流行的非病毒性STI，在美国影响约370万人(*838*,*1055*)。由于滴虫感染不是需报告疾病(1056)，且没有针对*T.vaginalis*一般筛查的建议，滴虫感染的流行病学主要来自基于人群和基于诊所的监测研究。美国基于人群的*T.vaginalis*患病率在女性中为2.1%，在男性中为0.5%，最高率见于黑人女性(9.6%)和黑人男性(3.6%)，相比之下非西班牙裔白人女性(0.8%)和西班牙裔女性(1.4%)(*1057*, *1058*)。与衣原体和淋病不同，*T.vaginalis*患病率在>24岁女性中的率与<24岁女性一样高(1057)。在九个地理多样STD诊所就诊者中,女性滴虫患病率为14.6%(1059),一项在阿拉巴马州伯明翰STD诊所就诊者的研究确定女性患病率为27%,男性为9.8%(1060)。有症状女性的感染率是无症状女性的四倍(26% versus 6.5%)(1061)。两性被监禁者中的率也高,被监禁女性为9%-32%(*386*, *387*, *391*, *392*, *1062*)以及被监禁男性为3.2%-8%(388)。有监禁史的女性患*T.vaginalis*的可能性高两到五倍(*387*, *388*, *1063*, *1064*)。*T.vaginalis*的其他风险因素包括过去一年有两个或更多性伴侣、教育程度低于高中、生活在全国贫困线以下(1065)。患有BV的女性患*T.vaginalis*的风险更高(1066)。滴虫感染女性的男性伴侣很可能有感染(1067)，尽管MSM中滴虫感染的患病率低(*179*, *1068*)。

大多数患有滴虫感染的人(70%-85%)要么有轻微生殖器症状要么没有，未治疗的感染可能持续数月至数年(*137*, *1069*, *1070*)。患有滴虫感染的男性有时有尿道炎、附睾炎或前列腺炎症状，患有滴虫感染的女性有时有阴道分泌物，可为弥漫性、有恶臭或黄绿色，伴或不伴外阴刺激，并可能有草莓样宫颈，这在阴道镜检查中比体格检查更常见(1071)。尽管许多人可能不知道自己的感染，但它在阴茎-阴道性交期间容易在性伴侣之间传播(1072)，或通过感染阴道液体或污染物在女女性行为者之间传播(*275*, *294*)。

在性活跃人群中，预防生殖道滴虫感染的最佳方法是持续正确使用安全套(外用或内置)(18)。已行包皮环切术的男性的伴侣可能对阴道毛滴虫感染的风险略有降低(*1072*,*1073*)。不建议阴道冲洗，因为可能增加阴道感染(包括滴虫感染)的风险(1074)。

阴道毛滴虫可引起生殖系统疾病，据报道与早产、胎膜早破及小于胎龄儿的可能性增加1.4倍相关(1075)。一项荟萃分析还确定，阴道毛滴虫与宫颈癌风险增加2.1倍相关(1076)。另一项纳入六项研究的荟萃分析报告，阴道毛滴虫与前列腺癌之间存在轻度升高但无统计学意义的关联(1077)。

T. vaginalis infection is associated with a 1.5-fold increased risk for HIV acquisition and is associated with an increase in HIV vaginal shedding, which is reduced with *T. vaginalis* treatment among women without viral suppression (*1078*,*1079*). Among women with HIV infection, *T. vaginalis* infection is associated with increased risk for PID (*1080*–*1082*).

Diagnostic testing for *T. vaginalis* should be performed for women seeking care for vaginal discharge. Annual screening might be considered for persons receiving care in high-prevalence settings (e.g., STD clinics and correctional facilities) and for asymptomatic women at high risk for infection (e.g., multiple sex partners, transactional sex, drug misuse, or a history of STIs or incarceration). However, data are lacking regarding whether screening and treatment for asymptomatic trichomoniasis in high-prevalence settings for women at high risk can reduce any adverse health events and health disparities or reduce community infection burden. Decisions about screening can be guided by local epidemiology of *T. vaginalis* infection. Routine annual screening for *T. vaginalis* among asymptomatic women with HIV infection is recommended because of these adverse events associated with trichomoniasis and HIV infection.

Extragenital *T. vaginalis* is possible but highly uncommon compared with genital infections. A study of 500 men in San Francisco, California, reported a 0.6% rate of rectal *T. vaginalis* (*1083*); however, this might reflect deposition of *T. vaginalis* DNA and not necessarily active infection. Few studies of extragenital *T. vaginalis* among women have been published. The efficacy, benefit, and cost-effectiveness of extragenital screening are unknown, and no tests are FDA cleared for extragenital testing; therefore, rectal and oral testing for *T. vaginalis* is not recommended.

Diagnostic Considerations

Wet-mount microscopy traditionally has been used as the preferred diagnostic test for *T. vaginalis* among women because it is inexpensive and can be performed at the POC; however, it has low sensitivity (44%–68%) compared with culture (*1084*–*1086*). To improve detection, clinicians using wet mounts should attempt to evaluate slides immediately after specimen collection because sensitivity decreases quickly to 20% within 1 hour after collection (*1087*). More highly sensitive and specific molecular diagnostic options are available, which should be used in conjunction with a negative wet mount when possible.

NAATs are highly sensitive, detecting more *T. vaginalis* infections than wet-mount microscopy among women (*1060*). The Aptima *T. vaginalis* assay (Beckton Dickinson) is FDA cleared for detection of *T. vaginalis* from symptomatic or asymptomatic women. Reliable samples include clinician-collected endocervical swabs, clinician-collected vaginal swabs, female urine specimens, and liquid Pap smear specimens collected in PreservCyt Solution (Hologic) (*698*,*1088*). This assay detects RNA by transcription-mediated amplification with a sensitivity of 95.3%–100% and specificity of 95.2%–100%, compared with wet mount and culture (*1088*,*1089*). Among women, vaginal swabs and urine specimens have <100% concordance (*1084*). This assay has not been FDA cleared for use among men and should be internally validated in accordance with CLIA regulations before use with urine or urethral swabs from men. The Probe Tec TV Q^{x} Amplified DNA Assay (Becton Dickinson) is FDA cleared for detection of *T. vaginalis* from vaginal (patient-collected or clinician-collected) swabs, endocervical swabs, or urine specimens from women and has sensitivity of 98.3% and specificity of 99.6%, compared with wet mount and culture (*1090*). Similar to the Aptima *T. vaginalis* assay, this test is only FDA cleared for use among women and should be internally validated for use with men. The Max CTGCTV2 assay (Becton Dickinson) is also FDA cleared for detection of *T. vaginalis* in patient-collected or clinician-collected vaginal swab specimens and male and female urine specimens, with sensitivity and specificity of 96.2%–100% and 99.1%–100%, respectively, depending on the specimen type, compared with wet mount and culture (*1091*). GeneXpert TV (Cepheid) is a moderately complex rapid test that can be performed in ≤1 hour and can be used at the POC (*1092*). It has been FDA cleared for use with female urine specimens, endocervical swabs, patient-collected or clinician-collected vaginal specimens, and male urine specimens, with sensitivity and specificity of 99.5%–100% and 99.4%–99.9% (*1007*), respectively, compared with wet mount and culture.

Multiple FDA-cleared rapid tests are available for detecting *T. vaginalis* with improved sensitivities and specificities, compared with wet mount. The Osom trichomonas rapid test (Sekisui Diagnostics) is an antigen-detection test that uses immunochromatographic capillary flow dipstick technology that can be performed at the POC by using clinician-obtained vaginal specimens. Results are available in approximately 10–15 minutes, with sensitivities of 82%–95% and specificity of 97%–100%, compared with wet mount, culture, and transcription-mediated amplification (*1089*,*1093*,*1094*). A study of 209 women aged 14–22 years reported that >99% could correctly perform and interpret a vaginal self-test by using the Osom assay, with a high correlation with clinician interpretation (96% agreement; κ = 0.87) (*1094*). The Osom test should not be used with men because of low sensitivity (38% compared with Aptima) (*1095*). The Solana trichomonas assay (Quidel) is another rapid test for the qualitative detection of *T. vaginalis* DNA and can yield results <40 minutes after

阴道毛滴虫感染与HIV获得风险增加1.5倍相关，并与HIV阴道排毒增加相关，在无病毒抑制的女性中，阴道毛滴虫治疗可减少该排毒(*1078*,*1079*)。在HIV感染女性中，阴道毛滴虫感染与PID风险增加相关(*1080* - *1082*)。

对于因阴道分泌物就诊的女性，应进行阴道毛滴虫的诊断检测。对于在高流行环境(如性病门诊和惩教设施)接受照护的人员以及感染高风险的无症状女性(如多个性伴侣、商业性行为、药物滥用或STI史或监禁史)，可考虑每年筛查。然而，目前缺乏数据说明在高流行环境中对高风险女性进行无症状滴虫感染的筛查和治疗是否能减少任何不良健康事件和健康差异，或减少社区感染负担。筛查决策可依据当地阴道毛滴虫感染的流行病学情况。建议对HIV感染的无症状女性每年常规筛查阴道毛滴虫，因为滴虫感染与HIV感染相关的不良事件。

生殖器外阴道毛滴虫感染是可能的，但与生殖器感染相比极为罕见。一项在加利福尼亚州旧金山对500名男性进行的研究报告，直肠阴道毛滴虫检出率为0.6%(1083)；然而，这可能反映的是阴道毛滴虫DNA的沉积，而不一定是活动性感染。关于女性生殖器外阴道毛滴虫感染的研究发表甚少。生殖器外筛查的效力、获益和成本效益尚不清楚，且尚无检测获FDA批准用于生殖器外检测；因此，不推荐对阴道毛滴虫进行直肠和口腔检测。

诊断考虑

湿片显微镜检查传统上被用作女性阴道毛滴虫的首选诊断检测，因为其价格低廉且可在POC进行；然而，与培养相比，其敏感性较低(44%-68%)(*1084* - *1086*)。为提高检出率，使用湿片的临床医生应尽量在标本采集后立即评估玻片，因为采集后1小时内敏感性会迅速降至20%(1087)。目前有更高敏感性和特异性的分子诊断选择，在可能的情况下应与阴性湿片联合使用。

NAATs高度敏感，在女性中检测到的阴道毛滴虫感染多于湿片显微镜检查(1060)。Aptima 阴道毛滴虫检测(Beckton Dickinson)已获FDA许可，用于检测有症状或无症状女性的阴道毛滴虫。可靠样本包括

临床医生采集的宫颈管内拭子、临床医生采集的阴道拭子、女性尿液标本以及在PreservCyt Solution(Hologic)中采集的液基巴氏涂片标本(*698*, *1088*)。该检测通过转录介导扩增检测RNA，与湿片和培养相比，敏感性为95.3%-100%，特异性为95.2%-100%(*1088*, *1089*)。在女性中，阴道拭子和尿液标本的一致性<100%(1084)。该检测尚未获FDA批准用于男性,在用于男性尿液或尿道拭子前,应按CLIA规定进行内部验证。Probe Tec TV Q ^{x} Amplified DNA Assay(Becton Dickinson)已获FDA批准用于从女性阴道拭子(患者自采或临床医生采集)、宫颈管内拭子或尿液标本中检测阴道毛滴虫，与湿片和培养相比，敏感性为98.3%，特异性为99.6%(1090)。与Aptima 阴道毛滴虫检测类似，该检测仅获FDA批准用于女性，用于男性时应进行内部验证。Max CTGCTV2 assay(Becton Dickinson)也已获FDA批准用于检测患者自采或临床医生采集的阴道拭子标本以及男性和女性尿液标本中的阴道毛滴虫，与湿片和培养相比，根据标本类型不同，敏感性和特异性分别为96.2%-100%和99.1%-100%(1091)。GeneXpert TV(Cepheid)是一种中等复杂度的快速检测，可在≤1小时内完成，并可在POC使用(1092)。该检测已获FDA批准用于女性尿液标本、宫颈管内拭子、患者自采或临床医生采集的阴道标本以及男性尿液标本，与湿片和培养相比，敏感性和特异性分别为99.5%-100%和99.4%-99.9%(1007)。

目前有多种经FDA批准的快速检测方法可用于检测阴道毛滴虫，与湿片法相比，其灵敏度和特异度均有所提高。Osom滴虫快速检测(Sekisui Diagnostics)是一种抗原检测试验，采用免疫层析毛细管流动试纸条技术，可在POC使用临床医生采集的阴道标本进行检测。结果约在10-15分钟内可获得，与湿片法、培养法和转录介导扩增法相比，灵敏度为82%-95%，特异度为97%-100%(*1089*,*1093*,*1094*)。一项纳入209名14-22岁女性的研究报告称，>99%的人能够正确使用Osom检测进行阴道自检并解读结果，与临床医生解读高度相关(一致率96%;κ = 0.87)(1094)。Osom检测不应在男性中使用，因为灵敏度低(与Aptima相比为38%)(1095)。Solana滴虫检测(Quidel)是另一种快速检测方法，用于定性检测阴道毛滴虫DNA，可在标本采集后<40分钟内得出结果。

specimen collection. This assay is FDA cleared for diagnosing *T. vaginalis* from female vaginal and urine specimens from asymptomatic and symptomatic women with sensitivity >98%, compared with NAAT for vaginal specimens, and >92% for urine specimens (*1096*). The Amplivue trichomonas assay (Quidel) is another rapid test providing qualitative detection of *T. vaginalis* that has been FDA cleared for vaginal specimens from symptomatic and asymptomatic women, with sensitivity of 90.7% and specificity of 98.9%, compared with NAAT (*1097*). Neither the Osom assay nor the Affirm VP III test is FDA cleared for use with specimens from men.

Culture, such as the InPouch system (BioMed Diagnostics), was considered the most sensitive method for diagnosing *T. vaginalis* infection before molecular detection methods became available. Culture has sensitivity of 44%–75% and specificity of <100% (*698*,*1086*,*1098*). For women, vaginal secretions are the preferred specimen type for culture because urine culture is less sensitive (*698*,*1099*,*1100*). For men, culture specimens require a urethral swab, urine sediment, or semen. To improve diagnostic yield, multiple specimens from men can be used to inoculate a single culture. Cultures require an incubator and are necessary for *T. vaginalis* drug susceptibility testing. The InPouch specimen should be examined daily for 5 days over a 7-day period to reduce the possibility of false negatives (*1101*).

Although *T. vaginalis* might be an incidental finding on a Pap test, neither conventional nor liquid-based Pap smears are considered diagnostic tests for trichomoniasis; however, women with *T. vaginalis* identified on a Pap smear should be retested with sensitive diagnostic tests and treated if infection is confirmed (*1102*,*1103*).

Treatment

Treatment reduces symptoms and signs of *T. vaginalis* infection and might reduce transmission. Treatment recommendations for women are based on a meta-analysis (*1104*) and a multicenter, randomized trial of mostly symptomatic women without HIV infection (*1105*). The study demonstrated that multidose metronidazole (500 mg orally 2 times/day for 7 days) reduced the proportion of women retesting positive at a 1-month test of cure visit by half, compared with women who received the 2-g single dose. No published randomized trials are available that compare these doses among men.

Recommended Regimen for Trichomoniasis Among Women

Metronidazole 500 mg orally 2 times/day for 7 days

Recommended Regimen for Trichomoniasis Among Men

Metronidazole 2 g orally in a single dose

Alternative Regimen for Women and Men

Tinidazole 2 g orally in a single dose

The nitroimidazoles are the only class of medications with clinically demonstrated efficacy against *T. vaginalis* infections. Tinidazole is usually more expensive, reaches higher levels in serum and the genitourinary tract, has a longer half-life than metronidazole (12.5 hours versus 7.3 hours), and has fewer gastrointestinal side effects (*1106*,*1107*). In randomized clinical trials, recommended metronidazole regimens have resulted in cure rates of approximately 84%–98% (*1108*), and the recommended tinidazole regimen has resulted in cure rates of approximately 92%–100% (*1108*–*1112*). Randomized controlled trials comparing single 2-g doses of metronidazole and tinidazole indicated that tinidazole is equivalent or superior to metronidazole in achieving parasitologic cure and symptom resolution (*1110*,*1113*,*1114*).

Metronidazole gel does not reach therapeutic levels in the urethra and perivaginal glands. Because it is less efficacious than oral metronidazole, it is not recommended.

Other Management Considerations

Providers should advise persons with *T. vaginalis* infections to abstain from sex until they and their sex partners are treated (i.e., when therapy has been completed and any symptoms have resolved). Testing for other STIs, including HIV, syphilis, gonorrhea, and chlamydia, should be performed for persons with *T. vaginalis*.

Follow-Up

Because of the high rate of reinfection among women treated for trichomoniasis, retesting for *T. vaginalis* is recommended for all sexually active women <3 months after initial treatment regardless of whether they believe their sex partners were treated (*137*,*1115*). If retesting at 3 months is not possible, clinicians should retest whenever persons next seek medical care <12 months after initial treatment. Data are insufficient to support retesting men after treatment.

Management of Sex Partners

Concurrent treatment of all sex partners is vital for preventing reinfections. Current partners should be referred for presumptive therapy. Partners also should be advised to abstain from intercourse until they and their sex partners have been treated and any symptoms have resolved. EPT might have a role in partner management for trichomoniasis (*129*,*1116*) and can be used in states where permissible by law (https://www.cdc.gov/std/ept/legal/default.htm); however, no partner management intervention has been demonstrated to be superior in reducing reinfection rates (*129*,*130*). Although

该检测经FDA批准，可用于从无症状和有症状女性的阴道及尿液标本中诊断阴道毛滴虫，与NAAT相比，阴道标本的灵敏度>98%，尿液标本的灵敏度>92%(1096)。Amplivue滴虫检测(Quidel)是另一种快速检测方法，可定性检测阴道毛滴虫，已获FDA批准用于有症状和无症状女性的阴道标本，与NAAT相比，灵敏度为90.7%，特异度为98.9%(1097)。Osom检测和Affirm VP III检测均未获FDA批准用于男性标本。

在分子检测方法问世之前，培养法(如InPouch系统，BioMed Diagnostics)被认为是诊断阴道毛滴虫感染最敏感的方法。培养法的灵敏度为44%-75%，特异度为<100%(*698*,*1086*,*1098*)。对于女性，阴道分泌物是培养的首选标本类型，因为尿液培养灵敏度较低(*698*,*1099*,*1100*)。对于男性，培养标本需要尿道拭子、尿沉渣或精液。为提高诊断阳性率，可将男性的多份标本接种于单一培养管中。培养需要孵育箱，并且是进行阴道毛滴虫药物敏感性检测所必需的。InPouch标本应在7天内每天检查，持续5天，以减少假阴性的可能性(1101)。

尽管阴道毛滴虫可能是Pap涂片上的偶然发现，但传统或液基Pap涂片均不被视为滴虫感染的诊断试验；然而，在Pap涂片上鉴定出阴道毛滴虫的女性应使用敏感诊断试验重新检测，如确认感染则应治疗(*1102*,*1103*)。

治疗

治疗可减轻阴道毛滴虫感染的症状和体征，并可能减少传播。针对女性的治疗建议基于一项meta分析(1104)和一项多中心随机试验，该试验纳入的主要为无HIV感染的有症状女性(1105)。该研究表明，与接受2 g单次剂量的女性相比，多剂量甲硝唑(500 mg口服，每日2次，共7天)使1个月治愈检测访视时复检阳性的女性比例减半。目前尚无已发表的随机试验在男性中比较这些剂量。

女性滴虫病推荐治疗方案

甲硝唑 500 mg 口服每日2次共7天

男性滴虫病推荐治疗方案

甲硝唑 2 g，单次口服

女性和男性的替代方案

替硝唑 2 g 口服，单次给药

硝基咪唑类是唯一一类经临床证实对阴道毛滴虫感染有效的药物。替硝唑通常更昂贵，在血清和泌尿生殖道中达到更高水平，半衰期比甲硝唑更长(12.5小时 vs 7.3小时)，且胃肠道副作用更少(*1106*,*1107*)。在随机临床试验中，推荐的甲硝唑方案治愈率约为84%-98%(1108)，推荐的替硝唑方案治愈率约为92%-100%(*1108 - 1112*)。比较甲硝唑和替硝唑2 g单次剂量的随机对照试验表明，替硝唑在实现寄生虫学治愈和症状缓解方面与甲硝唑相当或更优(*1110*,*1113*,*1114*)。

甲硝唑凝胶不能达到尿道和阴道周围腺体的治疗浓度。由于其疗效低于口服甲硝唑，不推荐使用。

其他管理考虑

医务人员应建议阴道毛滴虫感染者避免性行为，直至其及其性伴侣均接受治疗(即治疗完成且任何症状均已缓解)。阴道毛滴虫感染者应进行其他STI检测，包括HIV、梅毒、淋病和衣原体。

随访

由于接受滴虫感染治疗的女性再感染率很高，建议所有性活跃女性在初始治疗后<3个月内进行*T.vaginalis*复查，无论她们是否认为其性伴侣已接受治疗(*137*,*1115*)。如果无法在3个月时复查，临床医生应在初始治疗后<12个月内患者下次就医时进行复查。目前数据不足以支持男性治疗后复查。

性伴侣的管理

对所有性伴侣同时进行治疗对于预防再感染至关重要。当前性伴侣应转诊接受推定治疗。还应建议性伴侣在themselves 及其性伴侣完成治疗且症状消退之前避免性交。EPT可能在滴虫感染的性伴侣管理中发挥作用(*129*, *1116*)，并可在法律允许的州使用(https://www.cdc.gov/std/ept/legal/default.htm)；然而，尚无性伴侣管理干预措施被证明在降低再感染率方面具有优越性(*129*, *130*)。尽管

no definitive data exist to guide treatment for partners of persons with persistent or recurrent trichomoniasis among whom nonadherence and reinfection are unlikely, partners might benefit from being evaluated and receiving treatment (see Recurrent Trichomoniasis).

Recurrent Trichomoniasis

A recurrent infection can result from treatment failure (antimicrobial-resistant *T. vaginalis* or host-related problems), lack of adherence, or reinfection from an untreated sex partner. In the case of a recurrent infection, the origin of the repeat infection should be assessed because most recurrent infections likely result from reinfection. Retesting can be considered in cases of persistent or recurrent trichomoniasis with culture, the preferred test. If NAAT is used, it should not be conducted before 3 weeks after treatment completion because of possible detection of residual nucleic acid that is not clinically relevant (*1117*).

The nitroimidazoles are the only class of antimicrobials known to be effective against trichomonas infection. Metronidazole resistance occurs in 4%–10% of cases of vaginal trichomoniasis (*1116*,*1118*). Tinidazole resistance is less well studied but was present in 1% of infections in one study (*1116*). Overall, more *T. vaginalis* isolates have reported susceptibility to tinidazole than metronidazole (*1119*). Multidose oral metronidazole is more effective than single-dose treatment, particularly for women who are symptomatic or have a history of *T. vaginalis* (*1120*).

Nitroimidazole-resistant trichomoniasis is concerning because few alternatives to standard therapy exist. If treatment failure occurs in a woman after completing a regimen of metronidazole 500 mg 2 times/day for 7 days and she has been reexposed to an untreated partner, a repeat course of the same regimen is recommended. If no reexposure has occurred, she should be treated with metronidazole or tinidazole 2 g once daily for 7 days. If a man has persistent *T. vaginalis* after a single 2-g dose of metronidazole and has been reexposed to an untreated partner, he should be retreated with a single 2-g dose of metronidazole. If he has not been reexposed, he should be administered a course of metronidazole 500 mg 2 times/day for 7 days.

For persons who are experiencing persistent infection not attributable to reexposure, clinicians should request a kit from CDC to perform drug-resistance testing (https://www.cdc.gov/laboratory/specimen-submission/detail.html?CDCTestCode=CDC-10239). CDC is experienced with susceptibility testing for nitroimidazole-resistant *T. vaginalis* and can provide guidance regarding treatment in cases of drug resistance. On the basis of drug resistance testing, an alternative treatment regimen might be recommended. Treatments for infections demonstrating in vitro resistance can include metronidazole or tinidazole 2 g daily for 7 days. If a patient has treatment failure after the 7-day regimen of high-dose oral metronidazole or tinidazole, two additional treatment options have been determined to have successful results for women. The first is high-dose oral tinidazole 2 g daily plus intravaginal tinidazole 500 mg 2 times/day for 14 days (*1121*). If this regimen fails, high-dose oral tinidazole (1 g 3 times/day) plus intravaginal paromomycin (4 g of 6.25% intravaginal paromomycin cream nightly) for 14 days should be considered (*1122*).

Alternative regimens might be effective but have not been systemically evaluated; therefore, consultation with an infectious disease specialist is recommended. Clinical improvement has been reported with intravaginal boric acid (*1123,1124*) but not with nitazoxanide (*1123–1125*). The following topically applied agents have minimal success (<50%) and are not recommended: intravaginal betadine (povidone-iodine), clotrimazole, acetic acid, furazolidone, GV, nonoxynol-9, and potassium permanganate (*1126*). No other topical microbicide has been reported to be effective against trichomoniasis.

Special Considerations

Drug Allergy, Intolerance, and Adverse Reactions

Metronidazole and tinidazole are both nitroimidazoles. Patients with an IgE-mediated-type hypersensitivity reaction to 5-nitroimidazole antimicrobials should be managed by metronidazole desensitization according to published regimens (*1127*,*1128*) and in consultation with an allergy specialist. The optimal treatment for patients with *T. vaginalis* who are unable to be desensitized has not been systematically investigated and is based on case reports, some of which report using paromomycin or boric acid for treating *T. vaginalis* (*1123*,*1129*).

Pregnancy

T. vaginalis infection among pregnant women is associated with adverse pregnancy outcomes, particularly premature rupture of membranes, preterm delivery, and delivery of infants who are small for gestational age (*1075*). One randomized trial of pregnant women with asymptomatic trichomoniasis reported no substantial difference in preterm birth after treatment with 2 g of metronidazole 48 hours apart during 16–23 and 24–29 weeks' gestation, compared with placebo (*1130*). However, that trial had multiple limitations, including use of an atypical metronidazole regimen. Another multicenter observational study of asymptomatic pregnant women in sub-Sahara African, the majority with HIV infection, reported neither trichomoniasis nor its treatment appeared to influence the risk for preterm birth or a low-birthweight infant (*1131*).

尚无确切数据指导持续或复发性滴虫感染者的伴侣治疗；在不太可能不依从和再感染的情况下，伴侣可能受益于评估和接受治疗(见复发性滴虫感染)。

复发性滴虫病

复发性感染可能源于治疗失败(抗菌药物耐药的阴道毛滴虫或宿主相关问题)、依从性不足，或来自未治疗性伴侣的再感染。对于复发性感染，应评估重复感染的来源，因为大多数复发性感染很可能源于再感染。对于持续性或复发性滴虫感染，可考虑通过培养进行复检，培养是首选检测方法。若使用NAAT，则不应在治疗完成后3周内进行，因为可能检出无临床相关性的残留核酸(1117)。

硝基咪唑类是已知对滴虫感染有效的唯一一类抗菌药物。甲硝唑耐药发生在4%-10%的阴道滴虫感染病例中(*1116*, *1118*)。替硝唑耐药研究较少，但在一项研究中1%的感染中存在耐药(1116)。总体而言，更多阴道毛滴虫分离株对替硝唑的敏感性高于甲硝唑(1119)。多剂量口服甲硝唑比单剂量治疗更有效，特别是对于有症状或有阴道毛滴虫感染史的女性(1120)。

硝基咪唑类耐药滴虫感染值得关注，因为标准疗法的替代方案很少。如果女性在完成甲硝唑500 mg每日2次、共7天的方案后治疗失败，且再次暴露于未治疗的性伴侣，建议重复同一方案。如果未发生再次暴露，应给予甲硝唑或替硝唑2 g每日1次、共7天治疗。如果男性在单次2 g甲硝唑剂量后持续存在阴道毛滴虫，且再次暴露于未治疗的性伴侣，应重新给予单次2 g甲硝唑治疗。如果未发生再次暴露，应给予甲硝唑500 mg每日2次、共7天的疗程。

对于持续感染且无法归因于再暴露的患者，临床医生应向CDC申请检测试剂盒以进行药物耐药性检测(https://www.cdc.gov/laboratory/specimen-submission/detail.htmlCDCTestCode=CDC-10239)。CDC在硝基咪唑类耐药阴道毛滴虫的药敏检测方面具有经验，并可针对耐药病例的治疗提供指导。根据药物耐药性检测结果，可能推荐替代治疗方案。对于体外显示耐药的感染的治疗可包括甲硝唑或替硝唑2 g每日一次，共7天。如果患者在接受7天高剂量口服甲硝唑或替硝唑方案后治疗失败，已确定两种额外治疗方案对女性有成功结果。第一种是高剂量口服替硝唑2 g每日一次加阴道内替硝唑500 mg每日2次，共14天(1121)。如果该方案失败，应考虑高剂量口服替硝唑(1 g每日3次)加阴道内巴龙霉素(6.25%阴道内巴龙霉素乳膏4 g每晚)共14天(1122)。

替代方案可能有效，但尚未经过系统性评估；因此，建议咨询感染病专科医生。已有报道称阴道内使用硼酸可带来临床改善(*1123,1124*)，但硝唑尼特未见改善(*1123 - 1125*)。以下局部外用药物成功率极低(<50%),不推荐使用:阴道内聚维酮碘、克霉唑、乙酸、呋喃唑酮、GV、壬苯醇醚-9和高锰酸钾(1126)。尚无其他外用杀微生物剂被报道对滴虫感染有效。

特殊考虑

药物过敏、不耐受及不良反应

甲硝唑和替硝唑均属于硝基咪唑类。对5-硝基咪唑类抗菌药物发生IgE介导型超敏反应的患者，应按照已发表的方案进行甲硝唑脱敏处理(*1127*, *1128*)，并咨询过敏专科医生。对于无法进行脱敏的阴道毛滴虫感染患者，最佳治疗尚未经过系统性研究，目前基于病例报告，其中部分报告使用巴龙霉素或硼酸治疗阴道毛滴虫(*1123*, *1129*)。

妊娠

妊娠妇女中的阴道毛滴虫感染与不良妊娠结局相关，尤其是胎膜早破、早产以及小于胎龄儿分娩(1075)。一项针对无症状滴虫感染妊娠妇女的随机试验报告，在妊娠16-23周和24-29周期间，间隔48小时给予2 g甲硝唑治疗与安慰剂相比，早产率无实质性差异(1130)。然而，该试验存在多项局限性，包括使用了非典型的甲硝唑方案。另一项针对撒哈拉以南非洲无症状妊娠妇女的多中心观察性研究(其中大多数合并HIV感染)报告，滴虫感染及其治疗似乎均未影响早产或低出生体重儿的风险(1131)。

Although metronidazole crosses the placenta, data indicate that it poses a low risk to the developing fetus (*1040*,*1042*,*1132*). No evidence of teratogenicity or mutagenic effects among infants has been found in multiple cross-sectional and cohort studies among pregnant women examining single-dose (2 g) and multidose metronidazole regimens (*1040*,*1131–1135*).

Symptomatic pregnant women, regardless of pregnancy stage, should be tested and treated. Treatment of *T. vaginalis* infection can relieve symptoms of vaginal discharge for pregnant women and reduce sexual transmission to partners. Although perinatal transmission of trichomoniasis is uncommon, treatment might also prevent respiratory or genital infection in the newborn (*1136*,*1137*). Clinicians should counsel symptomatic pregnant women with trichomoniasis about the potential risks and benefits of treatment and about the importance of partner treatment and condom use in the prevention of sexual transmission. The benefit of routine screening for *T. vaginalis* in asymptomatic pregnant women has not been established.

Metronidazole is secreted in breast milk. With maternal oral therapy, breastfed infants receive metronidazole in doses that are lower than those used to treat infections among infants, although the active metabolite adds to the total infant exposure. Plasma levels of the drug and metabolite are measurable but remain less than maternal plasma levels (https://www.ncbi.nlm.nih.gov/books/NBK501922). Although multiple reported case series studies demonstrated no evidence of adverse effects among infants exposed to metronidazole in breast milk, clinicians sometimes advise deferring breastfeeding for 12–24 hours after maternal treatment with metronidazole (*1051*). In one study, maternal treatment with metronidazole (400 mg 3 times/day for 7 days) produced a lower concentration in breast milk and was considered compatible with breastfeeding over longer periods (*1052*).

Data from studies involving human subjects are limited regarding tinidazole use during pregnancy; however, animal data indicate this drug poses moderate risk. Thus, tinidazole should be avoided for pregnant women, and breastfeeding should be deferred for 72 hours after a single 2-g oral dose of tinidazole (https://www.ncbi.nlm.nih.gov/books/NBK501922).

HIV Infection

Up to 53% of women with HIV have *T. vaginalis* infection (*1115*,*1138*). *T. vaginalis* infection among these women is substantially associated with pelvic inflammatory disease (*1082*). Among women who are not virally suppressed, treatment of trichomoniasis is associated with decreases in genital tract HIV viral load and viral shedding (*1079*,*1139*); however, no difference might occur among women who are virally suppressed (*1140*). Because of the high prevalence of *T. vaginalis* among women with HIV and the potential for adverse reproductive health, poor birth outcomes, and possibly amplified HIV transmission, routine screening and prompt treatment are recommended for all women with HIV infection; screening should occur at entry to care and then at least annually thereafter.

A randomized clinical trial involving women with HIV and *T. vaginalis* infection demonstrated that a single dose of metronidazole 2 g orally was less effective than 500 mg 2 times/day for 7 days (*1105*). Factors that might interfere with standard single-dose treatment for trichomoniasis among women with HIV include high rates of asymptomatic BV infection, ART use, changes in vaginal ecology, and impaired immunity (*1141*). Thus, to improve cure rates, women with HIV who receive a diagnosis of *T. vaginalis* infection should be treated with metronidazole 500 mg orally 2 times/day for 7 days. For pregnant women with HIV, screening at the first prenatal visit and prompt treatment, as needed, are recommended because *T. vaginalis* infection is a risk factor for vertical transmission of HIV (*1142*).

Treatment

Treatment reduces symptoms and signs of *T. vaginalis* infection, cures infection, and might reduce transmission. Likelihood of adverse outcomes among women with HIV infection is also reduced with *T. vaginalis* therapy.

Recommended Regimen for Trichomonas and HIV Infection Among Women

Metronidazole 500 mg orally 2 times/day for 7 days

If a woman with HIV infection experiences treatment failure, the protocol outlined is recommended (see Recurrent Trichomonas). Other management considerations, follow-up, and management of sex partners should be performed as for women without HIV infection. Treatment of men with HIV infection should follow the same guidelines as for men without HIV.

For women with HIV who receive a diagnosis of *T. vaginalis* infection, retesting is recommended 3 months after treatment; NAAT is encouraged because of higher sensitivity of these tests. Data are insufficient to support retesting of men with trichomonas and HIV infection.

Vulvovaginal Candidiasis

VVC usually is caused by *Candida albicans* but can occasionally be caused by other *Candida* species or yeasts. Typical symptoms of VVC include pruritus, vaginal soreness, dyspareunia, external dysuria, and abnormal vaginal discharge. None of these symptoms is specific for VVC. An estimated 75% of women will have at least one episode of VVC, and 40%–45% will have two or more episodes. On the basis of

尽管甲硝唑可穿过胎盘，但数据表明其对发育中的胎儿风险较低(*1040*,*1042*,*1132*)。在多项横断面和队列研究中，检查单剂量(2 g)和多剂量甲硝唑方案的孕妇中，未发现婴儿致畸性或致突变效应的证据(*1040*,*1131 - 1135*)。

有症状的妊娠妇女，无论妊娠阶段如何，均应接受检测和治疗。治疗阴道毛滴虫感染可缓解妊娠妇女的阴道分泌物症状，并减少向性伴的性传播。尽管滴虫感染的围产期传播不常见，但治疗也可能预防新生儿呼吸道或生殖道感染(*1136*, *1137*)。临床医生应就有症状的滴虫感染妊娠妇女的治疗潜在风险与获益，以及性伴治疗和避孕套使用对预防性传播的重要性提供咨询。对无症状妊娠妇女常规筛查阴道毛滴虫的获益尚未确立。

甲硝唑可分泌至乳汁中。母亲口服治疗时，母乳喂养婴儿所接受的甲硝唑剂量低于用于治疗婴儿感染的剂量，尽管活性代谢物会增加婴儿的总暴露量。药物及代谢物的血浆水平可测得，但仍低于母亲血浆水平(https://www.ncbi.nlm.nih.gov/books/NBK501922)。尽管多项已报告的病例系列研究显示，暴露于母乳中甲硝唑的婴儿未见不良效应证据，临床医生有时建议在母亲接受甲硝唑治疗后推迟母乳喂养12-24小时(1051)。在一项研究中，母亲接受甲硝唑治疗(400 mg 3次/日，共7天)后乳汁中浓度较低，被认为可在较长时间内兼容母乳喂养(1052)。

涉及人类受试者的研究数据关于妊娠期使用替硝唑有限；然而，动物数据表明该药具有中等风险。因此，孕妇应避免使用替硝唑，单次2-g口服替硝唑后应推迟母乳喂养72小时(https://www.ncbi.nlm.nih.gov/books/NBK501922)。

HIV感染

高达53%的HIV感染女性患有阴道毛滴虫感染(*1115*, *1138*)。这些女性中的阴道毛滴虫感染与盆腔炎性疾病显著相关(1082)。在病毒未抑制的女性中，滴虫感染的治疗与生殖道HIV病毒载量及病毒排出的降低相关(*1079*, *1139*)；然而，在病毒已抑制的女性中可能无差异(1140)。由于HIV感染女性中阴道毛滴虫的高患病率以及潜在的对于不良生殖健康、不良出生结局以及可能放大的HIV传播，建议对所有HIV感染女性进行常规筛查和及时治疗；筛查应在进入医疗时进行，此后至少每年一次。

一项涉及HIV感染且合并阴道毛滴虫感染女性的随机临床试验表明，单次口服甲硝唑2 g的疗效低于500 mg每日2次连用7天(1105)。在HIV感染女性中，可能干扰滴虫感染标准单次治疗的因素包括无症状BV感染率高、ART使用、阴道生态改变和免疫功能受损(1141)。因此，为提高治愈率，诊断为阴道毛滴虫感染的HIV感染女性应接受甲硝唑500 mg口服每日2次连用7天治疗。对于HIV感染孕妇，建议在首次产前检查时进行筛查并根据需要及时治疗，因为阴道毛滴虫感染是HIV垂直传播的危险因素(1142)。

治疗

治疗可减轻阴道毛滴虫感染的症状和体征，治愈感染，并可能减少传播。对于HIV感染女性，阴道毛滴虫治疗还可降低不良结局的可能性。

女性滴虫病与HIV感染推荐治疗方案

甲硝唑 500 mg 口服每日2次共7天

如果HIV感染女性出现治疗失败，建议采用所述方案(见复发性滴虫病)。其他管理考虑、随访和性伴侣管理应与无HIV感染女性相同。HIV感染男性的治疗应遵循与无HIV男性相同的指南。

对于确诊阴道毛滴虫感染的HIV感染女性，建议在治疗后3个月进行复检；鼓励使用NAAT，因为这些检测具有更高的敏感性。目前数据不足以支持对合并滴虫和HIV感染的男性进行复检。

外阴阴道念珠菌病

VVC通常由白色念珠菌引起，但偶尔也可由其他念珠菌菌种或酵母菌引起。VVC的典型症状包括瘙痒、阴道疼痛、性交痛、外阴排尿困难和阴道分泌物异常。这些症状均非VVC特异性表现。估计75%的女性至少会有一次VVC发作，并且

40%-45%会有两次或更多次发作。基于

clinical presentation, microbiology, host factors, and response to therapy, VVC can be classified as either uncomplicated or complicated (Box 4). Approximately 10%–20% of women will have complicated VVC, requiring special diagnostic and therapeutic considerations.

Uncomplicated Vulvovaginal Candidiasis

Diagnostic Considerations

A diagnosis of *Candida* vaginitis is clinically indicated by the presence of external dysuria and vulvar pruritus, pain, swelling, and redness. Signs include vulvar edema, fissures, excoriations, and thick curdy vaginal discharge. Most healthy women with uncomplicated VVC have no identifiable precipitating factors. The diagnosis can be made in a woman who has signs and symptoms of vaginitis when either a wet preparation (saline, 10% KOH) of vaginal discharge demonstrates budding yeasts, hyphae, or pseudohyphae, or a culture or other test yields a positive result for a yeast species. *Candida* vaginitis is associated with normal vaginal pH (<4.5). Use of 10% KOH in wet preparations improves the visualization of yeast and mycelia by disrupting cellular material that might obscure the yeast or pseudohyphae. Examination of a wet mount with KOH preparation should be performed for all women with symptoms or signs of VVC, and women with a positive result should be treated. For those with negative wet mounts but existing signs or symptoms, vaginal cultures for *Candida* should be considered. If *Candida* cultures cannot be performed for these women, empiric treatment can be considered. Identifying *Candida* by culture in the absence of symptoms or signs is not an indication for treatment because approximately 10%–20% of women harbor *Candida* species and other yeasts in the vagina. The majority of PCR tests for yeast are not FDA cleared, and providers who use these tests should be familiar with the performance characteristics of the specific test used. Yeast culture, which can identify a broad group of pathogenic yeasts, remains the reference standard for diagnosis.

Treatment

Short-course topical formulations (i.e., single dose and regimens of 1–3 days) effectively treat uncomplicated VVC. Treatment with azoles results in relief of symptoms and negative cultures in 80%–90% of patients who complete therapy.

Recommended Regimens for Vulvovaginal Candidiasis

Over-the-Counter Intravaginal Agents
Clotrimazole 1% cream 5 g intravaginally daily for 7–14 days
or
Clotrimazole 2% cream 5 g intravaginally daily for 3 days
or
Miconazole 2% cream 5 g intravaginally daily for 7 days
or
Miconazole 4% cream 5 g intravaginally daily for 3 days
or
Miconazole 100 mg vaginal suppository one suppository daily for 7 days
or
Miconazole 200 mg vaginal suppository one suppository for 3 days
or
Miconazole 1,200 mg vaginal suppository one suppository for 1 day
or
Tioconazole 6.5% ointment 5 g intravaginally in a single application

Prescription Intravaginal Agents
Butoconazole 2% cream (single-dose bioadhesive product) 5 g intravaginally in a single application
or
Terconazole 0.4% cream 5 g intravaginally daily for 7 days
or
Terconazole 0.8% cream 5 g intravaginally daily for 3 days
or
Terconazole 80 mg vaginal suppository one suppository daily for 3 days

Oral Agent
Fluconazole 150 mg orally in a single dose

The creams and suppositories in these regimens are oil based and might weaken latex condoms and diaphragms. Patients should refer to condom product labeling for further information. Even women who have previously received a diagnosis of VVC by a clinician are not necessarily more likely to be able to diagnose themselves; therefore, any woman whose symptoms persist after using an over-the-counter preparation or who has a recurrence of symptoms <2 months

BOX 4. Classification of vulvovaginal candidiasis

Uncomplicated vulvovaginal candidiasis (VVC)
- Sporadic or infrequent VVC
and
- Mild-to-moderate VVC
and
- Likely to be *Candida albicans*
and
- Nonimmunocompromised women

Complicated VVC
- Recurrent VVC (three or more episodes of symptomatic VVC in <1 year)
or
- Severe VVC
or
- Non–*albicans* candidiasis
or
- Women with diabetes, immunocompromising conditions (e.g., HIV infection), underlying immunodeficiency, or immunosuppressive therapy (e.g., corticosteroids)

Source: Sobel JD, Faro S, Force RW, et al. Vulvovaginal candidiasis: epidemiologic, diagnostic, and therapeutic considerations. Am J Obstet Gynecol 1998;178:203–11.

临床表现、微生物学、宿主因素和治疗反应，VVC可分为非复杂性和复杂性(框4)。约10%-20%的女性会患有复杂性VVC，需要特殊的诊断和治疗考虑。

无并发症外阴阴道念珠菌病

诊断考虑

念珠菌阴道炎的临床诊断指征为存在外部排尿困难和外阴瘙痒、疼痛、肿胀及发红。体征包括外阴水肿、皲裂、抓痕和浓稠凝乳状阴道分泌物。大多数无并发症VVC的健康女性没有可识别的诱发因素。当有阴道炎体征和症状的女性阴道分泌物湿片(生理盐水、10% KOH)显示芽生酵母、菌丝或假菌丝，或培养或其他检测对酵母菌种呈阳性结果时，即可作出诊断。念珠菌阴道炎与正常阴道pH(<4.5)相关。在湿片中使用10% KOH可通过破坏可能遮蔽酵母或假菌丝的细胞物质来改善酵母和菌丝的可见度。应对所有有

VVC症状或体征的女性进行KOH制片湿片检查，结果阳性的女性应接受治疗。对于湿片阴性但存在体征或症状者，应考虑进行念珠菌阴道培养。如果这些女性无法进行念珠菌培养，可考虑经验性治疗。在无症状或体征的情况下通过培养鉴定出念珠菌不是治疗指征，因为约10%-20%的女性阴道内携带念珠菌菌种和其他酵母菌。大多数酵母菌PCR检测未获FDA批准，使用这些检测的医务人员应熟悉所用特定检测的性能特征。酵母培养可鉴定广泛的致病性酵母菌群，仍是诊断的参考标准。

治疗

短疗程局部制剂(即单剂量和1-3天方案)可有效治疗非复杂性VVC。唑类治疗可使80%-90%完成治疗的患者症状缓解和培养转阴。

外阴阴道念珠菌病的推荐治疗方案

非处方阴道内用药
克霉唑1%乳膏 5 g阴道内每日1次，连用7-14天**克霉唑2%乳膏** 5 g阴道内每日1次，连用3天**咪康唑2%乳膏** 5 g阴道内每日1次，连用7天**咪康唑4%乳膏** 5 g阴道内每日1次，连用3天
或
或
咪康唑100 mg阴道栓每日1枚，连用7天**咪康唑200 mg阴道栓**每日1枚，连用3天**咪康唑1,200 mg阴道栓**1枚，用1天**噻康唑6.5%软膏** 5 g阴道内单次给药
或
或

处方阴道内用药
布康唑2%乳膏(单剂量生物黏附制剂)5 g阴道内单次给药
或
特康唑 0.4% 乳膏 5 g 阴道内给药，每日一次，共 7 天**特康唑 0.8% 乳膏** 5 g 阴道内给药，每日一次，共 3 天
或
特康唑 80 mg 阴道栓每日一枚栓剂，共 3 天**口服药物**

氟康唑 150 mg，单次口服

这些方案中的乳膏和栓剂为油基制剂，可能削弱乳胶避孕套和子宫帽。患者应参考避孕套产品标签以获取更多信息。即使既往被临床医生诊断为VVC的女性，也不一定更有可能自我诊断；因此，任何使用非处方制剂后症状持续或症状复发<2个月的女性

框4. 外阴阴道念珠菌病的分类

无并发症外阴阴道念珠菌病(VVC)
- 散发性或非频发性VVC
和
- 轻至中度VVC
和
- 可能为白色念珠菌
和
- 非免疫缺陷妇女

复杂性VVC
- 复发性VVC(三次或以上发作一年内出现有症状的VVC)**或**
- 重度VVC
或
- 非白念珠菌性念珠菌病
或
- 患有糖尿病、免疫功能低下的女性状况(如HIV感染)、基础免疫缺陷或免疫抑制治疗(如皮质类固醇)

来源：Sobel JD, Faro S, Force RW, et al. Vulvovaginal candidiasis: epidemiologic, diagnostic, and therapeutic considerations. Am J Obstet Gynecol 1998;178:203–11.

after treatment for VVC should be evaluated clinically and tested. Unnecessary or unapproved use of over-the-counter preparations is common and can lead to a delay in treatment of other vulvovaginitis etiologies, which can result in adverse outcomes. No substantial evidence exists to support using probiotics or homeopathic medications for treating VVC.

Follow-Up

Follow-up typically is not required. However, women with persistent or recurrent symptoms after treatment should be instructed to return for follow-up visits.

Management of Sex Partners

Uncomplicated VVC is not usually acquired through sexual intercourse, and data do not support treatment of sex partners. A minority of male sex partners have balanitis, characterized by erythematous areas on the glans of the penis in conjunction with pruritus or irritation. These men benefit from treatment with topical antifungal agents to relieve symptoms.

Special Considerations

Drug Allergy, Intolerance, and Adverse Reactions

Topical agents usually cause no systemic side effects, although local burning or irritation might occur. Oral azoles occasionally cause nausea, abdominal pain, and headache. Therapy with the oral azoles has rarely been associated with abnormal elevations of liver enzymes. Clinically important interactions can occur when oral azoles are administered with other drugs (*1141*).

Complicated Vulvovaginal Candidiasis

Diagnostic Considerations

Vaginal culture or PCR should be obtained from women with complicated VVC to confirm clinical diagnosis and identify non–*albicans Candida*. *Candida glabrata* does not form pseudohyphae or hyphae and is not easily recognized on microscopy. *C. albicans* azole resistance is becoming more common in vaginal isolates (*1144*,*1145*), and non–*albicans Candida* is intrinsically resistant to azoles; therefore, culture and susceptibility testing should be considered for patients who remain symptomatic.

Recurrent Vulvovaginal Candidiasis

Recurrent VVC, usually defined as three or more episodes of symptomatic VVC in <1 year, affects <5% of women but carries a substantial economic burden (*1146*). Recurrent VVC can be either idiopathic or secondary (related to frequent antibiotic use, diabetes, or other underlying host factors). The pathogenesis of recurrent VVC is poorly understood, and the majority of women with recurrent VVC have no apparent predisposing or underlying conditions. *C. glabrata* and other non–*albicans Candida* species are observed in 10%–20% of women with recurrent VVC. Conventional antimycotic therapies are not as effective against these non–*albicans* yeasts as against *C. albicans*.

Treatment

Most episodes of recurrent VVC caused by *C. albicans* respond well to short-duration oral or topical azole therapy. However, to maintain clinical and mycologic control, a longer duration of initial therapy (e.g., 7–14 days of topical therapy or a 100-mg, 150-mg, or 200-mg oral dose of fluconazole every third day for a total of 3 doses [days 1, 4, and 7]) is recommended, to attempt mycologic remission, before initiating a maintenance antifungal regimen.

Oral fluconazole (i.e., a 100-mg, 150-mg, or 200-mg dose) weekly for 6 months is the indicated maintenance regimen. If this regimen is not feasible, topical treatments used intermittently can also be considered. Suppressive maintenance therapies are effective at controlling recurrent VVC but are rarely curative long-term (*1147*). Because *C. albicans* azole resistance is becoming more common, susceptibility tests, if available, should be obtained among symptomatic patients who remain culture positive despite maintenance therapy. These women should be managed in consultation with a specialist.

Severe Vulvovaginal Candidiasis

Severe VVC (i.e., extensive vulvar erythema, edema, excoriation, and fissure formation) is associated with lower clinical response rates among patients treated with short courses of topical or oral therapy. Either 7–14 days of topical azole or 150 mg of fluconazole in two sequential oral doses (second dose 72 hours after initial dose) is recommended.

Non–*albicans* Vulvovaginal Candidiasis

Because approximately 50% of women with a positive culture for non–*albicans Candida* might be minimally symptomatic or have no symptoms, and because successful treatment is often difficult, clinicians should make every effort to exclude other causes of vaginal symptoms for women with non–*albicans* yeast (*1148*). The optimal treatment of non–*albicans* VVC remains unknown; however, a longer duration of therapy (7–14 days) with a nonfluconazole azole regimen (oral or topical) is recommended. If recurrence occurs, 600 mg of boric acid in a gelatin capsule administered vaginally once daily for 3 weeks is indicated. This regimen has clinical and mycologic eradication rates of approximately 70% (*1149*). If symptoms recur, referral to a specialist is advised.

VVC治疗后应进行临床评估和检测。不必要或未经批准使用非处方制剂很常见，可能导致其他外阴阴道炎病因的治疗延迟，从而造成不良结局。没有实质性证据支持使用益生菌或顺势疗法药物治疗VVC。

随访

通常不需要随访。然而，治疗后症状持续或复发的女性应被指示返回进行随访。

性伴侣的管理

非复杂性VVC通常不通过性交获得，数据不支持治疗性伴侣。少数男性性伴侣患有龟头炎，表现为阴茎龟头红斑区域伴瘙痒或刺激。这些男性可从局部抗真菌药物治疗中获益以缓解症状。

特殊考虑

药物过敏、不耐受及不良反应

局部药物通常不引起全身副作用，但可能发生局部灼烧或刺激。口服唑类偶尔引起恶心、腹痛和头痛。口服唑类治疗很少与肝酶异常升高相关。口服唑类与其他药物同时给药时可能发生具有临床意义的相互作用(1141)。

复杂性外阴阴道念珠菌病

诊断考虑

对于复杂性VVC女性，应获取阴道培养或PCR以确认临床诊断并鉴定非白念珠菌。光滑念珠菌不形成假菌丝或菌丝，显微镜检查不易识别。白念珠菌对唑类的耐药性在阴道分离株中越来越常见(*1144*,*1145*)，而非白念珠菌对唑类具有内在耐药性；因此，对于仍有症状的患者，应考虑进行培养和药敏试验。

复发性外阴阴道念珠菌病

复发性VVC通常定义为<1年内三次或以上有症状VVC发作,影响<5%的女性,但带来巨大的经济负担(1146)。复发性VVC可为特发性或继发性(与频繁使用抗生素、糖尿病或其他基础宿主因素相关)。复发性VVC的发病机制了解甚少,大多数复发性VVC女性没有明显的易感因素或基础疾病。光滑念珠菌及其他非白念珠菌菌种见于 10%-20% 的复发性 VVC 女性。常规抗真菌治疗对这些非白念珠菌酵母菌的疗效不如对白念珠菌。

治疗

大多数由白念珠菌引起的复发性 VVC 发作对短疗程口服或局部唑类治疗反应良好。然而，为维持临床和真菌学控制，建议在开始维持性抗真菌方案之前，先进行较长疗程的初始治疗(例如，局部治疗 7-14 天，或 fluconazole 100-mg、150-mg 或 200-mg 口服剂量，每第三天一次，共 3 剂[第 1、4 和 7 天])，以尝试达到真菌学缓解。

口服氟康唑(即100-mg、150-mg或200-mg剂量)每周1次连用6个月是指示的维持方案。如果该方案不可行，也可考虑间歇使用局部治疗。抑制性维持治疗可有效控制复发性VVC，但很少能长期治愈(1147)。由于白念珠菌对唑类的耐药性越来越常见，对于尽管接受维持治疗仍培养阳性的有症状患者，如有可能应进行药敏试验。这些女性应与专科医生协商管理。

重度外阴阴道念珠菌病

重度VVC(即广泛外阴红斑、水肿、抓痕和裂隙形成)与接受短疗程局部或口服治疗的患者临床缓解率较低相关。可选用7-14天局部唑类或150 mg氟康唑两次序贯口服剂量(第二剂推荐在初始剂量后72小时进行。

非白假丝酵母菌外阴阴道炎

由于大约50%培养出非白色念珠菌阳性的女性可能症状轻微或无症状，且成功治疗往往困难，临床医生应尽一切努力排除非白色念珠菌酵母菌感染女性阴道症状的其他原因(1148)。非白色念珠菌VVC的最佳治疗仍未知；然而，推荐使用非氟康唑类唑类方案(口服或局部)延长疗程(7-14天)。如果复发，建议使用600 mg硼酸明胶胶囊阴道给药，每日一次，共3周。该方案的临床和真菌学清除率约为70%(1149)。如果症状复发，建议转诊至专科医生。

Management of Sex Partners

No data exist to support treating sex partners of patients with complicated VVC. Therefore, no recommendation can be made.

Special Considerations

Compromised Host

Women with underlying immunodeficiency, those with poorly controlled diabetes or other immunocompromising conditions (e.g., HIV), and those receiving immunosuppression therapy (e.g., corticosteroid treatment) might not respond as well to short-term therapies. Efforts to correct modifiable conditions should be made, and more prolonged (i.e., 7–14 days) conventional treatment is necessary.

Pregnancy

VVC occurs frequently during pregnancy. Only topical azole therapies, applied for 7 days, are recommended for use among pregnant women. Epidemiologic studies indicate a single 150-mg dose of fluconazole might be associated with spontaneous abortion (*1150*) and congenital anomalies; therefore, it should not be used (*1151*).

HIV Infection

Vaginal *Candida* colonization rates among women with HIV infection are higher than among women without HIV with similar demographic and risk behavior characteristics, and the colonization rates correlate with increasing severity of immunosuppression (*1152*). Symptomatic VVC is also more frequent among women with HIV infection and similarly correlates with severity of immunodeficiency (*1153*). In addition, among women with HIV, systemic azole exposure is associated with isolation of non–*albicans Candida* species from the vagina.

Treatment for uncomplicated and complicated VVC among women with HIV infection should not differ from that for women who do not have HIV. Although long-term prophylactic therapy with fluconazole 200 mg weekly has been effective in reducing *C. albicans* colonization and symptomatic VVC (*1154*), this regimen is not recommended for women with HIV infection in the absence of complicated VVC (*98*). Although VVC is associated with increased HIV seroconversion among HIV-negative women and increased HIV cervicovaginal levels among women with HIV infection, the effect of treatment for VVC on HIV acquisition and transmission remains unknown.

Pelvic Inflammatory Disease

PID comprises a spectrum of inflammatory disorders of the upper female genital tract, including any combination of endometritis, salpingitis, tubo-ovarian abscess, and pelvic peritonitis (*1155–1157*). Sexually transmitted organisms, especially *N. gonorrhoeae* and *C. trachomatis*, often are implicated. Recent studies report that the proportion of PID cases attributable to *N. gonorrhoeae* or *C. trachomatis* is decreasing; of women who received a diagnosis of acute PID, approximately 50% have a positive test for either of those organisms (*1158–1160*). Micro-organisms that comprise the vaginal flora, such as strict and facultative anaerobes (*1160*) and *G. vaginalis*, *H. influenzae*, enteric gram-negative rods, and *Streptococcus agalactiae,* have been associated with PID (*1161*). In addition, cytomegalovirus (CMV), *T. vaginalis*, *M. hominis*, and *U. urealyticum* might be associated with certain PID cases (*1072*). Data also indicate that *M. genitalium* might have a role in PID pathogenesis (*765*,*928*) and might be associated with milder symptoms (*919*,*923*,*928*), although one study failed to demonstrate a substantial increase in PID after detection of *M. genitalium* in the lower genital tract (*925*).

Screening and treating sexually active women for chlamydia and gonorrhea reduces their risk for PID (*1162*,*1163*). Although BV is associated with PID, whether PID incidence can be reduced by identifying and treating women with BV is unclear (*1161*). Whether screening young women for *M. genitalium* is associated with a reduction in PID is unknown.

Diagnostic Considerations

Acute PID is difficult to diagnose because of the considerable variation in symptoms and signs associated with this condition. Women with PID often have subtle or nonspecific symptoms or are asymptomatic. Delay in diagnosis and treatment probably contributes to inflammatory sequelae in the upper genital tract. Laparoscopy can be used to obtain a more accurate diagnosis of salpingitis and a more complete bacteriologic diagnosis. However, this diagnostic tool frequently is not readily available, and its use is not easily justifiable when symptoms are mild or vague. Moreover, laparoscopy will not detect endometritis and might not detect subtle inflammation of the fallopian tubes. Consequently, a PID diagnosis usually is based on imprecise clinical findings (*1164–1166*).

Data indicate that a clinical diagnosis of symptomatic PID has a positive predictive value for salpingitis of 65%–90%, compared with laparoscopy (*1167–1170*). The positive predictive value of a clinical diagnosis of acute PID depends on the epidemiologic characteristics of the population, with higher positive predictive values among sexually active young women (particularly adolescents), women attending STD clinics, and

性伴侣的管理

没有数据支持治疗复杂性VVC患者的性伴侣。因此，无法提出建议。

特殊考虑

免疫功能受损宿主

患有基础免疫缺陷的女性、糖尿病控制不佳或其他免疫受损状况(如HIV)的女性，以及接受免疫抑制治疗(如皮质类固醇治疗)的女性，对短期治疗的反应可能不佳。应努力纠正可改变的状况，需要更长时间(即7-14天)的常规治疗。

妊娠

VVC在妊娠期间频繁发生。妊娠女性仅推荐使用局部唑类治疗，应用7天。流行病学研究表明单次150 mg氟康唑剂量可能与自然流产(1150)和先天畸形相关；因此，不应使用(1151)。

HIV感染

HIV感染女性中阴道念珠菌定植率高于具有相似人口学和危险行为特征的非HIV感染女性，且定植率与免疫抑制严重程度增加相关(1152)。有症状VVC在HIV感染女性中也更常见，并与免疫缺陷严重程度相关(1153)。此外，在HIV感染女性中，全身性唑类暴露与从阴道分离出非白色念珠菌菌种相关。

HIV感染女性中无并发症和复杂性VVC的治疗应与无HIV感染女性相同。尽管每周200 mg fluconazole长期预防性治疗可有效减少白色念珠菌定植和有症状VVC(1154)，但在无复杂性VVC的情况下，不建议HIV感染女性采用该方案(98)。尽管VVC与HIV阴性女性HIV血清转换增加以及HIV感染女性HIV宫颈阴道水平升高相关，但VVC治疗对HIV获得和传播的影响仍未知。

盆腔炎性疾病

PID包括一系列上女性生殖道炎症性疾病，包括子宫内膜炎、输卵管炎、输卵管卵巢脓肿和盆腔腹膜炎的任何组合(*1155 - 1157*)。性传播微生物，特别是淋病奈瑟菌和沙眼衣原体，常被涉及。近期研究报告，归因于淋病奈瑟菌或沙眼衣原体的PID病例比例正在下降；在诊断为急性PID的女性中，约50%对上述任一微生物检测阳性(*1158 - 1160*)。构成阴道菌群的微生物，如专性和兼性厌氧菌(1160)以及阴道加德纳菌、流感嗜血杆菌、肠道革兰阴性杆菌和无乳链球菌，已与PID相关(1161)。此外，巨细胞病毒(CMV)、阴道毛滴虫、人型支原体和解脲脲原体可能与某些PID病例相关(1072)。数据还表明，生殖支原体可能在PID发病机制中起作用(*765*, *928*)，并可能与较轻症状相关(*919*, *923*, *928*)，尽管一项研究未能证明在下生殖道检测到生殖支原体后PID显著增加(925)。

对性活跃女性进行 chlamydia 和 gonorrhea 筛查和治疗可降低其 PID 风险(*1162*,*1163*)。尽管 BV 与 PID 相关，但通过识别和治疗 BV 女性是否能降低 PID 发生率尚不清楚(1161)。对年轻女性进行生殖支原体筛查是否与 PID 减少相关尚不清楚。

诊断注意事项

急性PID难以诊断，因为与该病症相关的症状和体征存在相当大的变异。PID女性常具有细微或非特异性症状，或无症状。诊断和治疗的延迟可能促成上生殖道的炎症后遗症。腹腔镜检查可用于获得更准确的输卵管炎诊断和更完整的细菌学诊断。然而，该诊断工具通常不易获得，且当症状轻微或模糊时其使用不易被证明合理。此外，腹腔镜检查不会检测子宫内膜炎，也可能不会检测输卵管的细微炎症。因此，PID诊断通常基于不精确的临床发现(*1164 - 1166*)。

数据表明，与腹腔镜检查相比，有症状PID的临床诊断对输卵管炎具有65%-90%的阳性预测值(*1167 - 1170*)。急性PID临床诊断的阳性预测值取决于人群的流行病学特征，在性活跃年轻女性(尤其是青少年)、就诊于STD门诊的女性中阳性预测值较高，并且

those who live in communities with high rates of gonorrhea or chlamydia. Regardless of positive predictive value, no single historical, physical, or laboratory finding is both sensitive and specific for the diagnosis of acute PID. Combinations of diagnostic findings that improve either sensitivity (i.e., detect more women who have PID) or specificity (i.e., exclude more women who do not have PID) do so only at the expense of the other. For example, requiring two or more findings excludes more women who do not have PID and reduces the number of women with PID who are identified.

Episodes of PID often go unrecognized. Although certain cases are asymptomatic, others are not diagnosed because the patient or the health care provider do not recognize the implications of mild or nonspecific symptoms or signs (e.g., abnormal bleeding, dyspareunia, and vaginal discharge). Even women with mild or asymptomatic PID might be at risk for infertility (*1157*). Because of the difficulty of diagnosis and the potential for damage to the reproductive health of women, health care providers should maintain a low threshold for the clinical diagnosis of PID (*1158*). The recommendations for diagnosing PID are intended to assist health care providers to recognize when PID should be suspected and when additional information should be obtained to increase diagnostic certainty. Diagnosis and management of other causes of lower abdominal pain (e.g., ectopic pregnancy, acute appendicitis, ovarian cyst, ovarian torsion, or functional pain) are unlikely to be impaired by initiating antimicrobial therapy for PID. Presumptive treatment for PID should be initiated for sexually active young women and other women at risk for STIs if they are experiencing pelvic or lower abdominal pain, if no cause for the illness other than PID can be identified, or if one or more of the following three minimum clinical criteria are present on pelvic examination: cervical motion tenderness, uterine tenderness, or adnexal tenderness.

More specific criteria for diagnosing PID include endometrial biopsy with histopathologic evidence of endometritis; transvaginal sonography or magnetic resonance imaging techniques demonstrating thickened, fluid-filled tubes with or without free pelvic fluid or tubo-ovarian complex, or Doppler studies indicating pelvic infection (e.g., tubal hyperemia); and laparoscopic findings consistent with PID. A diagnostic evaluation that includes some of these more extensive procedures might be warranted in certain cases. Endometrial biopsy is warranted for women undergoing laparoscopy who do not have visual evidence of salpingitis because endometritis is the only sign of PID for certain women.

Requiring that all three minimum criteria be present before the initiation of empiric treatment can result in insufficient sensitivity for a PID diagnosis. After deciding whether to initiate empiric treatment, clinicians should also consider the risk profile for STIs. More elaborate diagnostic evaluation frequently is needed because incorrect diagnosis and management of PID might cause unnecessary morbidity. For example, the presence of signs of lower genital tract inflammation (predominance of leukocytes in vaginal secretions, cervical discharge, or cervical friability), in addition to one of the three minimum criteria, increases the specificity of the diagnosis. One or more of the following additional criteria can be used to enhance the specificity of the minimum clinical criteria and support a PID diagnosis:

- Oral temperature >38.3°C (>101°F)
- Abnormal cervical mucopurulent discharge or cervical friability
- Presence of abundant numbers of WBCs on saline microscopy of vaginal fluid
- Elevated erythrocyte sedimentation rate
- Elevated C-reactive protein
- Laboratory documentation of cervical infection with *N. gonorrhoeae* or *C. trachomatis*

The majority of women with PID have either mucopurulent cervical discharge or evidence of WBCs on a microscopic evaluation of a saline preparation of vaginal fluid (i.e., wet prep). If the cervical discharge appears normal and no WBCs are observed on the wet prep of vaginal fluid, a PID diagnosis is unlikely, and alternative causes of pain should be considered. A wet prep of vaginal fluid also can detect the presence of concomitant infections (e.g., BV or trichomoniasis).

Treatment

PID treatment regimens should provide empiric, broad-spectrum coverage of likely pathogens. Multiple parenteral and oral antimicrobial regimens have been effective in achieving clinical and microbiologic cure in randomized clinical trials with short-term follow-up (*1171–1173*). However, only a limited number of studies have assessed and compared these regimens with regard to infection elimination in the endometrium and fallopian tubes or determined the incidence of long-term complications (e.g., tubal infertility and ectopic pregnancy) after antimicrobial regimens (*1159*,*1164*,*1174*). The optimal treatment regimen and long-term outcome of early treatment of women with subclinical PID are unknown. All regimens used to treat PID should also be effective against *N. gonorrhoeae* and *C. trachomatis* because negative endocervical screening for these organisms does not rule out upper genital tract infection. Anaerobic bacteria have been isolated from the upper genital tract of women who have PID, and data from in vitro studies have revealed that some anaerobes (e.g., *Bacteroides fragilis*) can cause tubal and epithelial destruction. BV is often present among women who have PID (*22*,*1160*,*1161*,*1175*).

生活在淋病或衣原体感染率高社区的人群。无论阳性预测值如何，没有任何单一的病史、体格检查或实验室检查结果对急性PID的诊断既敏感又特异。能够提高敏感性(即检出更多患有PID的女性)或特异性(即排除更多未患PID的女性)的诊断发现组合，只能以牺牲另一者为代价。例如，要求两项或以上发现会排除更多未患PID的女性，并减少被识别的PID女性数量。

PID发作常未被识别。虽然某些病例无症状，但其他病例未被诊断是因为患者或医疗保健提供者未认识到轻微或非特异性症状或体征(如异常出血、性交痛和阴道分泌物)的含义。即使患有轻度或无症状PID的女性也可能面临不孕风险(1157)。由于诊断困难及对女性生殖健康损害的潜在风险，医疗保健提供者应保持较低的PID临床诊断阈值(1158)。PID诊断建议旨在帮助医疗保健提供者识别何时应怀疑PID以及何时应获取额外信息以提高诊断确定性。对其他下腹痛原因(如异位妊娠、急性阑尾炎、卵巢囊肿、卵巢扭转或功能性疼痛)的诊断和管理不太可能因启动PID抗菌治疗而受损。对于性活跃的年轻女性和其他有STI风险的女性，如果她们正在经历盆腔或下腹痛，如果除PID外无法确定病因，或者如果盆腔检查时存在以下三项最低临床标准中的一项或多项：宫颈举痛、子宫压痛或附件压痛，则应启动PID的经验性治疗。

诊断PID的更特异标准包括：子宫内膜活检显示子宫内膜炎的组织病理学证据；经阴道超声或磁共振成像技术显示输卵管增厚、充满液体，伴或不伴盆腔游离液体或输卵管卵巢复合体，或多普勒研究提示盆腔感染(如输卵管充血)；以及腹腔镜检查发现与PID一致。在某些情况下，可能需要进行包含部分这些更广泛程序的诊断评估。对于接受腹腔镜检查但无输卵管炎视觉证据的女性，应进行子宫内膜活检，因为子宫内膜炎是某些女性PID的唯一体征。

在开始经验性治疗前要求所有三项最低标准均具备，可能导致盆腔炎性疾病诊断的敏感性不足。在决定是否开始经验性治疗后，临床医生还应考虑STI的风险特征。通常需要更详细的诊断评估，因为PID的错误诊断和管理可能导致不必要的并发症。例如，除三项最低标准之一外，存在下生殖道炎症体征(阴道分泌物中白细胞占优势、宫颈分泌物或宫颈脆性增加)可提高诊断的特异性。可使用以下一项或多项附加标准来增强最低临床标准的特异性并支持PID诊断：

- 口腔温度 >38.3°C(>101°F)
- 宫颈黏液脓性分泌物异常或宫颈脆性
- 生理盐水湿片中存在大量WBC
  阴道分泌物显微镜检查
- 红细胞沉降率升高
- C反应蛋白升高
- 宫颈感染的实验室记录，病原体为
  N. 淋病奈瑟菌或沙眼衣原体

大多数盆腔炎性疾病女性有黏液脓性宫颈分泌物或阴道分泌物生理盐水制片(即湿片)显微镜检查显示白细胞。如果宫颈分泌物外观正常且阴道分泌物湿片未观察到白细胞，则盆腔炎性疾病诊断不太可能，应考虑疼痛的其他原因。阴道分泌物湿片还可检测伴随感染(如细菌性阴道病或滴虫感染)的存在。

治疗

PID治疗方案应提供对可能病原体的经验性广谱覆盖。多种肠外和口服抗菌方案在短期随访的随机临床试验中已有效实现临床和微生物学治愈(*1171 - 1173*)。然而，仅有有限数量的研究评估和比较了这些方案在子宫内膜和输卵管中消除感染的效果，或确定了抗菌方案后长期并发症(如输卵管性不孕和异位妊娠)的发生率(*1159*, *1164*, *1174*)。对亚临床PID女性早期治疗的最佳治疗方案和长期结局尚不清楚。所有用于治疗PID的方案也应有效对抗*N.gonorrhoeae*和*C.trachomatis*，因为这些微生物的宫颈内膜筛查阴性不能排除上生殖道感染。已从PID女性的上生殖道分离出厌氧菌，体外研究数据显示某些厌氧菌(如*Bacteroides fragilis*)可导致输卵管和上皮破坏。BV常存在于PID女性中(*22*, *1160*, *1161*, *1175*)。

Addition of metronidazole to IM or oral PID regimens more effectively eradicates anaerobic organisms from the upper genital tract (*1160*). Until treatment regimens that do not cover anaerobic microbes have been demonstrated to prevent long-term sequelae (e.g., infertility and ectopic pregnancy) as successfully as the regimens that are effective against these microbes, using regimens with anaerobic activity should be considered. Treatment should be initiated as soon as the presumptive diagnosis has been made because prevention of long-term sequelae is dependent on early administration of recommended antimicrobials. For women with PID of mild or moderate clinical severity, parenteral and oral regimens appear to have similar efficacy. The decision of whether hospitalization is necessary should be based on provider judgment and whether the woman meets any of the following criteria:

- Surgical emergencies (e.g., appendicitis) cannot be excluded
- Tubo-ovarian abscess
- Pregnancy
- Severe illness, nausea and vomiting, or oral temperature >38.5°C (101°F)
- Unable to follow or tolerate an outpatient oral regimen
- No clinical response to oral antimicrobial therapy

No evidence is available to indicate that adolescents have improved outcomes from hospitalization for treatment of PID, and the clinical response to outpatient treatment is similar among younger and older women. The decision to hospitalize adolescents with acute PID should be based on the same criteria used for older women.

Parenteral Treatment

Randomized trials have demonstrated the efficacy of parenteral regimens (*1160*,*1171*,*1172*,*1176*). Clinical experience should guide decisions regarding transition to oral therapy, which usually can be initiated within 24–48 hours of clinical improvement. For women with tubo-ovarian abscesses, >24 hours of inpatient observation is recommended.

Recommended Parenteral Regimens for Pelvic Inflammatory Disease

Ceftriaxone 1 g IV every 24 hours
plus
Doxycycline 100 mg orally or IV every 12 hours
plus
Metronidazole 500 mg orally or IV every 12 hours
or
Cefotetan 2 g IV every 12 hours
plus
Doxycycline 100 mg orally or IV every 12 hours
or
Cefoxitin 2 g IV every 6 hours
plus
Doxycycline 100 mg orally or IV every 12 hours

Because of the pain associated with IV infusion, doxycycline should be administered orally when possible. Oral and IV administration of doxycycline and metronidazole provide similar bioavailability. Oral metronidazole is well absorbed and can be considered instead of IV for women without severe illness or tubo-ovarian abscess when possible. After clinical improvement with parenteral therapy, transition to oral therapy with doxycycline 100 mg 2 times/day and metronidazole 500 mg 2 times/day is recommended to complete 14 days of antimicrobial therapy.

Alternative Parenteral Regimens

Only limited data are available to support using other parenteral second- or third- generation cephalosporins (e.g., ceftizoxime or cefotaxime). Because these cephalosporins are less active than cefotetan or cefoxitin against anaerobic bacteria, the addition of metronidazole should be considered.

Ampicillin-sulbactam plus doxycycline has been investigated in at least one clinical trial and has broad-spectrum coverage (*1177*). Ampicillin-sulbactam plus doxycycline is effective against *C. trachomatis*, *N. gonorrhoeae*, and anaerobes for women with tubo-ovarian abscess. Another trial demonstrated short-term clinical cure rates with azithromycin monotherapy or combined with metronidazole (*1178*).

When using the clindamycin and gentamicin alternative parenteral regimen, women with clinical improvement after 24–28 hours can be transitioned to clindamycin (450 mg orally 4 times/day) or doxycycline (100 mg orally 2 times/day) to complete the 14-day therapy. However, when tubo-ovarian abscess is present, clindamycin (450 mg orally 4 times/day) or metronidazole (500 mg orally 2 times/day) should be used to complete 14 days of therapy with oral doxycycline to provide more effective anaerobic coverage.

Alternative Parenteral Regimens

Ampicillin-sulbactam 3 g IV every 6 hours
plus
Doxycycline 100 mg orally or IV every 12 hours
or
Clindamycin 900 mg IV every 8 hours
plus
Gentamicin loading dose IV or IM (2 mg/kg body weight), followed by a maintenance dose (1.5 mg/kg body weight) every 8 hours; single daily dosing (3–5 mg/kg body weight) can be substituted

Intramuscular or Oral Treatment

IM or oral therapy can be considered for women with mild-to-moderate acute PID because the clinical outcomes among women treated with these regimens are similar to those treated with IV therapy (*1158*). Women who do not respond to IM or

在IM或口服PID方案中加入甲硝唑能更有效地清除上生殖道的厌氧菌(1160)。在那些不覆盖厌氧微生物的治疗方案被证明能像针对这些微生物有效的方案一样成功预防长期后遗症(如不孕和异位妊娠)之前，应考虑使用具有抗厌氧菌活性的方案。一旦作出推定诊断，应尽快开始治疗，因为预防长期后遗症取决于早期给予推荐的抗菌药物。对于临床严重程度为轻度或中度的PID女性，肠外和口服方案似乎具有相似的疗效。是否需要住院的决定应基于提供者的判断以及该女性是否符合以下任何标准：

- 外科急症(如阑尾炎)不能排除
- 输卵管卵巢脓肿
- 妊娠
- 重症、恶心呕吐或口腔温度>38.5°C（101°F）
- 无法遵循或耐受门诊口服治疗方案
- 对口服抗菌治疗无临床反应

没有证据表明青少年因盆腔炎性疾病住院治疗可获得更好的结局，且年轻和年长女性对门诊治疗的临床反应相似。青少年急性盆腔炎性疾病住院决定应基于与年长女性相同的标准。

胃肠外治疗

随机试验已证明肠外方案的疗效(*1160*、*1171*、*1172*、*1176*)。临床经验应指导转换为口服治疗的决策，通常可在临床改善后24-48小时内开始。对于患有输卵管卵巢脓肿的女性，建议住院观察>24小时。

盆腔炎的推荐肠外给药方案
疾病

头孢曲松 1 g IV 每24小时
加
多西环素 100 mg 口服或静脉注射，每12小时一次
加
甲硝唑 500 mg 口服或静脉注射，每 12 小时一次
或
Cefotetan 2 g IV 每12小时一次
加
多西环素 100 mg 口服或静脉注射，每12小时一次
或
Cefoxitin 2 g IV 每6小时一次
加
多西环素 100 mg 口服或静脉注射，每12小时一次

由于IV输注相关的疼痛，应尽可能口服给予多西环素。口服和IV给予多西环素和甲硝唑提供相似的生物利用度。口服甲硝唑吸收良好，对于无严重疾病或输卵管卵巢脓肿的女性，在可能的情况下可考虑代替IV使用。在肠外治疗临床改善后，建议转为口服治疗，多西环素100 mg 2次/天和甲硝唑500 mg 2次/天，以完成14天的抗菌治疗。

替代性肠外给药方案

仅有有限数据支持使用其他肠外第二代或第三代头孢菌素(如头孢唑肟或头孢噻肟)。由于这些头孢菌素对厌氧菌的活性低于头孢替坦或头孢西丁，应考虑加用甲硝唑。

氨苄西林-舒巴坦加多西环素已在至少一项临床试验中研究，并具有广谱覆盖(1177)。氨苄西林-舒巴坦加多西环素对患有输卵管卵巢脓肿的女性的*C.trachomatis*、*N.gonorrhoeae*和厌氧菌有效。另一项试验显示阿奇霉素单药治疗或联合甲硝唑的短期临床治愈率(1178)。

当使用克林霉素和庆大霉素替代肠外方案时，24-28小时后临床改善的女性可转换为克林霉素(450 mg口服

4次/天)或多西环素(100 mg口服2次/天)以完成14天治疗。然而，当存在输卵管卵巢脓肿时，应使用克林霉素(450 mg口服4次/天)或甲硝唑(500 mg口服2次/天)联合口服多西环素完成14天治疗，以提供更有效的厌氧菌覆盖。

替代性肠外给药方案

氨苄西林-舒巴坦 3 g IV每6小时**多西环素** 100 mg口服或IV每12小时
或
克林霉素 900 mg 静脉注射每8小时一次
加
庆大霉素负荷剂量IV或IM(2 mg/kg体重)，随后维持剂量(1.5 mg/kg体重)每8小时；可替代为单日给药(3-5 mg/kg体重)

肌内注射或口服治疗

对于轻至中度急性盆腔炎性疾病女性，可考虑IM或口服治疗，因为接受这些方案治疗的女性的临床结局与接受IV治疗者相似(1158)。对IM或

oral therapy within 72 hours should be reevaluated to confirm the diagnosis and be administered therapy IV.

Recommended Intramuscular or Oral Regimens for Pelvic Inflammatory Disease

Ceftriaxone 500 mg* IM in a single dose
plus
Doxycycline 100 mg orally 2 times/day for 14 days with **metronidazole** 500 mg orally 2 times/day for 14 days
or
Cefoxitin 2 g IM in a single dose and **probenecid** 1 g orally administered concurrently in a single dose
plus
Doxycycline 100 mg orally 2 times/day for 14 days with **metronidazole** 500 mg orally 2 times/day for 14 days
or
Other parenteral third-generation cephalosporin (e.g., ceftizoxime or cefotaxime)
plus
Doxycycline 100 mg orally 2 times/day for 14 days with **metronidazole** 500 mg orally 2 times/day for 14 days

* For persons weighing ≥150 kg, 1 g of ceftriaxone should be administered.

These regimens provide coverage against frequent etiologic agents of PID; however, the optimal choice of a cephalosporin is unclear. Cefoxitin, a second-generation cephalosporin, has better anaerobic coverage than ceftriaxone, and, in combination with probenecid and doxycycline, has been effective in short-term clinical response among women with PID. Ceftriaxone has better coverage against *N. gonorrhoeae*. The addition of metronidazole to these regimens provides extended coverage against anaerobic organisms and will also effectively treat BV, which is frequently associated with PID.

Alternative Intramuscular or Oral Regimens

No data have been published regarding use of oral cephalosporins for treating PID. As a result of the emergence of quinolone-resistant *N. gonorrhoeae*, regimens that include a quinolone agent are not recommended for PID treatment. However, if the patient has cephalosporin allergy, the community prevalence and individual risk for gonorrhea are low, and follow-up is likely, alternative therapy can be considered. Use of either levofloxacin 500 mg orally once daily or moxifloxacin 400 mg orally once daily with metronidazole 500 mg orally 2 times/day for 14 days (*1179–1181*) or azithromycin 500 mg IV daily for 1–2 doses, followed by 250 mg orally daily in combination with metronidazole 500 mg 2 times/day for 12–14 days (*1178*), can be considered. Moxifloxacin is the preferred quinolone antimicrobial for *M. genitalium* infections; however, the importance of providing coverage for *M. genitalium* is unknown. Diagnostic tests for gonorrhea should be obtained before starting therapy, and persons should be managed as follows:

- If a culture for gonorrhea is positive, treatment should be based on results of antimicrobial susceptibility testing.
- If the isolate is determined to be quinolone-resistant *N. gonorrhoeae* or if antimicrobial susceptibility cannot be assessed (e.g., if only NAAT testing is available), consultation with an infectious disease specialist is recommended.

Other Management Considerations

To minimize disease transmission, women should be instructed to abstain from sexual intercourse until therapy is complete, symptoms have resolved, and sex partners have been treated (see Chlamydial Infections; Gonococcal Infections). All women who receive a diagnosis of PID should be tested for gonorrhea, chlamydia, HIV, and syphilis. The value of testing women with PID for *M. genitalium* is unknown (see *Mycoplasma genitalium)*. All contraceptive methods can be continued during treatment.

Follow-Up

Women should demonstrate clinical improvement (e.g., defervescence; reduction in direct or rebound abdominal tenderness; and reduction in uterine, adnexal, and cervical motion tenderness) <3 days after therapy initiation. If no clinical improvement has occurred <72 hours after outpatient IM or oral therapy, then hospitalization, assessment of the antimicrobial regimen, and additional diagnostics, including consideration of diagnostic laparoscopy for alternative diagnoses, are recommended. All women who have received a diagnosis of chlamydial or gonococcal PID should be retested 3 months after treatment, regardless of whether their sex partners have been treated (*753*). If retesting at 3 months is not possible, these women should be retested whenever they next seek medical care <12 months after treatment.

Management of Sex Partners

Persons who have had sexual contact with a partner with PID during the 60 days preceding symptom onset should be evaluated, tested, and presumptively treated for chlamydia and gonorrhea, regardless of the PID etiology or pathogens isolated. If the last sexual intercourse was >60 days before symptom onset or diagnosis, the most recent sex partner should be treated. Sex partners of persons who have PID caused by *C. trachomatis* or *N. gonorrhoeae* frequently are asymptomatic. Arrangements should be made to link sex partners to care. If linkage is delayed or unlikely, EPT is an alternative approach to treating sex partners who have chlamydial or gonococcal infection (*125*,*126*) (see Partner Services). Partners should be instructed to abstain from sexual intercourse until they

口服治疗72小时内无反应者应重新评估以确认诊断并给予IV治疗。

盆腔炎性疾病推荐的肌内或口服方案

头孢曲松 500 mg * 单次肌内注射
加
多西环素 100 mg口服2次/天共14天联合**甲硝唑** 500 mg口服2次/天共14天

或
头孢西丁 2 g IM单次剂量并**丙磺舒** 1 g口服同时单次给药

加
多西环素 100 mg口服2次/天共14天联合**甲硝唑** 500 mg口服2次/天共14天

或
其他肠外第三代头孢菌素(如头孢唑肟或头孢噻肟)

加
多西环素 100 mg口服2次/天共14天联合**甲硝唑** 500 mg口服2次/天共14天

* 对于体重≥150 kg的人员，应给予1 g的头孢曲松。

这些方案覆盖了PID常见的病原体；然而，头孢菌素的最佳选择尚不明确。头孢西丁作为第二代头孢菌素，对厌氧菌的覆盖优于头孢曲松，并且与丙磺舒和多西环素联合使用，在PID女性患者的短期临床反应中有效。头孢曲松对淋病奈瑟菌的覆盖更好。在这些方案中加入甲硝唑可扩展对厌氧菌的覆盖，并且也能有效治疗BV，而BV常与PID相关。

替代肌内注射或口服方案

目前尚无关于口服头孢菌素治疗PID的数据发表。由于耐喹诺酮淋病奈瑟菌的出现，不推荐含喹诺酮类药物的方案用于PID治疗。然而，如果患者对头孢菌素过敏、社区患病率和个体淋病风险低且可能进行随访，可考虑替代治疗。可使用左氧氟沙星500 mg口服每日一次或莫西沙星400 mg口服每日一次联合甲硝唑500 mg口服每日2次，共14天(1179-1181)，或阿奇霉素500 mg IV每日一次，用1-2剂，随后250 mg口服每日一次联合甲硝唑

500 mg 2次/天共12-14天(1178)，可考虑。莫西沙星是*M.genitalium*感染的首选喹诺酮类抗菌药；然而，提供*M.genitalium*覆盖的重要性尚不清楚。应在开始治疗前获取淋病诊断检测，人员管理如下：

- 如果淋病培养呈阳性，应进行治疗根据抗菌药物敏感性试验结果。
- 如果分离株被确定为耐喹诺酮类*N.gonorrhoeae*或如果无法评估抗菌药物敏感性(如仅有NAAT检测可用)，建议咨询感染病专家。

其他管理注意事项

为尽量减少疾病传播，应指导女性在治疗完成、症状缓解且性伴侣已接受治疗之前禁止性交(见衣原体感染；淋球菌感染)。所有诊断为PID的女性均应接受淋病、衣原体、HIV和梅毒检测。对PID女性进行生殖支原体检测的价值尚不明确(见生殖支原体)。治疗期间可继续使用所有避孕方法。

随访

女性应在开始治疗后<3天表现出临床改善(如退热;直接或反跳性腹部压痛减轻;子宫、附件和宫颈举痛减轻)。如果门诊IM或口服治疗后<72小时无临床改善,则建议住院、评估抗菌方案并进行额外诊断检查,包括考虑诊断性腹腔镜检查以排除其他诊断。所有诊断为衣原体或淋球菌PID的女性应在治疗后3个月复检,无论其性伴侣是否已治疗(753)。如果3个月时无法复检,这些女性应在治疗后<12个月内下次就医时复检。

管理的性伴侣

在症状出现前60天内与PID伴侣有性接触者，应进行评估、检测并推定治疗衣原体和淋病，无论PID病因或分离出的病原体如何。如果最后一次性交在症状出现或诊断前>60天，则应治疗最近的性伴侣。由*C.trachomatis*或*N.gonorrhoeae*所致PID患者的性伴侣常无症状。应安排将性伴侣链接至医疗照护。如果链接延迟或不太可能，EPT是治疗衣原体或淋球菌感染性伴侣的替代方法(*125*, *126*)(见Partner Services)。应指导伴侣在

and their sex partners have been treated (i.e., until therapy is completed and symptoms have resolved, if originally present).

Special Considerations

Drug Allergy, Intolerance, and Adverse Reactions

The risk for penicillin cross-reactivity is highest with first-generation cephalosporins but is negligible between the majority of second-generation (e.g., cefoxitin) and all third-generation (e.g., ceftriaxone) cephalosporins (*619*,*631*,*653*,*656*) (see Management of Persons Who Have a History of Penicillin Allergy).

Pregnancy

Pregnant women suspected of having PID are at high risk for maternal morbidity and preterm delivery. These women should be hospitalized and treated with IV antimicrobials in consultation with an infectious disease specialist.

HIV Infection

Differences in PID clinical manifestations among women with HIV infection and those without have not been well delineated (*1182*). In early observational studies, women with HIV infection and PID were more likely to require surgical intervention. More comprehensive observational and controlled studies have demonstrated that women with HIV infection and PID have similar symptoms, compared with women without HIV (*1183–1185*), except they are more likely to have a tubo-ovarian abscess. Women with HIV responded equally well to recommended parenteral and IM or oral antibiotic regimens as women without HIV. The microbiologic findings for women with HIV and women without HIV were similar, except women with HIV had higher rates of concomitant *M. hominis* and streptococcal infections. These data are insufficient for determining whether women with HIV infection and PID require more aggressive management (e.g., hospitalization or IV antimicrobial regimens).

Intrauterine Devices

IUDs are one of the most effective contraceptive methods. Copper-containing and levonorgestrel-releasing IUDs are available in the United States. The risk for PID associated with IUD use is primarily confined to the first 3 weeks after insertion (*1186–1188*). If an IUD user receives a diagnosis of PID, the IUD does not need to be removed (*59*,*1189*). However, the woman should receive treatment according to these recommendations and should have close clinical follow-up. If no clinical improvement occurs within 48–72 hours of initiating treatment, providers should consider removing the IUD. A systematic review of evidence demonstrated that treatment outcomes did not differ between women with PID who retained the IUD and those who had the IUD removed (*1190*). These studies primarily included women using copper-containing or other nonhormonal IUDs. No studies are available regarding treatment outcomes among women using levonorgestrel-releasing IUDs.

Epididymitis

Acute epididymitis is a clinical syndrome causing pain, swelling, and inflammation of the epididymis and lasting <6 weeks (*1191*). Sometimes a testicle is also involved, a condition referred to as epididymo-orchitis. A high index of suspicion for spermatic cord (testicular) torsion should be maintained among men who have a sudden onset of symptoms associated with epididymitis because this condition is a surgical emergency.

Acute epididymitis can be caused by STIs (e.g., *C. trachomatis, N. gonorrhoeae,* or *M. genitalium*) or enteric organisms (i.e., *Escherichia coli*) (*1192*). Acute epididymitis caused by an STI is usually accompanied by urethritis, which is frequently asymptomatic. Acute epididymitis caused by sexually transmitted enteric organisms might also occur among men who are the insertive partner during anal sex. Nonsexually transmitted acute epididymitis caused by genitourinary pathogens typically occurs with bacteriuria secondary to bladder outlet obstruction (e.g., benign prostatic hyperplasia) (*1193*). Among older men, nonsexually transmitted acute epididymitis is also associated with prostate biopsy, urinary tract instrumentation or surgery, systemic disease, or immunosuppression. Uncommon infectious causes of nonsexually transmitted acute epididymitis (e.g., Fournier's gangrene) should be managed in consultation with a urologist.

Chronic epididymitis is characterized by a ≥6-week history of symptoms of discomfort or pain in the scrotum, testicle, or epididymis. Chronic infectious epididymitis is most frequently observed with conditions associated with a granulomatous reaction. *Mycobacterium tuberculosis* (TB) is the most common granulomatous disease affecting the epididymis and should be suspected, especially among men with a known history of or recent exposure to TB. The differential diagnosis of chronic noninfectious epididymitis, sometimes termed orchialgia or epididymalgia, is broad (e.g., trauma, cancer, autoimmune conditions, or idiopathic conditions). Men with this diagnosis should be referred to a urologist for clinical management (*1191*,*1192*).

Diagnostic Considerations

Men who have acute epididymitis typically have unilateral testicular pain and tenderness, hydrocele, and palpable swelling

及其性伴侣已接受治疗(即直至治疗完成且症状已缓解，如果最初存在)。

特殊注意事项

药物过敏、不耐受及不良反应

青霉素交叉反应风险在第一代头孢菌素中最高，但在大多数第二代(如头孢西丁)和所有第三代(如头孢曲松)头孢菌素之间可忽略不计(*619*、*631*、*653*、*656*)(见青霉素过敏史者的管理)。

妊娠

怀疑患有盆腔炎性疾病的孕妇面临较高的孕产妇发病和早产风险。这些女性应住院并咨询感染病专家接受IV抗菌药物治疗。

HIV感染

HIV感染女性与无HIV感染女性之间PID临床表现的差异尚未得到充分阐明(1182)。在早期观察性研究中，HIV感染合并PID的女性更可能需要手术干预。更全面的观察性研究和对照研究表明，HIV感染合并PID的女性与无HIV女性相比症状相似(*1183 - 1185*)，但更可能发生输卵管卵巢脓肿。HIV感染女性对推荐的胃肠外和IM或口服抗生素方案的应答与无HIV女性同样良好。HIV感染女性和无HIV女性的微生物学发现相似，但HIV感染女性伴随*M.hominis*和链球菌感染的发生率更高。这些数据不足以确定HIV感染合并PID的女性是否需要更积极的管理(如住院或IV抗菌方案)。

宫内节育器

IUD是最有效的避孕方法之一。美国有含铜和释放左炔诺孕酮的IUD。与使用IUD相关的PID风险主要局限于置入后前3周(*1186 - 1188*)。如果IUD使用者被诊断为PID，无需取出IUD(*59*, *1189*)。但是，该女性应按照这些推荐接受治疗，并应进行密切的临床随访。如果开始治疗后48-72小时内无临床改善，提供者应考虑取出IUD。一项证据系统评价表明保留IUD的盆腔炎性疾病女性与取出IUD的女性之间治疗结局无差异(1190)。这些研究主要纳入使用含铜或其他非激素IUD的女性。尚无关于使用左炔诺孕酮释放IUD女性治疗结局的研究。

附睾炎

急性附睾炎是一种临床综合征，引起附睾疼痛、肿胀和炎症，持续<6周(1191)。有时睾丸也受累,称为附睾睾丸炎。对于突然出现与附睾炎相关症状的男性,应高度怀疑精索(睾丸)扭转,因为该情况是外科急症。

急性附睾炎可由STI(如*C.trachomatis, N.gonorrhoeae*,或*M.genitalium*)或肠道微生物(即*Escherichia coli*)引起(1192)。由STI引起的急性附睾炎通常伴有尿道炎，而尿道炎常无症状。由性传播肠道微生物引起的急性附睾炎也可能发生于肛交中作为插入方的男性。由泌尿生殖道病原体引起的非性传播急性附睾炎通常伴随继发于膀胱出口梗阻(如良性前列腺增生)的菌尿(1193)。在老年男性中，非性传播急性附睾炎还与前列腺活检、泌尿道器械操作或手术、全身性疾病或免疫抑制相关。非性传播急性附睾炎的少见感染性病因(如Fournier坏疽)应与泌尿科医生会诊管理。

慢性附睾炎的特征是阴囊、睾丸或附睾出现不适或疼痛症状且病史≥6周。慢性感染性附睾炎最常见于与肉芽肿性反应相关的疾病。结核分枝杆菌(TB)是影响附睾的最常见肉芽肿性疾病，应予以怀疑，尤其是在有已知TB病史或近期接触过TB的男性中。慢性非感染性附睾炎(有时称为睾丸痛或附睾痛)的鉴别诊断范围广泛(例如创伤、癌症、自身免疫性疾病或特发性疾病)。诊断为该病的男性应转诊至泌尿科医生进行临床管理(*1191*,*1192*)。

诊断注意事项

患有急性附睾炎的男性通常有单侧睾丸疼痛和压痛、鞘膜积液和可触及的肿胀

of the epididymis. Although inflammation and swelling usually begin in the tail of the epididymis, it can spread to the rest of the epididymis and testicle. The spermatic cord is usually tender and swollen. Spermatic cord (testicular) torsion, a surgical emergency, should be considered in all cases; however, it occurs more frequently among adolescents and men without evidence of inflammation or infection. For men with severe unilateral pain with sudden onset, those whose test results do not support a diagnosis of urethritis or urinary tract infection, or for whom diagnosis of acute epididymitis is questionable, immediate referral to a urologist for evaluation for testicular torsion is vital because testicular viability might be compromised.

Bilateral symptoms should increase suspicion of other causes of testicular pain. Radionuclide scanning of the scrotum is the most accurate method for diagnosing epididymitis but it is not routinely available. Ultrasound should be used primarily for ruling out torsion of the spermatic cord in cases of acute, unilateral, painful scrotal swelling. However, because partial spermatic cord torsion can mimic epididymitis on scrotal ultrasound, differentiation between spermatic cord torsion and epididymitis when torsion is not ruled out by ultrasound should be made on the basis of clinical evaluation. Although ultrasound can demonstrate epididymal hyperemia and swelling associated with epididymitis, it provides minimal diagnostic usefulness for men with a clinical presentation consistent with epididymitis. A negative ultrasound does not rule out epididymitis and thus does not alter clinical management. Ultrasound should be reserved for men if torsion of the spermatic cord is suspected or for those with scrotal pain who cannot receive an accurate diagnosis by history, physical examination, and objective laboratory findings.

All suspected cases of acute epididymitis should be evaluated for objective evidence of inflammation by one of the following POC tests:

- Gram, MB, or GV stain of urethral secretions demonstrating ≥2 WBCs per oil immersion field (*737*) (see Urethritis). These stains are preferred POC diagnostic tests for evaluating urethritis because they are highly sensitive and specific for documenting both urethral inflammation and presence or absence of gonococcal infection. Gonococcal infection is established by documenting the presence of WBC-containing intracellular gram-negative or purple diplococci on urethral Gram, MB, or GV stain, respectively.
- Positive leukocyte esterase test on first-void urine.
- Microscopic examination of sediment from a spun first-void urine demonstrating ≥10 WBCs/HPF.

All suspected cases of acute epididymitis should be tested for *C. trachomatis* and *N. gonorrhoeae* by NAAT. Urine is the preferred specimen for NAAT for men (*553*). Urine cultures for chlamydial and gonococcal epididymitis are insensitive and are not recommended. Urine bacterial cultures should also be performed for all men to evaluate for the presence of genitourinary organisms and to determine antibiotic susceptibility.

Treatment

To prevent complications and transmission of STIs, presumptive therapy for all sexually active men is indicated at the time of the visit before all laboratory test results are available. Selection of presumptive therapy is based on risk for chlamydial and gonococcal infections or enteric organisms. Treatment goals for acute epididymitis are 1) microbiologic infection cure, 2) improvement of signs and symptoms, 3) prevention of transmission of chlamydia and gonorrhea to others, and 4) decreased potential for chlamydial or gonococcal epididymitis complications (e.g., infertility or chronic pain). Although the majority of men with acute epididymitis can be treated on an outpatient basis, referral to a specialist and hospitalization should be considered when severe pain or fever indicates other diagnoses (e.g., torsion, testicular infarction, abscess, or necrotizing fasciitis) or when men are unable to comply with an antimicrobial regimen. Age, history of diabetes, fever, and elevated C-reactive protein can indicate more severe disease requiring hospitalization (*1193*).

Recommended Regimens for Epididymitis

For acute epididymitis most likely caused by chlamydia or gonorrhea:
Ceftriaxone 500 mg* IM in a single dose
plus
Doxycycline 100 mg orally 2 times/day for 10 days

For acute epididymitis most likely caused by chlamydia, gonorrhea, or enteric organisms (men who practice insertive anal sex):
Ceftriaxone 500 mg* IM in a single dose
plus
Levofloxacin 500 mg orally once daily for 10 days

For acute epididymitis most likely caused by enteric organisms only:
Levofloxacin 500 mg orally once daily for 10 days

* For persons weighing ≥150 kg, 1 g of ceftriaxone should be administered.

Levofloxacin monotherapy should be considered if the infection is most likely caused by enteric organisms only, and gonorrhea has been ruled out by Gram, MB, or GV stain. This includes men who have undergone prostate biopsy, vasectomy, and other urinary tract instrumentation procedures. Treatment should be guided by bacterial cultures and antimicrobial susceptibilities. As an adjunct to therapy, bed rest, scrotal elevation, and nonsteroidal anti-inflammatory drugs are

附睾的。尽管炎症和肿胀通常始于附睾尾部，但可蔓延至附睾其余部分和睾丸。精索通常有压痛和肿胀。精索(睾丸)扭转是一种外科急症，所有病例均应考虑；然而，它更常见于青少年和无炎症或感染证据的男性。对于突发严重单侧疼痛的男性、检测结果不支持尿道炎或尿路感染诊断的男性，或急性附睾炎诊断存疑的男性，立即转诊至泌尿科医生评估睾丸扭转至关重要，因为睾丸活力可能受损。

双侧症状应增加对其他睾丸疼痛原因的怀疑。阴囊放射性核素扫描是诊断附睾炎最准确的方法，但并非常规可用。超声应主要用于在急性、单侧、疼痛性阴囊肿胀的病例中排除精索扭转。然而，由于部分精索扭转在阴囊超声上可模仿附睾炎，当超声未能排除扭转时，精索扭转与附睾炎之间的鉴别应基于临床评估。尽管超声可以显示与附睾炎相关的附睾充血和肿胀，但对于临床表现符合附睾炎的男性，其诊断价值极小。超声阴性不能排除附睾炎，因此不改变临床管理。超声应保留用于怀疑精索扭转的男性，或用于那些通过病史、体格检查和客观实验室检查结果无法获得准确诊断的阴囊疼痛患者。

所有疑似急性附睾炎病例应通过以下POC检测之一评估炎症的客观证据：

- 尿道分泌物革兰染色、MB染色或GV染色显示≥2个白细胞/油镜视野(737)(见尿道炎)。这些染色是评估尿道炎的首选POC诊断检测，因为它们对记录尿道炎症和淋球菌感染的存在或缺失均具有高敏感性和特异性。淋球菌感染通过分别在尿道革兰染色、MB染色或GV染色上记录含白细胞的细胞内革兰阴性或紫色双球菌来确立。
- 首段尿白细胞酯酶试验阳性。
- 离心后首段尿沉渣显微镜检查显示≥10 WBCs/HPF。

所有疑似急性附睾炎病例均应通过NAAT检测沙眼衣原体和淋病奈瑟菌。尿液是男性NAAT检测的首选标本(553)。尿液培养用于衣原体和淋球菌性附睾炎不敏感，不推荐使用。所有男性还应进行尿液细菌培养，以评估是否存在泌尿生殖道微生物并确定抗生素敏感性。

治疗

为预防并发症和STI传播，应在就诊时、所有实验室检测结果可用之前，对所有性活跃男性进行推定性治疗。推定性治疗的选择基于衣原体和淋球菌感染或肠道微生物的风险。急性附睾炎的治疗目标是1)微生物学感染治愈，2)体征和症状改善，3)预防衣原体和淋病传播给他人，以及4)降低衣原体或淋球菌附睾炎并发症(例如不孕或慢性疼痛)的可能性。尽管大多数急性附睾炎男性可以在门诊治疗，但当严重疼痛或发热提示其他诊断(例如扭转、睾丸梗死、脓肿或坏死性筋膜炎)或男性无法遵守抗菌治疗方案时，应考虑转诊至专科医生并住院治疗。年龄、糖尿病史、发热和C反应蛋白升高可提示需要住院治疗的更严重疾病(1193)。

附睾炎推荐治疗方案

对于最可能由衣原体或淋病引起的急性附睾炎：头孢曲松 500 mg* 单次肌内注射
加
多西环素 100 mg 口服每日2次连用10天

对于最可能由衣原体、淋病或肠道微生物引起的急性附睾炎(插入性肛交的男性)：头孢曲松 500 mg* 单次肌内注射
加
左氧氟沙星 500 mg 口服，每日一次，共10天

对于最可能仅由肠道微生物引起的急性附睾炎：左氧氟沙星 500 mg 口服，每日一次，共10天

* 对于体重≥150 kg的人员，应给予1 g的头孢曲松。

如果感染最可能仅由肠道微生物引起，且已通过革兰染色、MB或GV染色排除淋病，应考虑左氧氟沙星单药治疗。这包括接受过前列腺活检、输精管切除术及其他泌尿道器械操作的男性。治疗应以细菌培养和抗菌药物敏感性为指导。作为辅助治疗，卧床休息、阴囊抬高和非甾体抗炎药

recommended until fever and local inflammation have subsided. Complete resolution of discomfort might not occur for a few weeks after completion of the antibiotic regimen.

Other Management Considerations

Men who have acute epididymitis confirmed or suspected to be caused by *N. gonorrhoeae* or *C. trachomatis* should be advised to abstain from sexual intercourse until they and their partners have been treated and symptoms have resolved. All men with acute epididymitis should be tested for HIV and syphilis.

Follow-Up

Men should be instructed to return to their health care providers if their symptoms do not improve <72 hours after treatment. Signs and symptoms of epididymitis that do not subside in <3 days require reevaluation of the diagnosis and therapy. Men who experience swelling and tenderness that persist after completion of antimicrobial therapy should be evaluated for alternative diagnoses, including tumor, abscess, infarction, testicular cancer, TB, and fungal epididymitis.

Management of Sex Partners

Men who have acute sexually transmitted epididymitis confirmed or suspected to be caused by *N. gonorrhoeae* or *C. trachomatis* should be instructed to refer all sex partners during the previous 60 days before symptom onset for evaluation, testing, and presumptive treatment (see Chlamydial Infections; Gonococcal Infections). If the last sexual intercourse was >60 days before onset of symptoms or diagnosis, the most recent sex partner should be evaluated and treated. Arrangements should be made to link sex partners to care. EPT is an effective strategy for treating sex partners of men who have or are suspected of having chlamydia or gonorrhea for whom linkage to care is anticipated to be delayed (*125*,*126*) (see Partner Services). Partners should be instructed to abstain from sexual intercourse until they and their sex partners are treated and symptoms have resolved.

Special Considerations

Drug Allergy, Intolerance, and Adverse Reactions

The risk for penicillin cross-reactivity is negligible between all third-generation cephalosporins (e.g., ceftriaxone) (*658*,*681*) (see Management of Persons Who Have a History of Penicillin Allergy). Alternative regimens have not been studied; therefore, clinicians should consult an infectious disease specialist if such regimens are required.

HIV Infection

Men with HIV infection who have uncomplicated acute epididymitis should receive the same treatment regimen as those who do not have HIV. Other etiologic agents have been implicated in acute epididymitis among men with HIV, including CMV, salmonella, toxoplasmosis, *U. urealyticum*, *Corynebacterium* species, *Mycoplasma* species, and *Mima polymorpha* (*1192*).

Human Papillomavirus Infections

Approximately 150 types of HPV have been identified, at least 40 of which infect the genital area (*1194*). The majority of HPV infections are self-limited and are asymptomatic or unrecognized. Sexually active persons are usually exposed to HPV during their lifetime (*838*,*1195*,*1196*). Oncogenic, high-risk HPV infection (e.g., HPV types 16 and 18) causes the majority of cervical, penile, vulvar, vaginal, anal, and oropharyngeal cancers and precancers (*1197*), whereas other HPV infection (e.g., HPV types 6 and 11) causes genital warts and recurrent respiratory papillomatosis. Persistent oncogenic HPV infection is the strongest risk factor for development of HPV-attributable precancers and cancers. A substantial proportion of cancers and anogenital warts are attributable to HPV in the United States. An estimated 34,800 new HPV-attributable cancers occurred every year during 2012–2016 (*1198*). Before HPV vaccines were introduced, approximately 355,000 new cases of anogenital warts occurred every year (*1199*).

Prevention

HPV Vaccines

Three HPV vaccines are licensed in the United States: Ceravrix, a 2-valent vaccine (2vHPV) that targets HPV types 16 and 18; Gardasil, a 4-valent vaccine (4vHPV) that targets HPV types 6, 11, 16, and 18; and Gardasil 9, a 9-valent vaccine (9vHPV) that targets HPV types 6, 11, 16, 18, 31, 33, 45, 52, and 58. Types 16 and 18 account for 66% of all cervical cancers, whereas the five additional types targeted by the 9-valent vaccine account for 15%. Types 6 and 11 cause >90% of genital warts. Only 9vHPV vaccine is available in the United States.

ACIP recommendations for HPV vaccination (https://www.cdc.gov/vaccines/hcp/acip-recs/vacc-specific/hpv.html) include the following:

- Routine HPV vaccination for all adolescents at age 11 or 12 years.
- Administering vaccine starting at age 9 years.

推荐使用直至发热和局部炎症消退。抗生素方案完成后，不适可能不会在数周内完全缓解。

其他管理注意事项

确诊或疑似由淋病奈瑟菌或沙眼衣原体引起的急性附睾炎男性应被告知在本人及其性伴侣完成治疗且症状消退之前避免性交。所有急性附睾炎男性均应接受HIV和梅毒检测。

随访

应告知男性如果在治疗后<72小时症状未改善,应返回其医疗保健提供者处就诊。附睾炎的体征和症状在<3天内未消退需要重新评估诊断和治疗。抗菌治疗完成后仍持续存在肿胀和压痛的男性应评估替代诊断,包括肿瘤、脓肿、梗死、睾丸癌、结核和真菌性附睾炎。

管理的性伴侣

对于确诊或疑似由淋病奈瑟菌或沙眼衣原体引起的急性性传播性附睾炎的男性，应指示其转介症状出现前60天内的所有性伴侣进行评估、检测和推定治疗(见衣原体感染；淋球菌感染)。如果最后一次性交发生在症状出现或诊断前>60天，则应对最近的性伴侣进行评估和治疗。应做出安排将性伴侣与照护联系起来。EPT是治疗患有或疑似患有衣原体或淋病且预计与照护的联系会延迟的男性的性伴侣的有效策略(*125*,*126*)(见伴侣服务)。应指示伴侣在 themselves 及其性伴侣接受治疗且症状消退之前避免性交。

特殊注意事项

药物过敏、不耐受及不良反应

所有第三代头孢菌素(如头孢曲松)之间的青霉素交叉反应风险可忽略不计(*658*, *681*)(见有青霉素过敏史者的管理)。替代方案尚未研究；因此，如果需要此类方案，临床医生应咨询感染病专家。

HIV感染

患有无并发症急性附睾炎的HIV感染男性应接受与无HIV感染者相同的治疗方案。其他病原体也与HIV感染男性的急性附睾炎有关，包括CMV、沙门菌、弓形虫病、解脲脲原体、棒状杆菌属、支原体属和多形模仿菌(1192) 。

人乳头状瘤病毒感染

已鉴定出约150种HPV类型，其中至少40种感染生殖器区域(1194)。大多数HPV感染为自限性，无症状或未被识别。性活跃人群通常在其一生中会暴露于HPV(*838*, *1195*, *1196*)。致癌性高危HPV感染(如HPV 16型和18型)导致大多数宫颈、阴茎、外阴、阴道、肛门和口咽癌及癌前病变(1197)，而其他HPV感染(如HPV 6型和11型)导致生殖器疣和复发性呼吸道乳头状瘤病。持续性致癌HPV感染是发生HPV归因癌前病变和癌症的最强危险因素。在美国，相当比例的癌症和肛门生殖器疣可归因于HPV。据估计，2012-2016年期间每年发生约34,800例新的HPV归因癌症(1198)。在引入HPV疫苗之前，每年发生约355,000例新的肛门生殖器疣病例(1199)。

预防

HPV疫苗

美国已批准三种HPV疫苗：Ceravrix，一种针对HPV 16型和18型的2价疫苗(2vHPV);Gardasil，一种针对HPV 6、11、16和18型的4价疫苗(4vHPV)；以及Gardasil 9，一种针对HPV 6、11、16、18、31、33、45、52和58型的9价疫苗(9vHPV)。16型和18型占所有宫颈癌的66%，而9价疫苗针对的另外五种类型占15%。6型和11型导致>90%的生殖器疣。美国仅提供9vHPV疫苗。

ACIP关于HPV疫苗接种的建议(https://www.cdc.gov/vaccines/hcp/acip-recs/vacc-specific/hpv.html)包括以下内容：

- 所有青少年在11岁时常规接种HPV疫苗，或12年。
- 从9岁开始接种疫苗。

- Catch-up vaccination through age 26 years for those not vaccinated previously.
- Not using HPV vaccination for all adults aged >26 years. Instead, shared clinical decision-making between a patient and a provider regarding HPV vaccination is recommended for certain adults aged 27–45 years not vaccinated previously.
- A 2-dose vaccine schedule (at 0- and 6–12-month intervals) is recommended for persons who initiate vaccination before their 15th birthday.
- A 3-dose vaccine schedule (at 0-, 1–2-, and 6-month intervals) for immunocompromised persons regardless of age of initiation.

HPV vaccines are not recommended for use in pregnant women. HPV vaccines can be administered regardless of history of anogenital warts, abnormal Pap test or HPV test, or anogenital precancer. Women who have received HPV vaccine should continue routine cervical cancer screening (see Cervical Cancer). HPV vaccine is available for eligible children and adolescents aged <19 years through the Vaccines for Children (VFC) program (additional information is available at https://www.cdc.gov/vaccines/programs/vfc/index.html or by calling CDC INFO 800-232-4636). For uninsured persons aged <19 years, patient assistance programs are available from the vaccine manufacturers. Prelicensure and postlicensure safety evaluations have determined that the vaccine is well tolerated. With >120 million doses of HPV vaccines distributed in the United States, robust data demonstrate that HPV vaccines are safe (https://www.cdc.gov/vaccinesafety). Impact-monitoring studies in the United States have demonstrated reductions of genital warts as well as the HPV types contained within the quadrivalent vaccine (*1200–1203*). Settings that provide STI services should either administer the vaccine to eligible clients within the routine and catch-up age groups through age 26 years who have not started or completed the vaccine series, or link these persons to another facility equipped to provide the vaccine. Clinicians providing services to children, adolescents, and young adults should be knowledgeable about HPV and the vaccine (https://www.cdc.gov/vaccines/who/teens/for-hcp/hpv-resources.html). HPV vaccination has not been associated with initiation of sexual activity or sexual risk behaviors (*1204*,*1205*).

Abstaining from sexual activity is the most reliable method for preventing genital HPV infection. Persons can decrease their chances of infection by practicing consistent and correct condom use and limiting their number of sex partners. Although these interventions might not fully protect against HPV, they can decrease the chances of HPV acquisition and transmission.

Diagnostic Considerations

HPV tests are available for detecting oncogenic types of HPV infection and are used in the context of cervical cancer screening and management or follow-up of abnormal cervical cytology or histology (see Cervical Cancer). These tests should not be used for male partners of women with HPV or women aged <25 years, for diagnosis of genital warts, or as a general STI test.

Application of 3%–5% acetic acid, which might cause affected areas to turn white, has been used by certain providers to detect genital mucosa infected with HPV. The routine use of this procedure to detect mucosal changes attributed to HPV infection is not recommended because the results do not influence clinical management.

Treatment

Treatment is directed to the macroscopic (e.g., genital warts) or pathologic precancerous lesions caused by HPV. Subclinical genital HPV infection typically clears spontaneously; therefore, specific antiviral therapy is not recommended to eradicate HPV infection. Precancerous lesions are detected through cervical cancer screening; HPV-related precancer should be managed on the basis of existing guidance (see Cervical Cancer).

Counseling

Key Messages for Persons with Human Papillomavirus Infection

When counseling persons with anogenital HPV infection, the provider should discuss the following:

- Anogenital HPV infection is common. It usually infects the anogenital area but can infect other areas, including the mouth and throat. The majority of sexually active persons get HPV at some time during their lifetime, although most never know it.
- Partners tend to share HPV, and it is not possible to determine which partner transmitted the original infection. Having HPV does not mean that a person or his or her partner is having sex outside the relationship.
- Persons who acquire HPV usually clear the infection spontaneously, meaning that HPV becomes undetectable with no associated health problems.
- If HPV infection persists, genital warts, precancers, and cancers of the cervix, anus, penis, vulva, vagina, head, or neck might develop.
- Discussion of tobacco use, and provision of cessation counseling, is important because of its contribution to the progression of precancer and cancer.
- The types of HPV that cause genital warts are different from the types that can cause cancer.

- 为未接种者提供至26岁的补种疫苗接种
  既往接种过疫苗。
- 不推荐所有年龄>26岁的成年人接种HPV疫苗。
  相反，对于某些27-45岁既往未接种疫苗的成人，推荐患者与提供者之间就HPV疫苗接种进行共享临床决策。

- 2剂疫苗接种程序(0月和6-12月龄)
  对于在15岁生日前开始接种疫苗的人，推荐(间隔)接种。

- 3剂疫苗接种方案(0、1-2和6个月时接种)
  (间隔)对于免疫功能低下者，无论开始年龄如何。

不建议孕妇使用HPV疫苗。无论是否有肛门生殖器疣病史、Pap试验或HPV试验异常或肛门生殖器癌前病变，均可接种HPV疫苗。已接种HPV疫苗的女性应继续常规宫颈癌筛查(见宫颈癌)。符合条件的<19岁儿童和青少年可通过Vaccines for Children(VFC)项目获得HPV疫苗(更多信息请访问https://www.cdc.gov/vaccines/programs/vfc/index.html或致电CDC INFO 800-232-4636)。对于<19岁的未保险人员,疫苗生产商提供患者援助项目。上市前和上市后安全性评估已确定该疫苗耐受性良好。在美国已分发超过1.2亿剂HPV疫苗,大量数据表明HPV疫苗是安全的(https://www.cdc.gov/vaccinesafety)。美国的影响监测研究已证明生殖器疣以及四价疫苗所含HPV类型有所减少(*1200 - 1203*)。提供STI服务的机构应通过常规和补种年龄组(至26岁)向尚未开始或完成疫苗系列的符合条件的服务对象接种疫苗，或将这些人员转介至具备疫苗提供条件的其他机构。为儿童、青少年和年轻成人提供服务的临床医生应了解HPV和疫苗相关知识(https://www.cdc.gov/vaccines/who/ teens/for-hcp/hpv-resources.html)。HPV疫苗接种与性行为开始或性危险行为无关(*1204*, *1205*)。

避免性活动是预防生殖器HPV感染最可靠的方法。人们可以通过坚持正确使用安全套和限制性伴侣数量来降低感染机会。尽管这些干预措施可能不能完全预防HPV，但可以减少HPV获得和传播的机会。

诊断注意事项

HPV检测可用于检测致癌型HPV感染，并用于宫颈癌筛查和异常宫颈细胞学或组织学的管理或随访(见宫颈癌)。这些检测不应用于HPV女性的男性伴侣或<25岁女性、生殖器疣的诊断或作为一般STI检测。

某些提供者使用3%-5%醋酸涂抹(可使受累区域变白)来检测感染HPV的生殖器黏膜。不推荐常规使用此操作来检测归因于HPV感染的黏膜变化，因为结果不影响临床管理。

治疗

治疗针对HPV引起的宏观(如生殖器疣)或病理性癌前病变。亚临床生殖器HPV感染通常自行清除；因此，不推荐使用特异性抗病毒治疗来根除HPV感染。癌前病变通过宫颈癌筛查检测；HPV相关癌前病变应根据现有指南进行管理(见宫颈癌)。

咨询

人乳头瘤病毒感染者的关键信息

在咨询肛门生殖器HPV感染者时，提供者应讨论以下内容：

- 肛门生殖器 HPV 感染很常见。它通常感染
  肛门生殖器区域，但也可感染其他区域，包括口腔和咽喉。大多数性活跃者在其一生中某个时候会感染HPV，尽管大多数人从未知晓。
- 伴侣往往共享HPV，且无法确定
  确定哪个伴侣传播了原始感染。感染HPV并不意味着某人或其伴侣在关系之外有性行为。• 获得HPV的人通常会清除感染
  自行清除，意味着HPV变得检测不到且无相关健康问题。
- 如果 HPV 感染持续存在，生殖器疣、癌前病变和
  宫颈、肛门、阴茎、外阴、阴道、头或颈部可能发生癌症。
- 讨论烟草使用情况，并提供戒烟
  咨询很重要，因为其对癌前病变和癌症进展有促进作用。
- 引起生殖器疣的HPV类型不同
  从可能致癌的类型中区分出来。

- Many types of HPV are sexually transmitted through anogenital contact, mainly during vaginal and anal sex. HPV also might be transmitted during oral sex and genital-to-genital contact without penetration. In rare cases, a pregnant woman can transmit HPV to an infant during delivery.
- Treatments are available for the conditions caused by HPV but not for the virus itself.
- Having HPV does not make it harder for a woman to get pregnant or carry a pregnancy to term. However, certain precancers or cancers that HPV can cause, and the surgical procedures needed to treat them, can affect a woman's ability to get pregnant or carry a pregnancy to term.
- No HPV test can determine which HPV infection will become undetectable and which will persist or progress to disease. However, in certain circumstances, HPV tests can determine whether a woman is at increased risk for cervical cancer. These tests are not for detecting other HPV-related problems, nor are they useful for women aged <25 years or men of any age.

Prevention

- Three HPV vaccines can prevent diseases and cancers caused by HPV. The 2vHPV, 4vHPV, and 9vHPV vaccines protect against the majority of cervical cancer cases, although the 4vHPV and 9vHPV vaccines also protect against the majority of genital warts. Only 9vHPV vaccine is available in the United States. HPV vaccines are safe and effective and are recommended routinely for adolescents aged 11–12 years. Catch-up vaccination is also recommended for older adolescents and young adults through age 26 years (https://www.cdc.gov/hpv/hcp/index.html). Shared clinical decision-making is recommended regarding HPV vaccination for certain adults aged 27–45 years who are not adequately vaccinated per guidance (https://www.cdc.gov/mmwr/volumes/68/wr/pdfs/mm6832a3-H.pdf).
- Condoms used consistently and correctly can lower the chances of acquiring and transmitting HPV and developing HPV-related diseases (e.g., genital warts or cervical cancer). However, because HPV can infect areas not covered by a condom, condoms might not fully protect against HPV.
- Limiting the number of sex partners can reduce the risk for HPV. However, even persons with only one lifetime sex partner can get HPV.
- Abstaining from sexual activity is the most reliable method for preventing genital HPV infection.

Anogenital Warts

Anogenital warts are a common disease, and 90% are caused by nononcogenic HPV types 6 or 11. These types can be commonly identified before or at the same time anogenital warts are detected (*1206*). HPV types 16, 18, 31, 33, and 35 also are occasionally identified in anogenital warts (usually as infections with HPV 6 or 11) and can be associated with foci of high-grade squamous intraepithelial lesion (HSIL), particularly among persons who have HIV infection. In addition to anogenital warts, HPV types 6 and 11 have been associated with conjunctival, nasal, oral, and laryngeal warts.

Anogenital warts are usually asymptomatic; however, depending on the size and anatomic location, they can be painful or pruritic. They are usually flat, papular, or pedunculated growths on the genital mucosa. Anogenital warts occur commonly at certain anatomic sites, including around the vaginal introitus, under the foreskin of the uncircumcised penis, and on the shaft of the circumcised penis. Warts can also occur at multiple sites in the anogenital epithelium or within the anogenital tract (e.g., cervix, vagina, urethra, perineum, perianal skin, anus, or scrotum). Intra-anal warts are observed predominantly in persons who have had receptive anal intercourse; however, they also can occur among men and women who have not had a history of anal sexual contact.

Prevention

Anogenital warts have decreased among adolescents, young women, and heterosexual men with use of HPV vaccination in multiple countries, including the United States (*1203*,*1207–1216*).

Diagnostic Considerations

Diagnosis of anogenital warts is usually made by visual inspection but can be confirmed by biopsy, which is indicated if lesions are atypical (e.g., pigmented, indurated, affixed to underlying tissue, bleeding, or ulcerated lesions). Biopsy might also be indicated in the following circumstances, particularly if the patient is immunocompromised (including those with HIV infection): the diagnosis is uncertain, the lesions do not respond to standard therapy, or the disease worsens during therapy. HPV testing is not recommended for anogenital wart diagnosis because test results are not confirmatory and do not guide genital wart management. Some anogenital lesions can resemble anogenital warts (condyloma accuminata), but do not respond to anogenital wart treatment. Condyloma lata, a manifestation of secondary syphilis, can be diagnosed by serologic tests or through direct detection from serous fluid from the lesions (see Syphilis, Diagnostic Considerations).

Treatment

The aim of treatment is removal of the warts and amelioration of symptoms, if present. The appearance of warts also can result in considerable psychosocial distress, and removal can relieve

- 许多类型的HPV通过肛门生殖器接触性传播，主要在阴道和肛交期间。HPV也可能在口交和无插入的生殖器对生殖器接触期间传播。在罕见情况下，孕妇可在分娩期间将HPV传播给婴儿。
- 针对由HPV引起的病症，已有可用的治疗方法。但不适用于病毒本身。
- 感染HPV并不会使女性更难获得怀孕或足月妊娠。然而，HPV可能引起的某些癌前病变或癌症，以及治疗它们所需的外科手术，可能影响女性怀孕或足月妊娠的能力。
- 没有HPV检测能确定哪种HPV感染会发展为检测不到以及哪些将持续或进展为疾病。然而，在某些情况下，HPV检测可以确定女性是否有增加的宫颈癌风险。这些检测不用于检测其他HPV相关问题，对<25岁女性或任何年龄男性也无用。

预防

- 三种HPV疫苗可预防疾病和癌症由HPV引起。2vHPV、4vHPV和9vHPV疫苗可预防大多数宫颈癌病例，而4vHPV和9vHPV疫苗还可预防大多数生殖器疣。美国仅提供9vHPV疫苗。HPV疫苗安全有效，推荐11-12岁青少年常规接种。还推荐较大青少年和年轻成人至26岁进行补种接种(https://www.cdc.gov/hpv/hcp/index.html)。对于某些27-45岁未按指南充分接种的成人，推荐就HPV疫苗接种进行共同临床决策(https://www.cdc.gov/mmwr/volumes/68/ wr/pdfs/mm6832a3-H.pdf)。
- 持续正确使用安全套可以降低获得和传播HPV以及发生HPV相关疾病(如生殖器疣或宫颈癌)的机会。然而，由于HPV可感染安全套未覆盖的区域，安全套可能不能完全预防HPV。
- 限制性伴侣数量可降低风险对于HPV也是如此。然而，即使一生只有一个性伴侣的人也可能感染HPV。
- 禁欲是最可靠的方法用于预防生殖器HPV感染。

肛门生殖器疣

肛门生殖器疣是一种常见疾病，90%由非致癌性HPV 6型或11型引起。这些型别可通常在肛门生殖器疣检测之前或同时被识别(1206)。HPV 16、18、31、33和35型偶尔也在肛门生殖器疣中识别(通常为HPV 6或11感染)，并可能与高级别鳞状上皮内病变(HSIL)病灶相关，特别是在HIV感染者中。除肛门生殖器疣外，HPV 6和11型还与结膜、鼻腔、口腔和喉部疣相关。

肛门生殖器疣通常无症状；然而，根据大小和解剖位置，它们可能疼痛或瘙痒。它们通常是生殖器黏膜上的扁平、丘疹状或有蒂生长物。肛门生殖器疣常见于某些解剖部位，包括阴道口周围、未环切阴茎的包皮下以及环切阴茎的阴茎干上。疣也可发生在肛门生殖器上皮的多个部位或肛门生殖道内(如宫颈、阴道、尿道、会阴、肛周皮肤、肛门或阴囊)。肛内疣主要见于有接受性肛交史的人员；然而，它们也可发生在无肛交接触史的男性和女性中。

预防

在包括美国在内的多个国家，随着HPV疫苗的使用，青少年、年轻女性和异性恋男性中的肛门生殖器疣有所减少(*1203*, *1207 - 1216*)。

诊断考虑

肛门生殖器疣的诊断通常通过肉眼检查作出，但可通过活检确认，若病变不典型(如色素沉着、硬化、附着于底层组织、出血或溃疡性病变)则提示需行活检。在以下情况下也可能需要活检，特别是患者存在免疫抑制(包括HIV感染者)：诊断不明确、病变对标准治疗无反应，或疾病在治疗期间恶化。不推荐进行HPV检测用于肛门生殖器疣的诊断，因为检测结果不具有确诊性，也不能指导生殖器疣的管理。某些肛门生殖器病变可能类似于肛门生殖器疣(尖锐湿疣)，但对肛门生殖器疣的治疗无反应。扁平湿疣是二期梅毒的表现，可通过血清学检测或从病变浆液性渗出物中直接检测来诊断(见梅毒，诊断考虑)。

治疗

治疗的目的是去除疣体并改善症状(如有)。疣体的外观也可导致相当大的心理社会困扰，去除疣体可缓解

cosmetic concerns. For most patients, treatment results in resolution of the warts. If left untreated, anogenital warts can resolve spontaneously, remain unchanged, or increase in size or number. Because warts might spontaneously resolve in <1 year, an acceptable alternative for certain persons is to forego treatment and wait for spontaneous resolution. Available therapies for anogenital warts might reduce, but probably do not eradicate, HPV infectivity. Whether reduction in HPV viral DNA resulting from treatment reduces future transmission remains unknown.

Treatment of anogenital warts should be guided by wart size, number, and anatomic site; patient preference; cost of treatment; convenience; adverse effects; and provider experience. No definitive evidence indicates that any one recommended treatment is superior to another, and no single treatment is ideal for all patients or all warts. Shared clinical decision-making between a patient and a provider regarding treatment algorithms has been associated with improved clinical outcomes and should be encouraged. Because all available treatments have shortcomings, clinicians sometimes use combination therapy (e.g., provider-administered cryotherapy with patient-applied topical therapy between visits to the provider). However, limited data exist regarding the efficacy or risk for complications associated with combination therapy. Treatment regimens are classified as either patient-applied or provider-administered modalities. Patient-applied modalities are preferred by certain persons because they can be administered in the privacy of their home. To ensure that patient-applied modalities are effective, instructions should be provided to patients while in the clinic, and all anogenital warts should be accessible and identified during the clinic visit. Follow-up visits after weeks of therapy enable providers to answer any questions about use of the medication, address any side effects experienced, and facilitate assessment of the response to treatment.

Recommended Regimens for External Anogenital Warts (i.e., Penis, Groin, Scrotum, Vulva, Perineum, External Anus, or Perianus)*

Patient-applied: Imiquimod 3.75% or 5% cream†
or
Podofilox 0.5% solution or gel
or
Sinecatechins 15% ointment†

Provider-administered: Cryotherapy with liquid nitrogen or cryoprobe
or
Surgical removal by tangential scissor excision, tangential shave excision, curettage, laser, or electrosurgery
or
Trichloroacetic acid (TCA) or bichloroacetic acid (BCA) 80%–90% solution

* Persons with external anal or perianal warts might also have intra-anal warts. Thus, persons with external anal warts might benefit from an inspection of the anal canal by digital examination, standard anoscopy, or high-resolution anoscopy.
† Might weaken condoms and vaginal diaphragms.

Imiquimod is a patient-applied, topically active immune enhancer that stimulates production of interferon and other cytokines. Imiquimod 5% cream should be applied once at bedtime, 3 times/week for <16 weeks (*1217*). Similarly, imiquimod 3.75% cream should be applied once at bedtime every night for <8 weeks (*1218*). With either formulation, the treatment area should be washed with soap and water 6–10 hours after the application. Local inflammatory reactions, including redness, irritation, induration, ulceration or erosion, and vesicles might occur with using imiquimod, and hypopigmentation has also been described (*1219*). Limited case reports demonstrate an association between treatment with imiquimod cream and worsened inflammatory or autoimmune skin diseases (e.g., psoriasis, vitiligo, or lichenoid dermatoses) (*1220–1222*). Data from studies of human participants are limited regarding use of imiquimod during pregnancy; however, animal data indicate that this therapy poses low risk (*431*).

Podofilox (podophyllotoxin) is a patient-applied antimitotic drug that causes wart necrosis. Podofilox solution (using a cotton swab) or podofilox gel (using a finger) should be applied to anogenital warts 2 times/day for 3 days, followed by 4 days of no therapy. This cycle can be repeated, as necessary, for up to four cycles. The total wart area treated should not exceed 10 cm^2, and the total volume of podofilox should be limited to 0.5 mL/day. If possible, the health care provider should apply the initial treatment to demonstrate proper application technique and identify which warts should be treated. Mild to moderate pain or local irritation might develop after treatment. After each treatment, the gel or solution should be allowed to dry. Patients should wash their hands before and after each application. Podofilox is contraindicated during pregnancy (*431*).

Sinecatechins is a patient-applied, green-tea extract with an active product (catechins). Sinecatechins 15% ointment should be applied 3 times/day (0.5-cm strand of ointment to each wart) by using a finger to ensure coverage with a thin layer of ointment until complete clearance of warts is achieved. This product should not be continued for >16 weeks (*1223–1225*). The medication should not be washed off after use. Genital, anal, and oral sexual contact should be avoided while the ointment is on the skin. The most common side effects of sinecatechins are erythema, pruritus or burning, pain, ulceration, edema, induration, and vesicular rash. This medication is not recommended for persons with HIV infection, other immunocompromised conditions, or genital herpes because the safety and efficacy of therapy has not been evaluated. The safety of sinecatechins during pregnancy is unknown.

Cryotherapy is a provider-administered therapy that destroys warts by thermal-induced cytolysis. Health care providers should be trained on the correct use of this therapy because overtreatment or undertreatment can result in complications or low efficacy. Pain during and after application of the liquid

美容方面的顾虑。对于大多数患者，治疗可使疣消退。若不治疗，肛门生殖器疣可自行消退、保持不变，或体积增大或数量增多。由于疣可能在<1年内自行消退,对某些人而言可接受的替代方案是放弃治疗并等待自行消退。现有的肛门生殖器疣治疗方法可能降低但可能不会根除HPV感染性。治疗导致的HPV病毒DNA减少是否降低未来传播风险仍未知。

肛门生殖器疣的治疗应依据疣的大小、数量和解剖部位；患者偏好；治疗费用；便利性；不良反应；以及提供者的经验来指导。没有确切证据表明任何一种推荐治疗优于另一种，也没有单一治疗对所有患者或所有疣都是理想的。患者与提供者之间就治疗方案进行共享临床决策与改善临床结局相关，应予以鼓励。由于所有可用治疗均有不足之处，临床医生有时使用联合治疗(例如，提供者实施的冷冻疗法与患者在就诊间期自行应用的局部治疗相结合)。然而，关于联合治疗的疗效或并发症风险的数据有限。治疗方案分为患者自行应用或提供者实施的方式。某些人偏好患者自行应用的方式，因为他们可以在家中私密地使用。为确保患者自行应用方式有效，应在诊所内向患者提供指导，且所有肛门生殖器疣应在就诊期间可及并被识别。治疗数周后的随访就诊使提供者能够回答关于药物使用的任何问题、处理所出现的任何副作用，并促进对治疗反应的评估。

外生殖器疣(即阴茎、腹股沟、阴囊、外阴、会阴、肛门外或肛周)的推荐方案*

患者自行使用：Imiquimod 3.75% 或 5% 乳膏 †
或
Podofilox 0.5% 溶液或凝胶
或
Sinecatechins 15% 软膏 †

由医务人员实施：冷冻疗法使用液氮或冷冻探针
或
手术切除，采用切向剪刀切除、切向削切术、刮除术、激光或电外科手术
或
三氯乙酸(TCA)或二氯乙酸(BCA)80%-90%溶液

* 患有肛门外或肛周疣的人也可能有肛内疣。因此，患有肛门外疣的个体可能受益于通过指检、标准肛门镜检查或高分辨率肛门镜检查对肛管进行检查。
† 可能削弱避孕套和阴道隔膜的效果。

Imiquimod是一种患者自行应用的局部活性免疫增强剂，可刺激干扰素和其他细胞因子的产生。Imiquimod 5%乳膏应在睡前外用，每周3次，持续<16周(1217)。同样,imiquimod 3.75%乳膏应在睡前每晚外用一次,持续<8周(1218)。无论使用哪种制剂,治疗区域应在用药后6-10小时用肥皂和水清洗。使用imiquimod可能出现局部炎症反应,包括发红、刺激、硬化、溃疡或糜烂以及水疱,也有色素减退的报道(1219)。有限的病例报告显示,使用imiquimod乳膏治疗与炎症性或自身免疫性皮肤病(如银屑病、白癜风或苔藓样皮肤病)恶化之间存在关联(*1220 - 1222*)。关于妊娠期间使用imiquimod的人体研究数据有限；然而，动物数据表明该治疗风险较低(431)。

Podofilox(podophyllotoxin)是一种患者自行使用的抗有丝分裂药物，可引起疣体坏死。Podofilox溶液(使用棉签)或podofilox凝胶(使用手指)应施用于肛门生殖器疣，2次/天，连续3天，随后4天不治疗。此周期可根据需要重复，最多四个周期。治疗的总疣体面积不应超过10 cm^2,podofilox的总量应限制在

0.5 mL/天。如有可能，医疗保健提供者应进行初始治疗以示范正确的施用技术并确定应治疗哪些疣体。治疗后可能出现轻度至中度疼痛或局部刺激。每次治疗后，应让凝胶或溶液干燥。患者应在每次施用前后洗手。Podofilox在妊娠期禁用(431)。

Sinecatechins是一种患者自行应用的绿茶提取物，含活性成分(儿茶素)。Sinecatechins 15%软膏应每日3次外用(每个疣用0.5-cm长的软膏)，用手指确保以薄层软膏覆盖，直至疣完全清除。该产品不应持续使用>16周(*1223 - 1225*)。用药后不应洗去药物。软膏在皮肤上时应避免生殖器、肛门和口腔性接触。Sinecatechins最常见的副作用是红斑、瘙痒或灼烧感、疼痛、溃疡、水肿、硬化及水疱性皮疹。该药物不推荐用于HIV感染者、其他免疫抑制状况或生殖器疱疹患者，因为治疗的安全性和有效性尚未评估。Sinecatechins在妊娠期间的安全性未知。

冷冻疗法是由提供者实施的疗法，通过热诱导的细胞溶解破坏疣体。医疗保健提供者应接受正确使用该疗法的培训，因为过度治疗或治疗不足可导致并发症或疗效低下。施用液体期间和之后的疼痛

nitrogen, followed by necrosis and sometimes blistering, is common. Local anesthesia (topical or injected) might facilitate therapy if warts are present in many areas or if the area of warts is large. Surgical therapy has the advantage of eliminating the majority of warts at a single visit, although recurrence can occur. Surgical removal requires substantial clinical training, additional equipment, and sometimes a longer office visit. After local anesthesia is applied, anogenital warts can be physically destroyed by electrocautery, in which case no additional hemostasis is required. Care should be taken to control the depth of electrocautery to prevent scarring. Alternatively, the warts can be removed either by tangential excision with a pair of fine scissors or a scalpel, by CO_2 laser, or by curettage. Because most warts are exophytic, this procedure can be accomplished with a resulting wound that only extends into the upper dermis. Hemostasis can be achieved with an electrocautery unit or, in cases of minor bleeding, a chemical styptic (e.g., an aluminum chloride solution). Suturing is neither required nor indicated in the majority of cases. For patients with large or extensive warts, surgical therapy, including CO_2 laser, might be most beneficial; such therapy might also be useful for intraurethral warts, particularly for those persons whose warts have not responded to other treatments. Treatment of anogenital and oral warts should be performed in a ventilated room by using standard precautions (https://www.cdc.gov/infectioncontrol/guidelines/isolation/index.html/Isolation2007.pdf#page) and local exhaust ventilation (e.g., a smoke evacuator) (*1226*).

Trichloroacetic acid (TCA) and bichloroacetic acid (BCA) are provider-administered caustic agents that destroy warts by chemical coagulation of proteins. Although these preparations are widely used, they have not been investigated thoroughly. TCA solution has a low viscosity, comparable with that of water, and can spread rapidly and damage adjacent tissues if applied excessively. A small amount should be applied only to the warts and allowed to dry (i.e., develop white frost on tissue) before the patient sits or stands. If pain is intense or an excess amount of acid is applied, the area can be covered with sodium bicarbonate (i.e., baking soda), washed with liquid soap preparations, or be powdered with talc to neutralize the acid or remove unreacted acid. TCA or BCA treatment can be repeated weekly if necessary.

Alternative Regimens for External Genital Warts

Fewer data are available regarding the efficacy of alternative regimens for treating anogenital warts, which include podophyllin resin, intralesional interferon, photodynamic therapy, and topical cidofovir. Shared clinical decision-making between the patient and provider regarding benefits and risks of these regimens should be provided. In addition, alternative regimens might be associated with more side effects. Podophyllin resin is no longer a recommended regimen because of the number of safer regimens available, and severe systemic toxicity has been reported when podophyllin resin was applied to large areas of friable tissue and was not washed off within 4 hours (*1227–1229*). Podophyllin resin 10%–25% in a compound tincture of benzoin might be considered for provider-administered treatment under conditions of strict adherence to recommendations. Podophyllin should be applied to each wart and then allowed to air dry before the treated area comes into contact with clothing. Overapplication or failure to air dry can result in local irritation caused by spread of the compound to adjacent areas and possible systemic toxicity. The treatment can be repeated weekly, if necessary. To avoid the possibility of complications associated with systemic absorption and toxicity, application should be limited to <0.5 mL of podophyllin or an area of <10 cm^2 of warts per session; the area to which treatment is administered should not contain any open lesions, wounds, or friable tissue; and the preparation should be thoroughly washed off 1–4 hours after application. Podophyllin resin preparations differ in the concentration of active components and contaminants. Shelf life and stability of podophyllin preparations are unknown. The safety of podophyllin during pregnancy has not been established.

Recommended Regimens for Urethral Meatus Warts

Cryotherapy with liquid nitrogen
or
Surgical removal

Recommended Regimens for Vaginal Warts

Cryotherapy with liquid nitrogen

The use of a cryoprobe in the vagina is not recommended because of the risk for vaginal perforation and fistula formation.

or
Surgical removal
or
Trichloracetic acid (TCA) or bichloroacetic acid (BCA) 80%–90% solution

Recommended Regimens for Cervical Warts

Cryotherapy with liquid nitrogen
or
Surgical removal
or
Trichloracetic acid (TCA) or bichloroacetic acid (BCA) 80%–90% solution

Management of cervical warts should include consultation with a specialist. For women who have exophytic cervical warts, a biopsy evaluation to exclude HSIL should be performed before treatment is initiated.

氮，随后出现坏死，有时起疱，是常见的。如果疣存在于许多区域或疣的面积较大，局部麻醉(表面或注射)可能有助于治疗。手术治疗的优势在于一次就诊即可消除大多数疣，尽管可能复发。手术切除需要大量的临床培训、额外设备，有时还需要较长的诊室就诊时间。在应用局部麻醉后，肛门生殖器疣可以通过电灼物理破坏，在这种情况下不需要额外的止血。应注意控制电灼的深度以防止瘢痕形成。或者，疣可以通过用精细剪刀或手术刀切向切除、通过CO2激光或通过刮除术去除。由于大多数疣是外生性的，此手术可以完成， resulting wound仅延伸至真皮上层。止血可以通过电灼单元实现，或者在轻微出血的情况下，使用化学止血剂(例如，氯化铝溶液)。在大多数情况下，缝合既不需要也不指示。对于有大或广泛疣的患者，手术治疗，包括CO2激光，可能最为有益；这种治疗也可能对尿道内疣有用，特别是对于那些疣对其他治疗没有反应的人。肛门生殖器和口腔疣的治疗应在通风房间内进行，使用标准预防措施(https://www.cdc.gov/infectioncontrol/ guidelines/isolation/index.html/Isolation2007.pdf#page)和局部排气通风(例如，烟雾抽吸器)(1226)。

三氯乙酸(TCA)和二氯乙酸(BCA)是由提供者给药的腐蚀性剂，通过蛋白质的化学凝固破坏疣。尽管这些制剂被广泛使用，但尚未进行彻底研究。TCA溶液具有低粘度，与水相当，如果应用过量，可以迅速扩散并损伤邻近组织。应仅将少量应用于疣，并允许干燥(即在组织上形成白霜) before the patient sits or stands.如果疼痛剧烈或应用了过量的酸，可以用碳酸氢钠(即小苏打)覆盖该区域，用液体肥皂制剂清洗，或用滑石粉扑撒以中和酸或去除未反应的酸。如有必要，TCA或BCA治疗可以每周重复。

外生殖器疣的替代方案

关于肛门生殖器疣替代方案疗效的数据较少，这些方案包括podophyllin树脂、病灶内干扰素、光动力疗法和局部cidofovir。患者与提供者之间就获益进行共享临床决策

尿道口疣的推荐治疗方案

冷冻疗法使用液氮
或
手术切除

阴道疣的推荐治疗方案

液氮冷冻疗法

不建议在阴道内使用冷冻探针，因为有阴道穿孔和瘘管形成的风险。

或
手术切除
或
三氯乙酸(TCA)或二氯乙酸(BCA)80%-90%溶液

宫颈疣的推荐治疗方案

液氮冷冻疗法
或
手术切除
或
三氯乙酸(TCA)或二氯乙酸(BCA)80%-90%溶液

宫颈疣的管理应包括咨询专科医生。对于有外生性宫颈疣的女性，在开始治疗前应进行活检评估以排除HSIL。

Podophyllin树脂10%-25%在复方安息香酊中可考虑用于提供者给药治疗，在严格遵循推荐的情况下。Podophyllin应应用于每个疣，然后允许风干 before the treated area comes into contact with clothing.过度应用或未能风干可能导致局部刺激，由化合物扩散到邻近区域引起，并可能全身毒性。如有必要，治疗可以每周重复。为避免与全身吸收和毒性相关的并发症可能性，应用应限制为每次会话<0.5 mL的Podophyllin或<10 cm^2的疣面积；治疗区域不应包含任何开放病变、伤口或脆弱组织；并且制剂应在应用后1-4小时彻底洗掉。Podophyllin树脂制剂在活性成分和污染物的浓度上有所不同。Podophyllin制剂的保质期和稳定性未知。Podophyllin在妊娠期间的安全性尚未确定。

Recommended Regimens for Intra-Anal Warts

Cryotherapy with liquid nitrogen
or
Surgical removal
or
Trichloracetic acid (TCA) or bichloroacetic acid (BCA) 80%–90% solution

Management of intra-anal warts should include consultation with a colorectal specialist.

Follow-Up

Anogenital warts typically respond within 3 months of therapy. Factors that might affect response to therapy include immunosuppression and treatment compliance. Warts located on moist surfaces or in intertriginous areas respond best to topical treatment. A new treatment modality should be selected when no substantial improvement is observed after a complete course of treatment or in the event of severe side effects; treatment response and therapy-associated side effects should be evaluated throughout the therapy course. Complications occur rarely when treatment is administered correctly. Persistent hypopigmentation or hyperpigmentation can occur with ablative modalities (e.g., cryotherapy and electrocautery) and have been described with immune modulating therapies (e.g., imiquimod cream). Depressed or hypertrophic scars are uncommon but can occur, especially if patients have insufficient time to heal between treatments. Rarely, treatment can result in chronic pain syndromes (e.g., vulvodynia and hyperesthesia of the treatment site) or, in the case of anal warts, painful defecation or fistulas.

Counseling

When counseling persons with anogenital warts, the provider should discuss the following:

- If left untreated, genital warts might resolve, stay the same, or increase in size or number. The types of HPV that cause genital warts are different from the types that can cause cancer.
- Women with genital warts do not need Pap tests more often than other women.
- Time of HPV acquisition cannot be definitively determined. Genital warts can develop months or years after acquiring HPV.
- HPV types that cause genital warts can be passed on to another person, even without visible signs of warts. Sex partners tend to share HPV, even though signs of HPV (e.g., warts) might occur in only one or neither partner.
- Although genital warts are common and benign, certain persons might experience considerable psychosocial impact after receiving this diagnosis.
- Although genital warts can be treated, such treatment does not cure the virus itself. For this reason, genital warts often recur after treatment, especially during the first 3 months.
- Because genital warts can be sexually transmitted, persons with genital warts benefit from testing for other STIs. HPV might remain present and can still be transmitted to partners even after the warts are gone.
- Condoms might lower the chances of transmitting genital warts if used consistently and correctly; however, HPV can infect areas that are not covered by a condom and might not fully protect against HPV.
- A vaccine is available for males and females to prevent genital warts (Gardasil 9) but it will not treat existing HPV or genital warts. This vaccine can prevent the majority of cases of genital warts among persons who have not yet been exposed to wart-causing types of HPV.

Management of Sex Partners

Persons should inform current partners about having genital warts because the types of HPV that cause warts can be passed on to partners. Partners should be counseled that they might already have HPV despite no visible signs of warts; therefore, HPV testing of sex partners of persons with genital warts is not recommended. Partners might benefit from a physical examination to detect genital warts and tests for other STIs. No recommendations can be made regarding informing future sex partners about a diagnosis of genital warts because the duration of viral persistence after warts have resolved is unknown.

Special Considerations

Pregnancy

Podofilox, podophyllin, and sinecatechins should not be used during pregnancy. Imiquimod appears to pose low risk but should be avoided until more data are available. Anogenital warts can proliferate and become friable during pregnancy. Although removal of warts during pregnancy can be considered, resolution might be incomplete or poor until pregnancy is complete. Rarely, HPV types 6 and 11 can cause respiratory papillomatosis among infants and children, although the route of transmission (i.e., transplacental, perinatal, or postnatal) is not completely understood. Whether cesarean delivery prevents respiratory papillomatosis among infants and children also is unclear (*1230*); therefore, cesarean delivery should not be performed solely to prevent transmission of HPV infection to the newborn. Cesarean delivery is indicated for women with anogenital warts if the pelvic outlet is obstructed or if vaginal delivery would result in excessive bleeding. Pregnant women with anogenital warts should be counseled about the low risk

肛门内疣的推荐治疗方案

液氮冷冻疗法
或
手术切除
或
三氯乙酸(TCA)或二氯乙酸(BCA)80%-90%溶液

肛内疣的管理应包括咨询结直肠专科医生。

随访

肛门生殖器疣通常在治疗后3个月内出现应答。可能影响治疗应答的因素包括免疫抑制和治疗依从性。位于潮湿表面或间擦部位的疣对局部治疗的应答最佳。若完成一个完整疗程后未见实质性改善，或出现严重副作用，应选择新的治疗方式；在整个治疗过程中应评估治疗应答和治疗相关副作用。正确实施治疗时并发症罕见。持久性色素减退或色素沉着可发生于消融性治疗方式(如冷冻疗法和电灼术)，免疫调节疗法(如imiquimod乳膏)也有报道。凹陷性或肥厚性瘢痕不常见但可能发生，尤其是患者两次治疗之间愈合时间不足时。罕见情况下，治疗可导致慢性疼痛综合征(如外阴痛和治疗部位感觉过敏)，或在肛门疣的情况下导致排便疼痛或瘘管。

咨询

在为肛门生殖器疣患者提供咨询时，医务人员应讨论以下内容：

- 如果不治疗，生殖器疣可能会消退、保持不变，或大小或数量增加。引起生殖器疣的HPV类型与可引起癌症的HPV类型不同。
- 患有生殖器疣的女性不需要更频繁地进行巴氏涂片检查比其他女性更常见。
- HPV 获得的时间无法确定已确定。生殖器疣可在感染HPV后数月或数年出现。
- 引起生殖器疣的HPV类型可以传播给另一个人，即使没有可见的疣体征。性伴侣往往共享HPV，尽管HPV的体征(如疣)可能只出现在一个伴侣或两个伴侣都不出现。
- 尽管生殖器疣常见且为良性，但某些患者在收到该诊断后可能会经历相当大的心理社会影响。
- 尽管生殖器疣可以治疗，但此类治疗确实不能治愈病毒本身。因此，生殖器疣在治疗后常常复发，尤其是在前3个月内。• 由于生殖器疣可以性传播，患者

  患有生殖器疣的人受益于其他STI的检测。即使疣消失后，HPV可能仍然存在并可传染给伴侣。

- 安全套可能降低传播生殖器

  如果持续正确使用避孕套可预防疣；然而，HPV可感染避孕套未覆盖的区域，可能无法完全预防HPV。

- 有一种疫苗可供男性和女性使用，以预防生殖器疣(Gardasil 9)，但它不会治疗现有的HPV或生殖器疣。该疫苗可在尚未暴露于致疣型HPV的人群中预防大多数生殖器疣病例。

性伴侣的管理

应告知当前性伴侣其患有生殖器疣，因为引起疣的HPV类型可传播给伴侣。应告知伴侣，尽管没有可见的疣体征，他们可能已经感染HPV；因此，不建议对生殖器疣患者的性伴侣进行HPV检测。伴侣可能受益于体格检查以发现生殖器疣及其他STI检测。关于是否告知未来性伴侣生殖器疣诊断，无法给出建议，因为疣消退后病毒持续存在的时间尚不清楚。

特殊考虑

妊娠

妊娠期间不应使用podofilox、podophyllin和sinecatechins。Imiquimod似乎风险较低，但在获得更多数据之前应避免使用。肛门生殖器疣在妊娠期间可增殖并变得脆弱。虽然可考虑在妊娠期间去除疣，但在妊娠结束前消退可能不完全或效果不佳。罕见情况下，HPV 6型和11型可在婴幼儿和儿童中引起呼吸道乳头瘤病，尽管传播途径(即经胎盘、围产期或产后)尚未完全明确。剖宫产是否能预防婴幼儿和儿童呼吸道乳头瘤病亦不明确(1230)；因此，不应仅为预防HPV感染传播给新生儿而实施剖宫产。对于肛门生殖器疣女性，若骨盆出口梗阻或阴道分娩会导致过度出血，则指示剖宫产。应告知患肛门生殖器疣的孕妇低风险

for warts on the larynx of their infants or children (recurrent respiratory papillomatosis).

HIV and Other Causes of Immunosuppression

Persons with HIV infection or who are otherwise immunosuppressed are more likely to develop anogenital warts than those who do not have HIV (*1231*). Moreover, such persons can have larger or more numerous lesions, might not respond to therapy as well as those who are immunocompetent, and might have more frequent recurrences after treatment (*1231*,*1232*–*1234*). Despite these factors, data do not support altered approaches to treatment for persons with HIV infection. Squamous cell carcinomas arising in or resembling anogenital warts might occur more frequently among immunosuppressed persons, therefore requiring biopsy for confirmation of diagnosis for suspicious cases (*1235*–*1237*).

High-Grade Squamous Intraepithelial Lesions

Biopsy of an atypical wart might reveal HSIL or cancer of the anogenital tract. In this instance, referral to a specialist for treatment is recommended.

Cancers and Precancers Associated with Human Papillomavirus

Persistent infection with high-risk (oncogenic) types of HPV has a causal role in approximately all cervical cancers and in certain vulvar, vaginal, penile, anal, and oropharyngeal cancers (*1238*). However, cervical cancer is the only HPV-associated cancer for which routine screening is recommended.

Cervical Cancer

Screening Recommendations

Recommendations for cervical cancer screening in the United States are based on systematic evidence reviews by major medical and advocacy organizations, including USPSTF (*174*), ACS (*177*), and ACOG (*175*). Over time, general alignment across these organizations has emerged as to when to start and end cervical cancer screening as well as the periodicity of screening. Although no single guideline universally guides screening practices in the United States, the Patient Protection and Affordable Care Act required Medicaid and new private health insurance plans to provide coverage for preventive services graded A or B by USPSTF, which includes cervical cancer screening. In addition, the National Center for Quality Assurance provides a set of measures (the Healthcare Effectiveness Data and Information Set [HEDIS]) for up-to-date cervical cancer screening that aligns with USPSTF recommendations (https://www.ncqa.org/hedis/measures/cervical-cancer-screening). The Center for Medicaid and Medicare Services uses the same measure as HEDIS to measure cervical cancer screening performance.

USPSTF screening recommendations apply to persons with a cervix at average risk, defined as those with no previous cervical cancer or high-grade precancer, not currently under close follow-up for a recent abnormal result, not immunocompromised (e.g., persons with HIV), and who had no exposure to diethylstilbestrol in utero. Among these persons, screening should be performed starting at age 21 years and continue through age 65 years. Testing can be performed using either conventional or liquid-based cytologic tests (i.e., Pap tests). For persons aged ≥30 years, screening can include FDA-cleared tests for high-risk, oncogenic types of HPV. For cytopathologic testing, clinics should use CLIA-certified laboratories using acceptable terminology (Bethesda 2001 or LAST terminology) (*1239*).

Annual cervical cancer screening is not recommended for persons at average risk. Instead, cytology testing is recommended every 3 years for persons aged 21–29 years. For persons aged 30–65 years, a cytology test every 3 years, an HPV test alone every 5 years, or a cytology test plus an HPV test (cotest) every 5 years is recommended. Cotesting can be done by either collecting one sample for the cytology test and another for the HPV test or by using the remaining liquid cytology material for the HPV test. Cervical screening programs should screen those who have received HPV vaccination in the same manner as those that are unvaccinated. Screening is not recommended before age 21 years among those at average risk. For those aged 30–65 years, cytology alone or primary HPV testing is preferred by USPSTF; however, cotesting can be used as an alternative approach. ACOG (*1240*), ACS (*177*), and USPSTF (*174*) each have screening recommendations (*1241*) (Table 1).

Clinics should weigh the benefits of each screening strategy as well as their resources, such as time and cost, in deciding on which of the three possible screening strategies to implement. Decision analytic models (*1242*) estimating the benefits, harms, and costs (*1243*) of several different strategies might be useful in making this determination (*174*,*1244*,*1245*). Adopting recommended screening and follow-up procedures, including screening methods, results provision, and follow-up, can lead to success in implementing cervical cancer screening in clinics (*1246*).

Patients should be provided a copy of their test results; those with normal results should be provided information on follow-up visits and the importance of continued cervical cancer screening, if applicable. Those with abnormal screening tests should be managed per published guidelines. National consensus guidelines are available for the management of abnormal cervical cancer screening tests (*1247*). HPV testing or cotesting is preferred to cytology alone for surveillance after an abnormal screening test result. These guidelines base

其婴儿或儿童喉部的疣(复发性呼吸道乳头状瘤病)。

HIV及其他免疫抑制原因

HIV感染者或其他免疫抑制者比非HIV感染者更易发生肛门生殖器疣(1231)。此外，此类患者的病灶可能更大或更多，治疗应答可能不如免疫功能正常者，且治疗后复发可能更频繁(*1231*, *1232* - *1234*)。尽管存在这些因素，数据不支持对HIV感染者改变治疗方法。发生于肛门生殖器疣内或类似肛门生殖器疣的鳞状细胞癌在免疫抑制者中可能更常见，因此可疑病例需要活检以确认诊断(*1235* - *1237*)。

高度鳞状上皮内病变

非典型疣的活检可能揭示HSIL或肛门生殖道癌症。在这种情况下，建议转诊至专科医生进行治疗。

与人乳头瘤病毒相关的癌症及癌前病变

高危(致癌)型HPV的持续感染在几乎所有宫颈癌以及某些外阴、阴道、阴茎、肛门和口咽癌中具有因果作用(1238)。然而，宫颈癌是唯一推荐常规筛查的HPV相关癌症。

宫颈癌

筛查建议

美国宫颈癌筛查建议基于主要医学和倡导组织的系统证据审查，包括USPSTF(174)、ACS(177)和ACOG(175)。随着时间的推移，这些组织在宫颈癌筛查的开始和结束时间以及筛查周期方面已形成总体一致。尽管美国没有单一指南普遍指导筛查实践，但《患者保护与平价医疗法案》要求Medicaid和新的私人健康保险计划覆盖USPSTF评为A级或B级的预防性服务，其中包括宫颈癌筛查。此外，国家质量保证委员会提供了一套与USPSTF建议一致的及时宫颈癌筛查措施(医疗效果数据与信息集[HEDIS])(https://www.ncqa.org/hedis/measures/cervical-cancer-screening)。Medicaid和Medicare Services使用与HEDIS相同的指标来衡量宫颈癌筛查绩效。

USPSTF筛查建议适用于平均风险的宫颈人群，定义为既往无宫颈癌或高级别癌前病变、目前未因近期异常结果接受密切随访、无免疫抑制(如HIV感染者)、且宫内未暴露于己烯雌酚者。在这些人群中，筛查应自21岁开始并持续至65岁。检测可采用传统或液基细胞学检查(即Pap试验)。对于年龄≥30岁者，筛查可包括FDA批准的高危致癌型HPV检测。对于细胞病理学检测，诊所应使用CLIA认证的实验室，采用可接受的术语(Bethesda 2001或LAST术语)(1239)。

不建议对平均风险人群进行年度宫颈癌筛查。相反，建议21-29岁人群每3年进行一次细胞学检测。对于30-65岁人群，建议每3年进行一次细胞学检测、每5年单独进行一次HPV检测，或每5年进行一次细胞学检测加HPV检测(联合检测)。联合检测可通过采集一份样本用于细胞学检测和另一份样本用于HPV检测，或使用剩余的液基细胞学材料进行HPV检测来完成。宫颈筛查项目应以与未接种者相同的方式对已接种HPV疫苗者进行筛查。不建议对平均风险人群在21岁前进行筛查。对于30-65岁人群，USPSTF首选单独细胞学检测或初级HPV检测；然而，联合检测可作为替代方法。ACOG(1240)、ACS(177)和USPSTF(174)各有筛查建议(1241)(表1)。

诊所应权衡每种筛查策略的益处及其资源(如时间和成本)，以决定实施三种可能筛查策略中的哪一种。评估几种不同策略的益处、危害和成本的决策分析模型(1242)(1243)可能有助于做出这一决定(*174*,*1244*,*1245*)。采用推荐的筛查和随访程序，包括筛查方法、结果提供和随访，可使诊所成功实施宫颈癌筛查(1246)。

应向患者提供其检测结果的副本；结果正常者应获得关于随访就诊以及继续宫颈癌筛查重要性(如适用)的信息。筛查检测异常者应按已发表的指南进行管理。国家共识指南可用于宫颈癌筛查检测异常的管理(1247)。在筛查检测结果异常后的监测中，HPV检测或联合检测优于单独细胞学检测。这些指南基于

TABLE 1. Cervical cancer screening and surveillance recommendations

Population	Screening specifics	Guideline group, yr of recommendation: USPSTF, 2018	ACOG, 2016	ACS, 2020
Persons at average risk	Age to start screening	21 yrs	21 yrs	25 yrs
	Age to end screening	65 yrs	65 yrs	65 yrs
		If three consecutive negative cytology tests or two negative cytology plus HPV tests or two negative HPV tests (ACS) with the most recent within the previous 5 yrs and no abnormal tests within the previous 10 yrs (ACS) and no CIN 2 or CIN 3 within the previous 25 yrs		
	Screening test options and intervals	Aged 21–65 yrs: Cytology alone every 3 yrs ***or*** Aged 21–29 yrs: Cytology alone every 3 yrs Aged 30–65 yrs: Cytology plus HPV testing every 5 yrs ***or*** Aged 21–29 yrs: Cytology alone every 3 yrs Aged 30–65: HPV testing alone every 5 yrs*		HPV testing alone every 5 yrs ***or*** Cytology plus HPV testing every 5 yrs ***or*** Cytology alone every 3 yrs
	Preferred strategies	Cytology alone every 3 yrs and HPV testing alone every 5 yrs (equally preferred)	Cytology plus HPV testing every 5 yrs	HPV testing alone every 5 yrs
	Previous hysterectomy with removal of cervix	Screening not recommended after hysterectomy for benign indications Surveillance testing recommended for previous diagnosis of high-grade precancer, AIS, or cancer		
Persons with an immunocompromising medical condition† (e.g., HIV infection or solid organ transplantation)	Age to start screening	No specific recommendation	Within 1 yr of onset of sexual activity or, if already sexually active, within the first year after HIV or other immunocompromising medical condition diagnosis but no later than age 21 yrs	
	Age to end screening		None; lifelong screening recommended	
	Screening test options and intervals		Aged 21–65 yrs: Cytology every year; after three consecutive annual normal cytology test results, screening can be every 3 yrs ***or*** Aged 21–29 yrs: Cytology every year Aged 30–65 yrs: Cytology plus HPV testing every 3 yrs	
	Previous hysterectomy with removal of cervix		Not specified	
Persons with in utero exposure to diethylstilbestrol§	Age to start screening	No specific recommendation	Not specified	No specific recommendation
	Age to end screening		Not specified	
	Screening test options and intervals		Cytology alone annually	
	Previous hysterectomy with removal of cervix		Not specified	
Persons who have received HPV vaccination	No changes to the screening approaches above			

Population	Screening specifics	ASCCP, 2019, and ACOG, 2020
Persons with a diagnosis of CIN 2 or CIN 3 (histologic HSIL¶) within the previous 25 yrs	Age to start screening	Not applicable
	Age to end screening	May end at age 65 yrs if CIN diagnosis ≥25 yrs ago and criteria for ending screening met, otherwise continue screening past age 65 yrs Continued screening for ≥25 yrs after diagnosis is acceptable if patient is in good health
	Screening test options and intervals	**Initial surveillance:** HPV testing alone or cytology plus HPV testing at 6, 18, and 30 mos ***or*** Cytology at 6, 12, 18, 24, and 30 mos **Long-term surveillance:** HPV testing alone or cytology plus HPV testing every 3 yrs ***or*** Cytology alone annually Continue for ≥25 yrs from the initial CIN diagnosis, even if extends past age 65 yrs Routine screening can resume after the posttreatment surveillance period
	Previous hysterectomy with removal of cervix	HPV testing alone or cytology plus HPV testing every 3 yrs ***or*** Cytology alone annually Continue for ≥25 yrs from the initial CIN diagnosis, even if extends past age 65 yrs

Source: Perkins R, Guido R, Saraiya M, et al. Summary of current guidelines for cervical cancer screening and management of abnormal test results: 2016–2020. J Womens Health (Larchmt) 2021;30:5–13.
Abbreviations: ACS = American Cancer Society; ACOG = American College of Obstetricians and Gynecologists; AIS = adenocarcinoma in situ; ASCCP = American Society for Colposcopy and Cervical Pathology; CIN = cervical intraepithelial neoplasia; HPV = human papillomavirus; HSIL = high-grade squamous intraepithelial lesion; USPSTF = U.S. Preventive Services Task Force.
* Considered an alternative screening strategy by ACOG.
† Panel for Opportunistic Infections, ACOG, 2016.
§ ACOG, 2016.
¶ Either by cytology or by histology; includes a persistent cytologic diagnosis of atypical squamous cells, cannot rule out HSIL.

表1. 宫颈癌筛查与监测建议

人群	筛查具体事项	指南组，推荐年份：美国预防服务工作组，2018	美国妇产科医师学会，2016	美国癌症协会，2020
平均风险人群	开始筛查年龄 21 岁结束筛查年龄 65 岁		21岁 65岁	25岁 65岁
		如果连续三次细胞学检查阴性或两次细胞学加HPV检测阴性或两次HPV检测阴性(ACS)，且最近一次在过去5年内，且过去10年内无异常检测(ACS)，且过去25年内无CIN 2或CIN 3 年龄21-65岁：单独细胞学每3年一次		
	筛查试验选择及间隔	或 21-29岁：单独细胞学检查每3年一次 30-65岁：细胞学检查加HPV检测，每5年一次 或 21-29岁：单独细胞学检查每3年一次 30-65岁：单独HPV检测每5年一次* 单独细胞学检查每3年一次	或 细胞学加HPV检测每5年 或 单独细胞学每3年	或HPV检测每5年一次
	首选策略	细胞学检查加HPV检测每5年一次，或单独HPV检测每5年一次 或仅进行HPV检测，每5年一次 5年 (同等首选)		
	既往子宫切除术伴宫颈切除	子宫切除术后不建议筛查(良性指征) 建议对既往诊断为高级别癌前病变、AIS或癌症者进行监测检测		
患有免疫抑制性疾病†(如HIV感染或实体器官移植)	开始筛查的年龄	无特定 在HIV或其他免疫功能受损情况出现后的第一年内推荐	在开始性活动后1年内，或如果已经有过性活动， 疾病诊断但不迟于21岁无；建议终身筛查	
	结束筛查的年龄			
	筛查试验选择以及间隔		年龄21-65岁：细胞学每年一次；在连续三年年度细胞学检查结果正常后，可每3年筛查一次**或** 21-29岁：每年细胞学检查 30-65岁：细胞学检查加HPV检测，每3年一次未指定	
	既往子宫切除术伴宫颈切除			
宫内暴露于diethylstilbestrol	开始筛查的年龄	无特定	未指定	无具体建议
	结束筛查的年龄	建议		
	筛查试验选择以及间隔		每年单独进行细胞学检查	
	既往子宫切除术伴宫颈切除		未指定	
已接种HPV疫苗者	对上述筛查方法不做任何更改			

人群筛查具体事项		ASCCP，2019，以及ACOG，2020
诊断为CIN 2的患者或CIN 3(组织学HSIL ¶)在过去25年内	开始筛查的年龄	不适用
	结束筛查的年龄	如果CIN诊断≥25年前且符合终止筛查标准，可在65岁终止，否则继续筛查超过65岁 如果患者健康状况良好，诊断后继续筛查≥25年是可接受的
	筛查试验选择以及间隔	**初始监测：** 单独HPV检测或细胞学联合HPV检测，分别在6、18和30个月时进行**或** 在6、12、18、24和30个月时进行细胞学检查 **长期监测：** 单独HPV检测或细胞学检查加HPV检测每3年一次**或** 每年单独进行细胞学检查 从初始CIN诊断起继续≥25年，即使超过65岁治疗后监测期后可恢复常规筛查单独HPV检测或细胞学加HPV检测每3年一次
	既往子宫切除术伴宫颈切除	或 每年单独进行细胞学检查 从初始CIN诊断起继续≥25年，即使超过65岁

来源：Perkins R, Guido R, Saraiya M, et al. 当前宫颈癌筛查及异常检测结果管理指南摘要：2016–2020。
J Womens Health (Larchmt) 2021;30:5–13。
缩写：ACS = 美国癌症协会；ACOG = 美国妇产科医师学会；AIS = 原位腺癌；ASCCP = 美国阴道镜和宫颈病理学会；CIN = 宫颈上皮内瘤变；HPV = 人乳头瘤病毒；HSIL = 高级别鳞状上皮内病变；USPSTF = 美国预防服务工作组。* 被ACOG视为替代筛查策略。

† 机会性感染专家组，ACOG,2016。ACOG,2016。

¶ 通过细胞学或组织学；包括持续细胞学诊断为非典型鳞状细胞、不能排除HSIL。

management recommendations on case-by-case assessment of risk considering past screening history and current results (see Follow-Up). Patients with abnormal cervical cancer screening test results should be counseled about those results (see Counseling Messages).

The following additional management considerations are associated with performing Pap tests and HPV tests:

- Cytology (Pap tests) and HPV tests should not be considered screening tests for STIs.
- All persons with a cervix should receive cervical cancer screening, regardless of sexual orientation or gender identity (i.e., those who identify as lesbian, bisexual, heterosexual, or transgender).
- A conventional cytology test (in which the sample is smeared onto a dry slide) should ideally be scheduled for 10–20 days after the first day of menses. Liquid-based cytology can be performed at any time during the menstrual cycle.
- If specific infections other than HPV (e.g., chlamydia or gonorrhea) are identified at the visit, a repeat cytology test after appropriate treatment for those infections might be indicated. However, in most instances (even in the presence of certain severe cervical infections), cytology tests will be reported as satisfactory for evaluation, and reliable final reports can be produced without the need to repeat the cytology test after treatment.
- The presence of a mucopurulent discharge should not postpone cytology testing. The test can be performed after removal of the discharge with a saline-soaked cotton swab.
- HPV testing can be performed either as a separate test or by using material from the liquid-based cytology specimen.
- In the absence of other indications, the presence of external genital warts does not warrant more frequent cervical cancer screening.
- The sequence of cytology testing in relation to collection of other endocervical specimens does not influence Pap test results or their interpretation (*600*). Typically, vaginal specimens are preferred for chlamydia and gonorrhea screening; however, during a pelvic examination, endocervical specimens for STI testing can be collected first.
- Persons who have had a total hysterectomy with removal of the cervix do not require screening unless cervical intraepithelial neoplasia (CIN) 2, CIN 3, or adenocarcinoma in situ was diagnosed within the previous 20 years (*175*,*1247*). If the cervix remains intact after a supracervical hysterectomy, regularly scheduled Pap tests should be performed as indicated (*1248*–*1250*).
- Health care facilities that train providers on cytology test collection and use simple quality assurance measures are more likely to obtain satisfactory test results (as determined by the laboratory).
- The use of instruments designed to sample the cervical transformation zone (e.g., cytobrushes) improves the accuracy of cytology tests (*1251*).
- Both liquid-based and conventional cytology are acceptable because they have similar test-performance characteristics.
- At an initial visit, providers should ask patients about their recent cytology test and HPV results and any history of evaluation and treatment (e.g., loop electrosurgical excision procedure and colposcopy) to assist with management; effort should be made to obtain copies of recent results. The importance and frequency of screening should be reinforced.

Counseling

Persons might believe the cytology (Pap test) or HPV test screens for conditions other than cervical cancer, or they might be confused by abnormal results (*1252*–*1254*). Health care providers, as trusted sources of information about HPV infections and abnormal cytology test results, have an important role in educating persons about HPV and can moderate the psychosocial impact of abnormal results (*1255*,*1256*). Persons should be counseled on the risks, uncertainties, and benefits of screening (*174*,*1257*).

An abnormal cytology test or a positive HPV test can cause short-term anxiety, stress, fear, and confusion, possibly decreasing the patient's ability to absorb and retain information and acting as a barrier to follow-up care (*1258*–*1261*). A positive HPV test might elicit concerns about partners, worries about disclosure, and feelings of guilt, anger, and stigmatization (*1260*). Providers should frame HPV positivity in a neutral, nonstigmatizing context and emphasize its common, asymptomatic, and transient nature. Providers also should emphasize that HPV infections often are shared between partners but it is often not possible to know the origin of an HPV infection; HPV tests might become positive many years after initial exposure due to reactivation of latent infections in both male and female partners. Having an HPV infection should not raise concerns about a male partner's health (*1262*). Providers should communicate the meaning of both the cytology and HPV test results to patients at screening.

Providers also should screen for tobacco use and perform cessation counseling (www.acog.org/clinical/clinical-guidance/committee-opinion/articles/2011/09/tobacco-use-and-womens-health). Smoking contributes to the progression of CIN, with both active and passive smoking associated with squamous cell carcinoma of the cervix in women with HPV 16 or 18 infection (*1263*–*1266*).

管理建议基于个案风险评估，考虑既往筛查史和当前结果(见随访)。宫颈癌筛查试验结果异常的患者应接受关于这些结果的咨询(见咨询信息)。

以下额外管理考虑与进行Pap试验和HPV试验相关：

- 细胞学(巴氏涂片)和 HPV 检测不应
  被认为是STI的筛查测试。
- 所有有子宫颈的人都应接受宫颈癌
  筛查，无论性取向或性别认同(即，认同为女同性恋、双性恋、异性恋或跨性别者)。
- 常规细胞学检查(其中样本是
  涂抹在干燥玻片上)理想情况下应安排在月经第一天后10-20天。液基细胞学可在月经周期任何时间进行。
- 若存在除HPV以外的特定感染(例如衣原体或
  淋病)在就诊时被识别，可能在适当治疗这些感染后指示重复细胞学试验。然而，在大多数情况下(即使存在某些严重宫颈感染)，细胞学试验将报告为满意用于评估，并且可以产生可靠的最终报告而无需在治疗后重复细胞学试验。
- 出现黏液脓性分泌物不应
  推迟细胞学试验。可在用盐水浸泡棉签去除分泌物后进行试验。
- HPV 检测可单独进行，或
  通过使用液基细胞学标本中的材料。
- 在无其他指征的情况下，存在外部
  生殖器疣不需要更频繁的宫颈癌筛查。
- 细胞学检测与采集相关的顺序
  其他宫颈内膜标本不影响Pap试验结果或其解释(600)。通常，阴道标本优先用于衣原体和淋病筛查；然而，在盆腔检查期间，可首先收集用于STI检测的宫颈内膜标本。
- 已行全子宫切除术并切除
  宫颈不需要筛查，除非在过去20年内诊断出宫颈上皮内瘤变(CIN)2、CIN 3或原位腺癌(*175*,*1247*)。如果宫颈在宫颈上子宫切除术后保持完整，应按指示定期进行Pap试验(*1248* - *1250*)。
- 对提供者进行细胞学检测培训的卫生保健机构
  收集并使用简单的质量保证措施是更可能获得满意的试验结果(由实验室确定)。
- 使用专为宫颈取样设计的器械
  转化区(例如，细胞刷)提高细胞学试验的准确性(1251)。
- 液基细胞学与传统细胞学均可接受
  因为它们具有相似的试验性能特征。• 在初次就诊时，提供者应询问患者其
  近期细胞学试验和HPV结果以及任何评估和治疗史(例如，环形电外科切除程序和阴道镜检查)以协助管理；应努力获取近期结果的副本。应强调筛查的重要性和频率。

咨询

人们可能认为细胞学(Pap试验)或HPV检测筛查的是宫颈癌以外的疾病，或可能对异常结果感到困惑(*1252* - *1254*)。医疗保健提供者作为HPV感染和细胞学检测结果异常信息的可信来源，在教育人们了解HPV方面具有重要作用，并可减轻异常结果的心理社会影响(*1255*,*1256*)。应就筛查的风险、不确定性和益处向人们提供咨询(*174*,*1257*)。

细胞学检查结果异常或HPV检测阳性可引起短期的焦虑、压力、恐惧和困惑，可能降低患者吸收和保留信息的能力，并成为后续随访照护的障碍(*1258* - *1261*)。HPV检测阳性可能引发对伴侣的担忧、对披露的忧虑，以及内疚、愤怒和污名化的感受(1260)。医务人员应以中立、非污名化的语境来阐释HPV阳性，并强调其常见、无症状和短暂性的特点。医务人员还应强调，HPV感染常在伴侣之间共享，但往往无法确定HPV感染的来源；由于男女伴侣体内潜伏感染的再激活，HPV检测可能在初次暴露多年后才呈阳性。感染HPV不应引起对男性伴侣健康的担忧(1262)。医务人员应在筛查时向患者说明细胞学检查和HPV检测结果的意义。

提供者还应筛查烟草使用并进行戒烟咨询(www.acog.org/clinical/clinical-guidance/ committee-opinion/articles/2011/09/tobacco-use-and- womens-health)。吸烟促进CIN进展，主动和被动吸烟均与HPV 16或18感染女性的宫颈鳞状细胞癌相关(*1263* - *1266*)。

Promoting Cervical Cancer Screening

Clinics can use the evidence-based interventions in the *Community Preventive Services Task Force* guidelines to promote cervical cancer screening in their communities (https://www.thecommunityguide.org/findings/cancer-screening-multicomponent-interventions-cervical-cancer). Implementing interventions that increase community demand for screening (*1266*) (e.g., client reminders, client incentives, media, group education, or one-on-one education) together with those that increase community access to screening (e.g., reducing structural barriers and reducing client out-of-pocket costs) is effective in increasing cervical cancer screening coverage. These interventions are more effective if they are implemented with interventions to increase provider delivery of screening services (e.g., provider assessment and feedback, provider incentives, and provider reminders). Print materials and online resources are available at https://www.cdc.gov/cancer/cervical/basic_info/screening.htm and https://www.cdc.gov/std/hpv/facts-brochures.htm. Patient navigators can be effective in improving both screening and follow-up after abnormal results (*1267*).

Key Messages About Cervical Cancer Screening

When counseling persons about cervical cancer screening, the provider should discuss the following:

- Cervical cancer can be prevented with regular screening tests, like the Pap test (cytology) and HPV tests. Those at average risk should start getting cytology tests at age 21 years.
- The cytology test can find abnormal cervical cells, which could lead to cervical cancer over time, and an HPV test detects HPV infection of the cervix. The HPV test can be used alone for cervical cancer screening or at the same time as the cytology test (known as cotesting) for those aged ≥30 years to 65 years. The HPV test is also used after a cytology test result of atypical squamous cells of undetermined significance (ASC-US) among persons aged >25 years (known as reflex HPV testing).
- Positive cytology and HPV tests are markers of cervical precancerous lesions, which often do not cause symptoms until they become invasive. Appropriate follow-up is essential to ensure that cervical cancer does not develop.
- HPV is a common infection and is often controlled by the body without any medical interventions. A positive HPV test does not mean that a person has cancer.
- Providers should emphasize that HPV infections often are shared between partners, and it is often not possible to know the origin of an HPV infection; HPV tests might become positive many years after initial exposure due to reactivation of latent infections in both male and female partners.

Management of Sex Partners

The benefit of disclosing a positive HPV test to current and future sex partners is unclear. The following counseling messages can be communicated to sex partners:

- Sex partners do not need to be tested for HPV.
- Sex partners tend to share HPV. Sex partners of persons with HPV infection also are likely have an HPV infection.
- Female sex partners of men who disclose they had a previous female partner with HPV should be screened at the same intervals as women with average risk. No data are available to suggest that more frequent screening is of benefit.
- When used correctly and consistently, condoms might lower the risk for HPV infection and might decrease the time to clear in those with HPV infection. However, HPV can infect areas not covered by the condom, and condoms might not fully protect against HPV (*24*,*25*).

Additional messages for partners include the messages for persons with HPV (see Cervical Cancer Screening; Counseling Messages).

Screening Recommendations in Special Populations

Pregnancy

Persons who are pregnant should be screened at the same intervals as those who are not. A swab, Ayre's spatula, or cytobrush can be used for obtaining cytology test samples during pregnancy (*1268*–*1270*).

HIV Infection

Several studies have documented an increased risk for cervical precancers and cancers in individuals with HIV infection (*1271*–*1273*). Adolescents with HIV should be screened 1 year after onset of sexual activity but no later than age 21 years. Sexually active persons should be screened at the time of the initial HIV diagnosis. Conventional or liquid-based cytology (Pap test) should be used as primary HPV testing and is not recommended in individuals with HIV. Cotesting (cytology and HPV test) can be done in individuals aged ≥30 years with HIV. Annual screening is recommended for persons with HIV infection; after 3 years of consecutive normal cytology results or normal cotest (normal cytology and negative HPV test), the screening interval can be increased to every 3 years. Lifelong screening is recommended among persons with HIV infection.

Providers should defer to existing *Guidelines for the Prevention and Treatment of Opportunistic Infections in Adults and Adolescents with HIV* for guidance on cervical cancer screening and management of results in persons with HIV (*98*).

促进宫颈癌筛查

诊所可以使用以下循证干预措施：

*Community Preventive Services Task Force*指南以促进其社区的宫颈癌筛查(https://www.thecommunityguide.org/findings/cancer- screening-multicomponent-interventions-cervical-cancer)。实施增加社区筛查需求的干预措施(1266)(例如客户提醒、客户激励、媒体、团体教育或一对一教育)以及增加社区获得筛查机会的干预措施(例如减少结构性障碍和减少客户自付费用)，可有效提高宫颈癌筛查覆盖率。如果这些干预措施与增加医务人员提供筛查服务的干预措施(例如医务人员评估与反馈、医务人员激励和医务人员提醒)一并实施，则更为有效。印刷材料和在线资源可在https://www.cdc.gov/ cancer/cervical/basic_info/screening.htm和https://www.cdc.gov/std/hpv/facts-brochures.htm获取。患者导航员可有效改善筛查以及异常结果后的随访(1267)。

关于宫颈癌筛查的关键信息

当咨询人们关于宫颈癌筛查时，提供者应讨论以下内容：

- 通过定期筛查可以预防宫颈癌，
  像Pap试验(细胞学)和HPV试验。平均风险者应在21岁开始接受细胞学试验。
- 细胞学检查可以发现异常的宫颈细胞，这些
  可能随时间导致宫颈癌，HPV试验检测宫颈HPV感染。HPV试验可单独用于宫颈癌筛查，或与细胞学试验同时进行(称为联合检测)用于30岁至65岁者。HPV试验也用于细胞学试验结果为未确定意义的非典型鳞状细胞(ASC-US)后，在年龄>25岁者中(称为反射HPV检测)。
- 细胞学检查和HPV检测阳性是宫颈的标记
  癌前病变，通常直到变为浸润性才引起症状。适当的随访至关重要以确保不发生宫颈癌。
- HPV 是一种常见感染，通常由
  身体无任何医疗干预。HPV试验阳性不意味着一个人有癌症。
- 医务人员应强调，HPV 感染通常
  在伴侣间共享，通常不可能知道HPV感染的起源；HPV试验可能在初始暴露多年后变为阳性，由于男性和女性伴侣中潜伏感染的再激活。

性伴侣的管理

向当前和未来性伴侣披露HPV试验阳性的益处不明确。以下咨询信息可传达给性伴侣：

- 性伴侣无需进行HPV检测。
- 性伴侣往往共享HPV。性伴侣的性伴侣
  有HPV感染也可能有HPV感染。• 男性性伴侣披露他们曾有先前

女性伴侣有HPV应按照平均风险女性相同间隔筛查。没有数据表明更频繁筛查有益。• 当正确和持续使用时，避孕套可能

降低HPV感染风险并可能减少HPV感染者清除时间。然而，HPV可感染避孕套未覆盖区域，避孕套可能不完全保护 against HPV(*24*,*25*)。

伴侣的额外信息包括HPV感染者的信息(见宫颈癌筛查；咨询信息)。

特殊人群的筛查建议

妊娠

妊娠者应按非妊娠者相同间隔筛查。拭子、Ayre刮匙或细胞刷可用于妊娠期间获取细胞学试验样本(*1268 - 1270*)。

HIV感染

多项研究已记录HIV感染者发生宫颈癌前病变和宫颈癌的风险增加(*1271 - 1273*)。感染HIV的青少年应在开始性活动后1年进行筛查，但不得晚于21岁。有性活动者应在初次诊断HIV时进行筛查。应采用传统或液基细胞学检查(Pap试验)作为主要检测方法，不推荐在HIV感染者中使用HPV检测。年龄≥30岁的HIV感染者可进行联合检测(细胞学检查和HPV检测)。建议HIV感染者每年筛查；在连续3年细胞学结果正常或联合检测正常(细胞学正常且HPV检测阴性)后，筛查间隔可延长至每3年一次。建议HIV感染者终身筛查。

医疗服务提供者应遵循现有的《预防指南》和*HIV*成人和青少年机会性感染治疗以获取HIV感染者宫颈癌筛查和结果管理指导(98)。

Adolescents

Prevalence of HPV infection is high among those aged <21 years (*174*); however, HPV infections and squamous intraepithelial lesions caused by HPV in adolescents are more likely to regress than those in older persons. For these reasons, cervical cancer screening and HPV testing are not recommended in immunocompetent adolescents. However, for adolescents with HIV infection, providers should screen 1 year after onset of sexual activity, regardless of age or mode of HIV acquisition (e.g., perinatally acquired or sexually acquired) (*98*); such screening is warranted because of the reported high rate of progression of abnormal cytology in adolescents with HIV.

Human Papillomavirus Tests for Cervical Cancer Screening

Clinical tests for HPV are used for the following: cervical cancer screening as a primary test, cervical cancer screening with a cytology test, triage of some abnormal cervical cytology results, follow-up after abnormal screening test results, follow-up after a colposcopy in which no CIN 2 or CIN 3 is found, and follow-up after treatment of cervical precancers. These tests are only FDA cleared for use with cervical specimens, not oral or anal specimens. Testing for nononcogenic HPV types (e.g., types 6 and 11) is not recommended (https://www.asccp.org/guidelines).

FDA-cleared HPV tests detect viral DNA or messenger RNA. Several FDA-cleared tests for HPV are available for use in the United States. The Cobas 4800 HPV test (Roche Molecular Diagnostics) and the Onclarity HPV test (Becton Dickinson) can detect the presence of 14 oncogenic HPV types (types 16, 18, 31, 33, 35, 39, 45, 51, 52, 56, 58, 59, 66, and 68), as well as individual types 16 and 18, and are cleared for primary cervical cancer screening.

Other HPV tests are cleared for use in conjunction with a cytology test or to triage some abnormal cervical cytology results; they should not be used for primary HPV testing because they are not cleared for this purpose. These tests include the Hybrid Capture 2 High-Risk HPV DNA test (Qiagen), the Cervista HPV High-Risk DNA and HPV 16/18 DNA tests (Hologics), and the APTIMA HR HPV (Gen Probe) test. All HPV assays should be FDA cleared and used only for the appropriate indications (https://www.fda.gov/media/122799/download) (*158*).

HPV testing should not be performed in the following situations:

- Deciding whether to vaccinate against HPV
- Conducting HPV tests for low-risk (nononcogenic) HPV types (e.g., types 6 and 11)
- Providing care to persons with genital warts or their partners
- Testing persons aged <25 years as part of routine cervical cancer screening
- Testing oral or anal specimens

Unlike cytology, samples for HPV testing have the potential to be collected by the patient and mailed to health programs for analysis, thus self-collection might be one strategy for increasing screening rates among populations where screening rates are low. Self-collection for HPV testing is not cleared by FDA or recommended by U.S. medical organizations (*174*).

Follow-Up of Abnormal Cytology and Human Papillomavirus Test Results

If the result of the cytology (Pap test) is abnormal, follow-up care should be provided according to the *2019 ASCCP Risk-Based Management Consensus Guidelines for Abnormal Cervical Cancer Screening Tests and Cancer Precursors* (*158*). Clinics that serve clients who might have difficulty adhering to follow-up recommendations and for whom linkage to care is unlikely should consider offering in-house colposcopy and biopsy services.

Consensus guidelines for management of abnormal cervical cancer screening tests combine patient-level risk data with clinical action thresholds to generate personalized management recommendations (Table 2). This framework allows management on the basis of risk for CIN 3, not specific test results. The guidelines were designed to identify persons at high risk who require colposcopy or expedited treatment and persons at low risk who might be able to safely defer invasive diagnostic procedures. The risk-based framework was designed to easily incorporate future revisions, such as the inclusion of new technologies for screening and management. Use of the guidelines can be facilitated by electronic technology that is continually updated, such as a smartphone application or the website (https://www.asccp.org/Default.aspx).

The following are highlights of the new management guidelines:

- Colposcopy can be deferred for patients at low risk.
  - If a patient has a minimally abnormal test result (i.e., negative for intraepithelial lesion or malignancy HPV positive, ASC-US HPV positive, LSIL, or HPV positive) that was preceded by a negative screening HPV test or cotest within the past 5 years, follow-up in 1 year instead of colposcopy is recommended (a negative HPV test or cotest performed during follow-up of abnormal results would not similarly reduce risk).
  - Referral to colposcopy is recommended if cytology test results are abnormal or the HPV test is positive at the 1-year follow-up visit.
- Treatment can be expedited for high-risk patients.
  - If a patient has a high-grade cytology (Pap test) result (i.e., HSIL) and an HPV test that is positive for HPV type 16, then treatment with a loop electrosurgical

青少年

年龄<21岁者HPV感染患病率高(174);然而,青少年中由HPV引起的HPV感染和鳞状上皮内病变比年长者更易消退。因此,不推荐对免疫功能正常的青少年进行宫颈癌筛查和HPV检测。然而,对于感染HIV的青少年,无论年龄或HIV感染方式(例如围产期获得或性传播获得)如何,医务人员应在开始性活动后1年进行筛查(98);由于有报道显示感染HIV的青少年异常细胞学进展率高,此种筛查是有必要的。

用于宫颈癌筛查的人乳头瘤病毒检测

HPV临床检测用于以下情况：作为主要检测进行宫颈癌筛查、结合细胞学检查进行宫颈癌筛查、对某些异常宫颈细胞学结果进行分诊、异常筛查结果后的随访、阴道镜检查未发现CIN 2或CIN 3后的随访，以及宫颈癌前病变治疗后的随访。这些检测仅获FDA批准用于宫颈标本，不适用于口腔或肛门标本。不推荐检测非致癌型HPV型别(例如6型和11型)(https://www.asccp.org/guidelines)。

FDA-cleared HPV试验检测病毒DNA或信使RNA。几种FDA-cleared HPV试验在美国可用。Cobas 4800 HPV试验(Roche Molecular Diagnostics)和Onclarity HPV试验(Becton Dickinson)可检测14种致癌HPV类型(类型16、18、31、33、35、39、45、51、52、56、58、59、66和68)，以及个别类型16和18，并被cleared用于初级宫颈癌筛查。

其他HPV检测被批准用于与细胞学检测联合使用，或用于对某些异常宫颈细胞学结果进行分诊；它们不应被用于初级HPV检测，因为它们未被批准用于此目的。这些检测包括Hybrid Capture 2 High-Risk HPV DNA test(Qiagen)、Cervista HPV High-Risk DNA和HPV 16/18 DNA tests(Hologics)以及APTIMA HR HPV(Gen Probe)test。所有HPV检测均应获得FDA批准，并且仅用于适当的适应证(https://www.fda.gov/ media/122799/download)(158)。

以下情况不应进行HPV试验：• 决定是否接种HPV疫苗

- 对低风险(非致癌型)HPV进行HPV检测型(例如6型和11型)
- 为生殖器疣患者或其伴侣提供医疗服务
- 对25岁以下人群进行常规宫颈检测，作为常规宫颈癌症筛查
- 检测口腔或肛门样本

与细胞学不同，HPV试验样本有潜力由患者收集并邮寄至健康程序分析，因此自收集可能是增加筛查率低人群筛查率的一种策略。HPV试验自收集未被FDA cleared或美国医疗组织推荐(174)。

异常细胞学及人乳头瘤病毒检测结果的随访

如果细胞学(Pap 试验)结果异常，应按照*2019 ASCCP*基于风险的异常宫颈癌筛查试验和癌前病变管理共识指南(158)提供随访护理。对于可能难以遵守随访建议且不太可能获得护理衔接的服务对象，诊所应考虑提供内部阴道镜检查和活检服务。

异常宫颈癌筛查检测管理的共识指南将患者层面的风险数据与临床行动阈值相结合，以生成个体化管理建议(Table 2)。该框架允许基于CIN 3的风险进行管理，而不是基于特定的检测结果。该指南旨在识别需要阴道镜检查或加速治疗的高风险人群，以及可能能够安全推迟侵入性诊断操作的低风险人群。基于风险的框架旨在便于纳入未来的修订，例如纳入新的筛查和管理技术。使用持续更新的电子技术(如智能手机应用程序或网站)可促进该指南的使用(https://www.asccp.org/Default.aspx)。

以下是新管理指南的要点：• 低风险患者可以推迟阴道镜检查。

如果患者的检测结果仅轻微异常(即，上皮内病变或恶性肿瘤阴性 HPV 阳性、ASC-US HPV 阳性、LSIL 或 HPV 阳性)，且在过去 5 年内之前有阴性筛查 HPV 检测或联合检测，建议在 1 年内随访而不是阴道镜检查(在异常结果随访期间进行的阴性 HPV 检测或联合检测不会同样降低风险)。

- 如果细胞学检查结果异常，建议转诊阴道镜检查。

如果随访1年时结果异常或HPV检测呈阳性。

- 高危患者可加快治疗。

如果患者的高级别细胞学(Pap试验)结果(即 HSIL)且 HPV 检测为 HPV 16 型阳性，则采用环形电外科

TABLE 2. Comparison of 2012 and 2019 consensus recommendations for management of common abnormalities — American Society for Colposcopy and Cervical Pathology

Current HPV result	Current Pap test result	Previous result	Management by 2012 guidelines	Management by 2019 guidelines
Negative	ASC-US	Unknown or HPV negative*	Repeat Pap plus HPV testing in 3 yrs	Repeat HPV test with or without concurrent Pap test in 3 yrs
Negative	LSIL	Unknown or HPV negative*	Repeat Pap plus HPV testing in 1 yr preferred, colposcopy acceptable	Repeat HPV test with or without concurrent Pap test in 1 yr
Negative	ASC-H	Noncontributory	Colposcopy	Colposcopy
Noncontributory	AGC	Noncontributory	Colposcopy	Colposcopy
Positive	NILM	Unknown or HPV negative*	Repeat Pap plus HPV testing in 1 yr	Repeat HPV test with or without concurrent Pap test in 1 yr
Positive	NILM	HPV positive†	Colposcopy	Colposcopy
Positive for genotype HPV 16, HPV 18, or both	NILM	Noncontributory	Colposcopy	Colposcopy
Positive for genotype HPV 16, HPV 18, or both	ASC-US or LSIL	Noncontributory	Not applicable, genotyping not recommended for ASC-US or LSIL in 2012	Colposcopy
Positive	ASC-US or LSIL	Unknown or HPV positive	Colposcopy	Colposcopy
Positive	ASC-US or LSIL	Negative screening results with HPV testing or HPV plus Pap testing within the previous 5 yrs	Colposcopy	Repeat HPV test with or without concurrent Pap test in 1 yr§
Positive	ASC-US or LSIL	Colposcopy confirming the absence of high-grade lesion within the past yr	Colposcopy	Repeat HPV test with or without concurrent Pap test in 1 yr§
Positive	ASC-H	Noncontributory	Colposcopy	Colposcopy or expedited treatment
Positive untyped, positive for genotype other than HPV 16, or negative	HSIL	Noncontributory	Colposcopy or expedited treatment	Colposcopy or expedited treatment
Positive for genotype HPV 16	HSIL	Noncontributory	Colposcopy or expedited treatment	Expedited treatment¶

Sources: Massad LS, Einstein MH, Huh WK, et al.; 2012 ASCCP Consensus Guidelines Conference. 2012 updated consensus guidelines for the management of abnormal cervical cancer screening tests and cancer precursors. Obstet Gynecol 2013;121:829–46; Perkins RB, Guido RS, Castle PE, et al; 2019 ASCCP Risk-Based Management Consensus Guidelines Committee. 2019 ASCCP risk-based management consensus guidelines for abnormal cervical cancer screening tests and cancer precursors. J Low Genit Tract Dis 2020;24:102–31; Perkins R, Guido R, Saraiya M, et al. Summary of current guidelines for cervical cancer screening and management of abnormal test results: 2016–2020. J Womens Health (Larchmt) 2021;30:5–13.

Abbreviations: AGC = atypical glandular cells; AIS = adenocarcinoma in situ; ASC-H = atypical squamous cells cannot exclude high-grade squamous intraepithelial lesion; ASC-US = atypical squamous cells of undetermined significance; CIN = cervical intraepithelial neoplasia; HPV = human papillomavirus; HSIL = high-grade squamous intraepithelial lesion; LSIL = low-grade squamous intraepithelial lesion; NILM = negative for intraepithelial lesion or malignancy; Pap = Papanicolaou.

* Colposcopy may be warranted for patients with a history of high-grade lesions (CIN 2 or CIN 3, histologic or cytologic HSIL, ASC-H, AGC, or AIS).

† Previous Pap test results do not modify the recommendation; colposcopy is always recommended for two consecutive HPV-positive tests.

§ Negative HPV test or cotest (HPV plus Pap test) results only reduce risk sufficiently to defer colposcopy if performed for screening purposes within the last 5 years. Colposcopy is still warranted if negative HPV test or cotest results occurred in the context of surveillance for a previous abnormal result.

¶ Expedited treatment is preferred for nonpregnant patients aged ≥25 years. Colposcopy with biopsy is an acceptable option if desired by patient after shared decision-making.

excision procedure (LEEP) is preferred. A colposcopy with biopsy is not necessary to confirm the diagnosis first.
  - If a patient who has not been screened in more than 5 years (i.e., rarely screened) has an HSIL cytology result and a positive HPV test (regardless of type), then treatment with LEEP is preferred. A colposcopy with biopsy is not necessary to confirm the diagnosis first.
  - When considering treatment without confirmatory biopsy, shared decision-making with the patient is important. Considerations include age, concern about cancer, ability to follow up, financial concerns, and concerns about the potential effect of treatment on a future pregnancy.
- When primary HPV testing is used for screening, cytology testing should be performed for all positive HPV test results to help determine the next steps in management.
  - Ideally, cytology testing should be performed by the laboratory as a reflex test from the same specimen so the patient does not need to return to the clinic. Colposcopy is recommended if HPV genotyping is positive for types 16 or 18, and it can be considered if it is infeasible for the patient to return for cytology alone (*1274*).
  - HPV 16 is the highest-risk HPV type. Expedited treatment should be considered for HSIL cytology results, and colposcopy is recommended in all other cases, even if the cytology test is normal.
  - HPV 18 has a relatively high association with cancer, and colposcopy is recommended in all cases, even if the

表2. 2012年和2019年常见异常管理共识建议的比较 - American Society for 阴道镜与宫颈病理学

当前HPV结果	当前Pap检查检测结果	先前结果	2012年管理指南	2019年管理指南
阴性	ASC-US	未知或HPV阴性*	重复 Pap 加 HPV 检测3年内	带或不带重复HPV检测3年后同时进行Pap测试
阴性	LSIL	未知或HPV阴性*	重复 Pap 加 HPV 检测1 年内首选，阴道镜检查可接受	带或不带重复HPV检测1年内同时进行Pap测试
阴性	ASC-H	无贡献	阴道镜检查	阴道镜检查
无贡献	AGC			
阳性	NILM	未知或HPV阴性*	重复 Pap 加 HPV 检测1年内	带或不带重复HPV检测1年内同时进行Pap测试
阳性	NILM	HPV阳性†	阴道镜检查	阴道镜检查
HPV 16型阳性，HPV 18，或两者		无贡献		
HPV 16型阳性，HPV 18，或两者	ASC-US或LSIL	无贡献	不适用，基因分型不推荐用于2012年ASC-US或LSIL	阴道镜检查
阳性	ASC-US或LSIL	未知或HPV阳性	阴道镜检查	阴道镜检查
		阴性筛查结果伴有HPV检测或HPV加Pap在过去5年内进行过检测		带或不带重复HPV检测1 年后同时进行 Pap 检查
阳性	ASC-US或LSIL	阴道镜检查确认无异常高级别病变内的过去一年	阴道镜检查	带或不带重复HPV检测1 年后同时进行 Pap 检查
阳性	ASC-H	无贡献	阴道镜检查	阴道镜检查或加速治疗
阳性未分型，阳性为非HPV 16型的基因型，或阴性	HSIL	无贡献	阴道镜检查或加速治疗	阴道镜检查或加速治疗
HPV 16型阳性	HSIL	无贡献	阴道镜检查或加速治疗	快速治疗¶

来源：Massad LS, Einstein MH, Huh WK， 等；2012 ASCCP共识指南会议。2012年更新的异常宫颈癌筛查试验和癌前病变管理共识指南。Obstet Gynecol 2013;121:829–46；Perkins RB, Guido RS, Castle PE， 等；2019 ASCCP基于风险的管理共识指南委员会。2019 ASCCP基于风险的异常宫颈癌筛查试验和癌前病变管理共识指南。JLowGenitTractDis 2020;24:102–31；Perkins R, Guido R, Saraiya M， 等。当前宫颈癌筛查和异常检测结果管理指南摘要：2016–2020。J Womens Health (Larchmt) 2021;30:5–13。

缩写： AGC = 非典型腺细胞；AIS = 原位腺癌；ASC-H = 非典型鳞状细胞，不能排除高级别鳞状上皮内病变；ASC-US = 未明确意义的非典型鳞状细胞；CIN = 宫颈上皮内瘤变；HPV = 人乳头瘤病毒；HSIL = 高级别鳞状上皮内病变；LSIL = 低级别鳞状上皮内病变；NILM = 上皮内病变或恶性病变阴性；Pap = 巴氏。* 对于有高级别病变史(CIN 2 或 CIN 3、组织学或细胞学 HSIL、ASC-H、AGC 或 AIS)的患者，可能需要进行阴道镜检查。† 既往 Pap 检测结果不改变推荐；对于连续两次 HPV 阳性检测，始终推荐阴道镜检查。

阴性HPV检测或联合检测(HPV加Pap检测)结果仅在筛查目的下于过去5年内进行时，才能充分降低风险以推迟阴道镜检查。

如果阴性HPV检测或联合检测结果出现在先前异常结果的监测背景下，阴道镜检查仍然有必要。

¶ 对于年龄≥25岁的非妊娠患者，优先选择快速治疗。如果患者在共享决策后愿意，阴道镜活检是可接受的选择。

决策。

优先选择切除手术(LEEP)。不需要先进行阴道镜活检来确认诊断。

- 如果患者超过以下时间未接受筛查

  5年(即很少筛查)有HSIL细胞学结果和HPV检测阳性(无论类型)，则优先选择LEEP治疗。不需要先进行阴道镜活检来确认诊断。

- 在考虑未经确认性检测的治疗时

  活检，与患者共享决策很重要。考虑因素包括年龄、对癌症的担忧、随访能力、经济担忧以及对治疗对未来妊娠潜在影响的担忧。

- 当采用 primary HPV testing 进行筛查时，cytology

  所有HPV阳性检测结果均应进行细胞学检测，以帮助确定下一步管理措施。理想情况下，细胞学检测应由

  实验室作为反射测试从同一标本进行，以便患者无需返回诊所。如果HPV基因分型对16或18型阳性，推荐阴道镜检查，如果患者仅返回细胞学不可行，则可以考虑(1274)。

- HPV 16 是风险最高的 HPV 型别。加快

  对于HSIL细胞学结果应考虑治疗，在所有其他情况下推荐阴道镜检查，即使细胞学检测正常。

HPV 18 与癌症的关联性相对较高，

在所有情况下均建议进行阴道镜检查，即使

cytology test is normal. Because of the association of HPV 18 with adenocarcinoma, endocervical sampling is acceptable at the time of colposcopy.
  - If the HPV type is not HPV 16 or 18, and the cytology test is normal, return in 1 year is recommended in most cases.
- HPV testing or cotesting is preferred to cytology testing alone for follow-up after an abnormal test result.
  - Negative HPV testing or cotesting is less likely to miss disease than normal cytology testing alone. Therefore, cytology testing is recommended more often than HPV testing or cotesting for follow-up of abnormal results. Specifically, cytology testing is recommended annually when HPV testing or cotesting is recommended at 3-year intervals, and cytology testing is recommended at 6-month intervals when HPV testing or cotesting is recommended annually.
- After treatment for a high-grade precancer (moderate or severe dysplasia), surveillance should continue for at least 25 years.
  - Initial testing includes an HPV test or cotest at 6, 18, and 30 months. If cytology alone is used, testing should occur at 6, 12, 18, 24, and 30 months.
  - After completing initial testing, long-term surveillance includes testing at 3-year intervals if using HPV testing or cotesting, or annual testing if using cytology testing alone.
  - Surveillance should continue for at least 25 years after the initial treatment, even if this extends beyond age 65 years. If a woman undergoes hysterectomy during the surveillance period, vaginal screening should continue.

Anal Cancer

Anal cancer is rare in the general population (1–2 cases per 100,000 person-years); however, incidence is substantially higher among specific populations, including MSM with HIV infection (80–131 cases per 100,000 person-years), men with HIV infection (40–60 cases per 100,000 person-years), women with HIV infection (20–30 cases per 100,000 person-years), and MSM without HIV infection (14 cases per 100,000 person-years) (*1275*–*1279*). Incidence is variable among women with previous HPV-related gynecologic dysplasia and cancer (6–63 cases per 100,000 person-years) (*1280*,*1281*). Persistent HPV infection might be a risk factor for preventable HPV-associated second primary cancers among survivors of HPV-associated cancers (*1282*).

Data are insufficient to recommend routine anal cancer screening with anal cytology in persons with HIV infection, MSM without HIV infection, and the general population. An annual digital anorectal examination (DARE) might be useful to detect masses on palpation in persons with HIV infection and possibly in MSM without HIV with a history of receptive anal intercourse (*98*). More evidence is needed concerning the natural history of anal intraepithelial neoplasia, the best screening methods and target populations, the safety and response to treatments, and other programmatic considerations before screening can be routinely recommended.

Populations at High Risk and Digital Anorectal Examination

Providers should discuss anal cancer risk with their patients among specific populations to guide management. According to the HIV Opportunistic Infection guidelines and the International Anal Neoplasia Society, a DARE should be performed to detect early anal cancer in persons with HIV infection and MSM without HIV with a history of receptive anal intercourse (*98*,*1283*). DARE is acceptable to patients and has a low risk for adverse outcomes (*1284*,*1285*).

Data are insufficient to guide initiation of DARE at a defined age or optimal intervals for examination. Whereas anal HSIL is observed among young adults, cancer incidence begins to increase after the early 30s and continues to increase as a function of age.

Populations at High Risk and Anal Cytology

Data are insufficient to recommend routine anal cancer screening with anal cytology among populations at risk for anal cancer. Certain clinical centers perform anal cytology to screen for anal cancer among populations at high risk (e.g., persons with HIV infection, MSM, and those having receptive anal intercourse), followed by high-resolution anoscopy (HRA) for those with abnormal cytologic results (e.g., ACS-US, LSIL, or HSIL). Sensitivity and specificity of anal cytology to detect HSIL are limited (sensitivity 55%–89% and specificity 40%–67%) (*1286*–*1291*). Health centers that initiate a cytology-based screening program should only do so if referrals to HRA and biopsy are available.

HRA can be used for diagnosis of HSIL, to monitor response to therapy, or to conduct surveillance of HSIL for evidence of progression. HRA is the primary method used for diagnosis of superficially invasive squamous carcinoma, a very early form of anal cancer that is not palpable on DARE. However, data are insufficient to conclude whether use of HRA leads to reductions in anal cancer incidence or improves anal cancer morbidity and mortality. An ongoing clinical trial is investigating whether treatment of HSIL is effective in reducing the incidence of anal cancer among persons with HIV infection (NCT02135419).

Human Papillomavirus Testing

HPV tests (using high-risk HPV types) are not clinically useful for anal cancer screening because of a high prevalence of anal HPV infection among populations at high risk, particularly MSM (*1278*,*1289*,*1290*). No standard HPV-based

细胞学检测正常。由于HPV 18与腺癌的关联，在阴道镜检查时进行宫颈内取样是可接受的。

- 如果HPV型别不是HPV 16或18，且细胞学检查是正常的，多数情况下建议1年后复查。
- 首选HPV检测或联合检测，而非细胞学检测仅针对检测结果异常后的随访。
  - 阴性HPV检测或联合检测不太可能漏诊疾病比单独正常细胞学检测。因此，对于异常结果的随访，推荐细胞学检测比HPV检测或联合检测更频繁。具体而言，当推荐HPV检测或联合检测间隔3年时，推荐每年细胞学检测；当推荐每年HPV检测或联合检测时，推荐每6个月细胞学检测。
- 高度癌前病变(中度或(重度不典型增生)，监测应至少持续25年。
  - 初始检测包括在6、18、和30个月。如果仅使用细胞学，检测应在6、12、18、24和30个月进行。
  - 完成初步检测后，长期监测包括如果使用HPV检测或联合检测则间隔3年检测，或如果仅使用细胞学检测则每年检测。
  - 监测应至少持续25年，之后初始治疗，即使这超过65岁。如果妇女在监测期间进行子宫切除术，应继续阴道筛查。

肛门癌

肛门癌在一般人群中较为罕见（每10万人年1–2例）；然而，在特定人群中发病率显著更高，包括感染HIV的MSM（每10万人年80–131例）、感染HIV的男性（每10万人年40–60例）、感染HIV的女性（每10万人年20–30例）以及未感染HIV的MSM（每10万人年14例）（1275–1279）。在有既往HPV相关妇科异型增生和癌症的女性中，发病率存在差异（每10万人年6–63例）（1280,1281）。持续性HPV感染可能是HPV相关癌症幸存者中可预防的HPV相关第二原发癌的危险因素（1282）。

数据不足以推荐在HIV感染者、无HIV感染的MSM和一般人群中使用肛门细胞学进行常规肛门癌筛查。每年数字肛门直肠检查(DARE)可能有助于检测HIV感染者和可能有接受性肛交史的无HIV MSM的触诊肿块。

肛交(98)。需要更多证据关于肛门上皮内瘤变的自然史、最佳筛查方法和目标人群、治疗的安全性和反应以及其他规划考虑，然后才能常规推荐筛查。

高风险人群与数字肛门直肠检查

提供者应与特定人群的患者讨论肛门癌风险以指导管理。根据HIV机会性感染指南和国际肛门肿瘤学会，应对HIV感染者和有接受性肛交史的无HIV MSM进行DARE以检测早期肛门癌(*98*, *1283*)。DARE对患者可接受且不良结局风险低(*1284*, *1285*)。

数据不足以指导在定义年龄或最佳检查间隔开始DARE。虽然肛门HSIL在年轻成人中观察到，但癌症发病率在30岁早期后开始增加，并随年龄继续增加。

高风险人群与肛门细胞学检查

数据不足以推荐在肛癌风险人群中采用肛细胞学进行常规肛癌筛查。某些临床中心在高风险人群(例如，HIV 感染者、MSM，以及接受接受性肛交者)中开展肛细胞学以筛查肛癌，随后对细胞学结果异常者(例如，ACS-US、LSIL 或 HSIL)进行高分辨率肛门镜检查(HRA)。肛细胞学检测 HSIL 的敏感性和特异性有限(敏感性 55%-89%，特异性 40%-67%)(*1286 - 1291*)。启动基于细胞学的筛查项目的卫生中心，只有在能够转诊进行 HRA 和活检的情况下才应开展。

HRA 可用于诊断 HSIL、监测治疗反应，或对 HSIL 进行监测以发现进展证据。HRA 是诊断浅表浸润性鳞状细胞癌的主要方法，这是一种非常早期的肛癌，DARE 无法触及。然而，数据不足以得出结论，使用 HRA 是否能降低肛癌发病率或改善肛癌发病率和死亡率。一项正在进行的临床试验正在研究治疗 HSIL 是否能有效降低 HIV 感染者中肛癌的发病率(NCT02135419)。

人乳头瘤病毒检测

HPV检测(使用高风险HPV类型)对肛门癌筛查临床无用，因为高风险人群中肛门HPV感染高流行，特别是MSM(*1278*, *1289*, *1290*)。没有标准的基于HPV的

algorithms exist for anal cancer screening due to the high prevalence of high-risk HPV infection among groups at risk.

Treatment of Anal High-Grade Squamous Intraepithelial Lesion

Multiple office-based treatments exist for anal HSIL, including ablative methods (e.g., laser, electrocautery, or infrared coagulation) and topical patient-applied therapies (e.g., imiquimod). Recurrence rates with both provider-applied and patient-applied treatments are high, ranging from approximately 50% at 1 year to 77% after 3 years (*1289*,*1292*,*1293*). In addition, evidence exists that HSIL might spontaneously regress without treatment (*1294*,*1295*). Shared decision-making about treatment for anal HSIL is recommended because of limited data on the natural history of anal HSIL, including factors related to progression or regression of lesions.

Viral Hepatitis

Hepatitis A Virus Infection

HAV infection has an incubation period of approximately 28 days (range: 15–50 days) (*1296*). HAV replicates in the liver and is shed in high concentrations in feces from 2–3 weeks before to 1 week after the onset of clinical illness. HAV infection produces a self-limited disease that does not result in chronic infection or chronic liver disease. However, approximately 10% of patients experience a relapse of symptoms during the 6 months after acute illness. Acute liver failure from hepatitis A is rare (overall case-fatality rate: 0.5%). The risk for symptomatic infection is directly related to age, with approximately 70% of adults having symptoms compatible with acute viral hepatitis and the majority of children having either asymptomatic or unrecognized infection. Antibody produced in response to HAV infection persists for life and confers protection against reinfection (*1297*).

HAV infection is primarily transmitted by the fecal-oral route, by either person-to-person contact or through consumption of contaminated food or water (*1298*). Transmission of HAV during sexual activity probably results from fecal-oral contact. Although viremia occurs early during infection and can persist for weeks after symptom onset, bloodborne transmission of HAV is uncommon (*1299*). Transmission by saliva has not been demonstrated.

In the United States, of the hepatitis A cases accompanied by risk information, a particular risk was identified among only 23.8% (*13*,*372*). Among cases with a risk factor identified, a recognized foodborne or waterborne outbreak was the most commonly identified risk (49.6%). Other infection sources identified in the United States include MSM; persons who use injecting drugs; sexual and household contacts; those experiencing homelessness; international travelers; those with children attending a nursery, childcare, or preschool; and persons working in such settings (*13*,*372*).

Diagnostic Considerations

Diagnosis of HAV infection cannot be made on a clinical basis alone but requires serologic testing. Presence of IgM antibody to HAV is diagnostic of acute HAV infection. A positive test for total anti-HAV indicates immunity to HAV infection but does not differentiate current from previous HAV infection. Although usually not sensitive enough to detect the low level of protective antibody after vaccination, anti-HAV tests also might be positive after hepatitis A vaccination.

Treatment

Patients with acute HAV infection usually require only supportive care, with no restrictions in diet or activity. Hospitalization might be necessary for patients who become dehydrated because of nausea and vomiting and is crucial for patients with signs or symptoms of acute liver failure. Medications that might cause liver damage or are metabolized by the liver should be used with caution among persons with HAV infection.

Prevention

Vaccination is the most effective means of preventing HAV transmission among persons at risk for infection (e.g., MSM, injecting drug users, and persons with chronic liver disease) who did not receive hepatitis A vaccination during childhood. Hepatitis A vaccines are prepared from formalin-inactivated, cell-culture–derived HAV. Two monovalent vaccines (Havrix and Vaqta are approved by FDA for persons aged ≥12 months (Table 3). These vaccines are available for eligible children and adolescents aged <19 years through the VFC program (https://www.cdc.gov/vaccines/programs/vfc/index.html). Administered IM in a 2-dose series at 0 and 6–12 months, hepatitis A vaccines induce protective antibody levels among virtually all adults. By 1 month after the first dose, 94%–100% of adults have protective antibody levels, and after a second dose, 100% achieve protective levels (*1297*,*1300*,*1301*). Kinetic models of antibody decrease among adults indicate that protective levels persist for >40 years (*1302*–*1304*). A study of Alaska Natives demonstrated that seropositivity for hepatitis A persists for >20 years after completing 2-dose vaccination at age 12–21 months (*1302*). Anti-HAV persistence of >20 years was demonstrated among immunocompetent adults vaccinated with a 2-dose hepatitis A schedule as adults (*1303*,*1305*). A combined hepatitis A and hepatitis B vaccine (Twinrix) has

算法存在用于肛门癌筛查，因为风险群体中高风险HPV感染高流行。

肛门高级别鳞状上皮内病变的治疗

肛门HSIL存在多种诊室治疗方法，包括消融方法(如激光、电灼或红外线凝固)和患者自行应用的局部治疗(如imiquimod)。提供者实施和患者自行实施的治疗复发率均较高，约为1年时50%至3年后77%(*1289*,*1292*,*1293*)。此外，有证据表明HSIL可能未经治疗而自发消退(*1294*,*1295*)。由于关于肛门HSIL自然史的数据有限，包括与病变进展或消退相关的因素，建议就肛门HSIL的治疗进行共享决策。

病毒性肝炎

肝炎A病毒感染

HAV感染的潜伏期约为28天(范围：15-50天)(1296)。HAV在肝脏中复制，并在临床症状出现前2-3周至出现后1周期间以高浓度随粪便排出。HAV感染产生自限性疾病，不会导致慢性感染或慢性肝病。然而，约10%的患者在急性疾病后6个月内经历症状复发。甲型肝炎导致的急性肝衰竭罕见(总病死率：0.5%)。症状性感染的风险与年龄直接相关，约70%的成人出现与急性病毒性肝炎相符的症状，而大多数儿童为无症状或未被识别的感染。针对HAV感染产生的抗体终身持续存在，并提供针对再感染的保护(1297)。

HAV感染主要通过粪口途径传播，通过人际接触或消费受污染的食物或水(1298)。性活动期间HAV传播可能源于粪口接触。虽然病毒血症在感染早期发生并可在症状发作后持续数周，但HAV的血源性传播不常见(1299)。唾液传播尚未证明。

在美国，伴有风险信息的甲型肝炎病例中，仅在23.8%中识别出特定风险(*13*, *372*)。在识别出风险因素的病例中，公认的食源性或水源性爆发是最常见的识别风险(49.6%)。其他感染源在美国识别包括MSM；使用注射药物的人；性和家庭接触者；无家可归者；国际旅行者；有孩子上托儿所、儿童保育或学前班的人；以及在此类环境中工作的人(*13*, *372*)。

诊断考虑

HAV感染的诊断不能仅基于临床，而需要血清学检测。HAV IgM抗体的存在是急性HAV感染的诊断。总抗-HAV阳性测试表明对HAV感染的免疫，但不能区分当前与先前HAV感染。虽然通常不够敏感以检测疫苗接种后的低水平保护抗体，但抗-HAV测试在甲型肝炎疫苗接种后也可能阳性。

治疗

急性HAV感染患者通常只需要支持性护理，饮食或活动无限制。因恶心和呕吐而脱水的患者可能需要住院，对于有急性肝衰竭迹象或症状的患者至关重要。可能引起肝损伤或由肝脏代谢的药物在HAV感染者中应谨慎使用。

预防

疫苗接种是预防感染风险人群(如MSM、注射吸毒者和慢性肝病患者)中HAV传播的最有效手段，这些人群在儿童期未接种甲型肝炎疫苗。甲型肝炎疫苗由经福尔马林灭活、细胞培养来源的HAV制备。两种单价疫苗(Havrix和Vaqta)已获FDA批准用于年龄≥12个月的人群(表3)。这些疫苗可通过VFC项目(https://www.cdc.gov/vaccines/programs/vfc/index.html)供符合条件的<19岁儿童和青少年使用。甲型肝炎疫苗以2剂系列在0和6-12个月时IM给药,在几乎所有成人中诱导保护性抗体水平。第一剂后1个月,94%-100%的成人具有保护性抗体水平,第二剂后,100%达到保护性水平(*1297*,*1300*,*1301*)。成人抗体下降的动力学模型表明，保护性水平持续>40年(*1302 - 1304*)。一项对阿拉斯加原住民的研究表明，在12-21月龄完成2剂疫苗接种后，甲型肝炎血清学阳性持续>20年(1302)。在成年时接种2剂甲型肝炎疫苗的免疫 competent 成人中，抗-HAV持续>20年(*1303*,*1305*)。甲型肝炎和乙型肝炎联合疫苗(Twinrix)已

been developed and licensed for use as a 3-dose series for adults aged ≥18 years at risk for HAV or HBV infections. When administered IM on a 0-, 1-, and 6-month schedule, the vaccine has equivalent immunogenicity to that of the monovalent hepatitis A vaccines.

Pre-Exposure Vaccination

Persons at risk for HAV infection (Box 5) (*1297*) should be offered vaccine (Table 3). If persons are at risk for both HAV and HBV, the combined vaccine can be considered.

Prevaccination Serologic Testing

Among U.S.-born adults aged >20 years, HAV susceptibility prevalence (i.e., total antibody to HAV was negative) was 74.1% (95% CI: 72.9%–75.3%) during 2007–2016 (*1306*). Prevaccination serologic testing for HAV immunity before vaccination is not routinely recommended; however, it can be considered in specific settings to reduce costs by not vaccinating persons who are already immune. Prevaccination serologic testing should not be a barrier to vaccination of susceptible persons, especially for populations that are difficult to access. If prevaccination testing is performed, commercially available tests for total anti-HAV or IgG anti-HAV should be used (*1297*).

TABLE 3. Vaccines for preventing hepatitis A infection

Vaccine	Trade name (manufacturer)	Age group (yrs)	Dose	Route	Schedule	Booster
Hep A inactivated (2 doses)	Havrix (GlaxoSmithKline)	1–18	0.5 mL (720 ELISA units inactivated HAV)	IM	0, 6–12 mos	None
		≥19	1 mL (1,440 ELISA units inactivated HAV	IM	0, 6–12 mos	None
Hep A inactivated (2 doses)	Vaqta (Merck)	1–18	0.5 mL (25 units HAV antigen)	IM	0, 6–18 mos	None
		≥19	1 mL (50 units HAV antigen)	IM	0, 6–18 mos	None
Combined Hep A and Hep B* (3 doses)	Twinrix (GlaxoSmithKline)	≥18 (primary)	1 mL (720 ELISA units inactivated plus 20 μg HBsAg	IM	0, 1, 6 mos	None
		≥18 (accelerated)	1 mL (720 ELISA units inactivated plus 20 μg HBsAg	IM	0, 7, 21–30 days	12 mos

Source: Nelson NP, Weng MK, Hofmeister MG, et al. Prevention of hepatitis A virus infection in the United States: recommendations of the Advisory Committee on Immunization Practices, 2020. MMWR Recomm Rep 2020;69(No. RR-5).
Abbreviations: ELISA = enzyme-linked immunosorbent assay; HAV = hepatitis A virus; HBsAg = hepatitis B surface antigen; Hep A = hepatitis A; Hep B = hepatitis B; IM= intramuscular.
* Combined Hep A and Hep B vaccine (Twinrix) should not be used as postexposure prophylaxis.

BOX 5. Populations recommended for hepatitis A vaccination — Advisory Committee on Immunization Practices, 2020

Children
- All children aged 12–23 months
- Unvaccinated children and adolescents aged 2–18 years

Persons at increased risk for hepatitis A virus (HAV) infection
- International travelers
- Men who have sex with men
- Persons who use injecting or noninjecting drugs (i.e., all those who use illegal drugs)
- Persons with occupational risk for exposure
- Persons who anticipate close personal contact with an international adoptee
- Persons experiencing homelessness

Persons at increased risk for severe disease from HAV infection
- Persons with chronic liver disease
- Persons with HIV infection

Other persons recommended for vaccination
- Pregnant women at risk for HAV infection or severe outcome from HAV infection
- Any persons who requests a vaccine

Vaccination during outbreaks
- Unvaccinated persons in outbreak settings who are at risk for HAV infection or at risk for severe disease from HAV

Implementation strategies for settings providing services to adults
- Persons in settings that provide services to adults where a high proportion of those persons have risk factors for HAV infection

Hepatitis A vaccination is no longer recommended by the Advisory Committee on Immunization Practices
- Persons who receive blood products for clotting disorders (e.g., hemophilia)

Source: Nelson NP, Weng MK, Hofmeister MG, et al. Prevention of hepatitis A virus infection in the United States: recommendations of the Advisory Committee on Immunization Practices, 2020. MMWR Recomm Rep 2020;69(No. RR-5).

已开发并许可用作18岁及以上有HAV或HBV感染风险成人的3剂系列。当按0、1和6个月schedule IM给药时，疫苗具有与单价甲型肝炎疫苗等效的免疫原性。

暴露前疫苗接种

有HAV感染风险的人(框5)(1297)应提供疫苗(表3)。如果人有HAV和HBV风险，可以考虑联合疫苗。

接种前血清学检测

在年龄>20岁的美国出生成人中，2007-2016年期间HAV易感性患病率(即总HAV抗体阴性)为74.1%(95% CI:72.9%-75.3%)(1306)。不常规推荐在接种疫苗前进行HAV免疫力的血清学检测；然而，可在特定情况下考虑，通过不接种已免疫者来降低成本。接种前血清学检测不应成为易感者接种疫苗的障碍，尤其是对于难以接触的人群。如果进行接种前检测，应使用市售的总抗-HAV或IgG抗-HAV检测(1297)。

表3. 预防甲型肝炎感染的疫苗

疫苗	商品名(生产商)	年龄组(岁)	剂量	给药途径	接种程序	加强剂
甲型肝炎灭活疫苗（2剂）	Havrix(葛兰素史克)	1-18	0.5 mL(720 ELISA单位灭活甲肝病毒)	肌内注射	0,6-12个月	无
		≥19	1 mL(含1,440 ELISA单位灭活甲肝病毒			
甲型肝炎灭活疫苗（2剂）	Vaqta(默克)	1-18	0.5 mL(25单位HAV抗原)	肌内注射	0,6-18个月	无
		≥19	1 mL(50单位HAV抗原)			
甲型肝炎联合疫苗和乙肝*（3剂）	Twinrix(葛兰素史克)	≥18(主要)	1 mL(720 ELISA单位灭活加	肌内注射	0、1、6个月	无
		≥18(加速)	1 mL(720 ELISA单位灭活加 20 μ g HBsAg	肌内注	0、7、21-30天	12个月

来源： Nelson NP, Weng MK, Hofmeister MG, et al.Prevention of hepatitis A virus infection in the United States: recommendations of the Advisory Committee on **缩写：** ELISA = 酶联免疫吸附试验；HAV = 甲型肝炎病毒；HBsAg = 乙型肝炎表面抗原；Hep A = 甲型肝炎；Hep B = 乙型肝炎；* 甲型肝炎和乙型肝炎联合疫苗(Twinrix)不应作为暴露后预防使用。

免疫实践，2020。MMWR推荐报告2020;69(No.RR-5)。

IM=肌内注射。

BOX 5. 推荐接种甲型肝炎疫苗的人群--免疫实践咨询委员会，2020

儿童
- 所有12-23月龄儿童
- 未接种疫苗的2-18岁儿童和青少年

甲型肝炎病毒(HAV)感染风险增加的人群
- 国际旅行者
- 男男性行为者
- 使用注射或非注射药物(即，所有使用非法药物的人)
- 有职业暴露风险的人员
- 预计与以下对象有密切个人接触的人员国际被收养者
- 无家可归者

HAV感染后重症风险增加的人群
- 慢性肝病患者
- HIV感染者

建议接种疫苗的其他人群
- 有HAV感染风险或严重HAV感染的结果
- 任何请求接种疫苗的人

疫情暴发期间的疫苗接种
- 在疫情环境中未接种疫苗且处于以下情况的人员：有HAV感染风险或有HAV重症风险

为成人提供服务的机构的实施策略
- 为成人提供服务的场所中，相当比例的人存在HAV感染的危险因素

免疫实践咨询委员会不再推荐接种甲型肝炎疫苗
- 因凝血障碍接受血液制品的人(例如，血友病)

来源：Nelson NP, Weng MK, Hofmeister MG， 等。美国甲型肝炎病毒感染预防：咨询委员会建议免疫实践咨询委员会，2020年。MMWR推荐报告2020;69(编号 RR-5)。

Persons for whom prevaccination testing will likely be most cost-effective include adults who were either born in or lived for extensive periods in geographic areas where HAV endemicity is high or intermediate (*1297*). Prevaccination serologic testing of children is not indicated because of the low prevalence of infection among that age group.

For populations who are expected to have high rates of previous HAV infection, vaccination history should be obtained when feasible before testing or vaccination. Vaccination should not be postponed if vaccination history cannot be obtained, records are unavailable, or prevaccination testing is infeasible. Vaccinating persons immune from natural infection carries no known risk, nor does giving extra doses of hepatitis A vaccine (*1307*). Vaccination of a person who is already immune is not harmful. Persons who have a documented history of ≥2 doses of hepatitis A vaccine do not need further vaccination or serologic testing.

Postvaccination Serologic Testing

Serologic testing for immunity is unnecessary after routine vaccination of infants, children, or adults (*1297*). Testing for anti-HAV antibody after vaccination is recommended for persons whose subsequent clinical management depends on knowledge of their immune status and persons for whom revaccination might be indicated (e.g., persons with HIV infection and other immunocompromising conditions).

Postexposure Prophylaxis

Persons who recently have been exposed to HAV and who previously have not received hepatitis A vaccine should be administered a single dose of monovalent hepatitis A vaccine or immunoglobulin (IG) (0.1 mL/kg body weight) as soon as possible, ideally <2 weeks after exposure because the efficacy of vaccine or IG when administered >2 weeks after exposure has not been established (*1297*). In most cases, monovalent hepatitis A vaccine at the age-appropriate dose is preferred over IG for PEP. Advantages of hepatitis A vaccine for PEP include induction of active immunity, longer-term protection, ease of administration, and better acceptability and availability. Decisions to use vaccine versus IG should be guided by patient characteristics associated with more severe manifestations of HAV infection (e.g., older age, immunocompromising conditions, and chronic liver disease) and the magnitude of the risk for HAV transmission resulting from the exposure (*1297*).

IG should be used for children aged <6 months, immunocompromised persons, persons with chronic liver disease, and persons for whom vaccine is contraindicated. IG can be administered to persons aged >40 years, in addition to hepatitis A vaccine (*1297*).

IG administered IM can provide PEP against HAV (Table 4). IG is a sterile solution of concentrated immunoglobulins prepared

TABLE 4. Recommendations for hepatitis A postexposure prophylaxis and pre-exposure protection, by age group and risk category — Advisory Committee on Immunization Practices, 2020

Indication and age group	Risk category and health status	Hepatitis A vaccine	IG*
Postexposure prophylaxis			
0–11 mos	Healthy	No	0.1 mL/kg body weight
12 mos to 40 yrs	Healthy	1 dose†	None
>40 yrs	Healthy	1 dose†	0.1 mL/kg body weight§
≥12 mos	Immunocompromised or chronic liver disease	1 dose†	0.1 mL/kg body weight¶
≥12 mos	Vaccine contraindicated**	No	0.1 mL/kg body weight
Pre-exposure protection (e.g., travel)††			
<6 mos	Healthy	No	0.1–0.2 mL/kg body weight§§
6–11 mos	Healthy	1 dose¶¶	None
12 mos to 40 yrs	Healthy	1 dose***	None
>40 yrs	Healthy	1 dose***	0.1–0.2 mL/kg body weight§§,†††
>6 mos	Immunocompromised or chronic liver disease	1 dose***	0.1–0.2 mL/kg body weight§§,†††
>6 mos	Persons who elect not to receive vaccine or for whom vaccine is contraindicated**	No	0.1–0.2 mL/kg body weight§§

Source: Nelson NP, Weng MK, Hofmeister MG, et al. Prevention of hepatitis A virus infection in the United States: recommendations of the Advisory Committee on Immunization Practices, 2020. MMWR Recomm Rep 2020;69(No. RR-5).
Abbreviations: HAV = hepatitis A virus; IG = immune globulin.
* Measles, mumps, and rubella vaccine should not be administered for ≥2 weeks before and 6 months after administration of IG.
† A second dose of hepatitis A vaccine is not required for postexposure prophylaxis; however, for long-term immunity, the vaccination series should be completed with a second dose ≥6 months after the first dose.
§ The provider's risk assessment should determine the need for IG administration. If the provider's risk assessment determines that both vaccine and IG are warranted, hepatitis A vaccine and IG should be administered simultaneously at different anatomic sites (e.g., separate limbs).
¶ Vaccine and IG should be administered simultaneously at different anatomic sites (e.g., separate limbs).
** Life-threatening allergic reaction to a previous dose of hepatitis A vaccine or allergy to any vaccine component.
†† IG should be considered before travel for persons with special risk factors for either HAV infection or severe disease from HAV infection.
§§ 0.1 mL/kg body weight for travel ≤1 month; 0.2 mL/kg body weight for travel ≤2 months; 0.2 mL/kg every 2 months for travel of ≥2 months' duration.
¶¶ This dose should not be counted toward the routine 2-dose series, which should be initiated at age 12 months.
*** For persons not previously vaccinated with hepatitis A vaccine, administer dose as soon as travel is considered and complete the series according to routine schedule if the next dose is needed before travel.
††† Can be administered on the basis of the provider's risk assessment.

接种前检测最可能具有成本效益的人群包括在HAV高流行或中流行地区出生或长期居住的成人(1297)。不建议对儿童进行接种前血清学检测，因为该年龄组感染率较低。

对于预期既往HAV感染率较高的人群，应在检测或接种疫苗前尽可能获取疫苗接种史。如果无法获取疫苗接种史、记录不可用或接种前检测不可行，则不应推迟接种疫苗。对因自然感染而免疫者接种疫苗无已知风险，给予额外剂次的甲型肝炎疫苗也无已知风险(1307)。对已免疫者接种疫苗无害。有≥2剂甲型肝炎疫苗接种记录史者无需进一步接种疫苗或血清学检测。

疫苗接种后血清学检测

婴儿、儿童或成人常规接种后无需进行免疫血清学检测(1297)。对于后续临床管理取决于其免疫状态以及可能需要再接种的人群(例如HIV感染者和其他免疫功能低下者)，建议在接种后检测抗-HAV抗体。

暴露后预防

近期接触过HAV且既往未接种过甲型肝炎疫苗者，应尽快给予单剂单价甲型肝炎疫苗或免疫球蛋白(IG)(0.1 mL/kg体重)，理想情况下应在暴露后<2周内接种,因为暴露后>2周接种疫苗或IG的有效性尚未确立(1297)。在大多数情况下，对于PEP，首选按年龄相应剂量接种单价甲型肝炎疫苗而非IG。甲型肝炎疫苗用于PEP的优点包括诱导主动免疫、保护时间更长、易于接种以及更好的可接受性和可及性。选择使用疫苗还是IG的决定应依据与HAV感染更严重表现相关的患者特征(例如年龄较大、免疫功能受损状况和慢性肝病)以及暴露所致HAV传播风险的大小(1297)。

对于年龄<6个月的儿童、免疫功能低下者、慢性肝病患者以及疫苗禁忌者，应使用免疫球蛋白（IG）。对于年龄>40岁的人群，除甲型肝炎疫苗外，还可给予免疫球蛋白（1297）。

IM给予的IG可提供针对HAV的PEP(Table 4)。IG是由浓缩免疫球蛋白制备的无菌溶液

TABLE 4. 按年龄组和风险类别划分的甲型肝炎暴露后预防和暴露前保护建议--Advisory 免疫实践咨询委员会，2020

适应症和年龄组	风险类别与健康状况	甲型肝炎疫苗	IG*
暴露后预防			
0-11个月	健康	否	0.1 mL/kg体重
12个月至40岁		1 dose †	无
>40年	健康		0.1 mL/kg 体重
≥12个月	免疫功能低下或慢性肝病	1 dose †	0.1 mL/kg 体重¶
	疫苗禁忌**	否	0.1 mL/kg体重
暴露前保护(例如旅行)† †			
<6个月	健康	否	0.1-0.2 mL/kg 体重
6-11个月		1 剂¶¶	无
12个月至40岁	健康	1剂***	
>40年			0.1-0.2 mL/kg 体重,†††
>6个月	免疫功能低下或慢性肝病	1剂***	
	选择不接种疫苗或对其疫苗是禁忌的**	否	0.1-0.2 mL/kg 体重

来源：Nelson NP, Weng MK, Hofmeister MG， 等。美国甲型肝炎病毒感染预防：咨询委员会免疫实践，2020。MMWR推荐报告2020;69(No.RR-5)。
缩写： HAV = 甲型肝炎病毒；IG = 免疫球蛋白。
* 麻疹、腮腺炎和风疹疫苗不应在给予IG前≥2周内以及给予IG后6个月内接种。
† 暴露后预防不需要第二剂甲型肝炎疫苗；然而，为获得长期免疫，应完成疫苗接种系列在首剂后≥6个月接种第二剂。
§ 提供者的风险评估应确定是否需要给予IG。如果提供者的风险评估确定疫苗和IG均有必要，
¶ 甲型肝炎疫苗和IG应在不同解剖部位同时给予(例如，不同肢体)。
** 对既往甲型肝炎疫苗剂量有危及生命的过敏反应或对任何疫苗成分过敏。
†† 对于具有HAV感染或HAV感染所致严重疾病特殊风险因素的人群，应考虑在旅行前给予IG。旅行≤1个月：0.1 mL/kg体重；旅行≤2个月：0.2 mL/kg体重；旅行≥2个月：每2个月0.2 mL/kg。
¶¶ 该剂量不应计入常规2剂系列，常规系列应在12月龄时开始。
*** 对于既往未接种甲型肝炎疫苗的人群，应在考虑旅行时尽快给予剂量，并按常规完成系列如果旅行前需要接种下一剂，请安排时间。
††† 可根据提供者的风险评估进行给药。

from pooled human plasma processed by cold ethanol fractionation. In the United States, IG is produced only from plasma that has tested negative for HBsAg, antibodies to HIV and HCV, and HIV and HCV RNA. In addition, the process used to manufacture IG inactivates viruses (e.g., HBV, HCV, and HIV). When administered IM <2 weeks after exposure to HAV, IG is >85% effective in preventing HAV infection (*1308*).

If IG is administered to persons for whom hepatitis A vaccine also is recommended, a dose of vaccine should be provided simultaneously with IG in different anatomic sites (e.g., different limbs) as soon as possible, and the second vaccine dose should be administered according to the licensed schedule to complete the series. The combined vaccine can be considered for persons among whom both hepatitis A and hepatitis B vaccine is recommended (*13*,*1297*,*1302*–*1304*).

Special Considerations

For persons with HIV infection, antibody response can be directly related to CD4+ T-cell levels. Although persons with HIV who have lower CD4+ T-cell counts or percentages might have a weaker response to the vaccine, vaccination should not be delayed for the CD4+ T-cell count to exceed a certain threshold because of the prolonged risk for HAV exposure created by missed opportunities to vaccinate.

Hepatitis B Virus Infection

The incubation period for HBV infection from time of exposure to symptom onset ranges from 6 weeks to 6 months. The highest concentrations of HBV are located in blood, with lower concentrations in other body fluids including wound exudates, semen, vaginal secretions, and saliva (*1309*,*1310*). HBV is more infectious and more stable in the environment than other bloodborne pathogens (e.g., HCV or HIV).

HBV infection can be either self-limited or chronic. Among adults, approximately half of newly acquired HBV infections are symptomatic, and approximately 1% of reported cases result in acute liver failure and death (*1311*). Risk for chronic infection is inversely related to age at acquisition; approximately 90% of infected infants and 30% of infected children aged <5 years become chronically infected, compared with 2%–6% of persons who become infected as adults (*1312*). Among persons with chronic HBV infection, the risk for premature death from cirrhosis or hepatocellular carcinoma is 15%–25% (*1313*).

HBV is efficiently transmitted by percutaneous or mucous membrane exposure to HBV-infected blood or body fluids that contain HBV. The primary risk factors associated with infection among adolescents and adults are unprotected sex with an infected partner, having multiple partners, men having sex with men, having history of other STIs, and injecting drug use (*233*). In addition, studies have demonstrated other modes of HBV transmission, including premastication and lapses in health care infection control procedures, as less common sources of transmission (*1314*–*1317*).

CDC's national strategy for eliminating transmission of HBV infection includes prevention of perinatal infection through routine screening of all pregnant women for HBsAg and immunoprophylaxis of infants born to mothers with HBsAg or mothers whose HBsAg status is unknown, routine infant vaccination, vaccination of previously unvaccinated children and adolescents through age 18 years, and vaccination of previously unvaccinated adults at increased risk for infection (*12*). High vaccination coverage rates with subsequent decreases in acute HBV infection incidence have been achieved among infants and adolescents (*1318*). The vaccination of persons as children and adolescents likely has led to improved vaccination coverage among adults aged <30 years (*1319*) and corresponding lower rates of acute HBV infection among this group. In contrast, vaccination coverage among the majority of adult populations at high risk aged ≥30 years (e.g., persons with multiple sex partners, MSM, and injecting drug users) has remained low (*1320*,*1321*); these groups account for the highest rates of preventable acute infections (*12*,*1319*,*1322*). STD clinics and other health care settings providing STI services to adults at high risk for infection should administer hepatitis B vaccine to those who are unvaccinated.

Diagnosis

Diagnosis of acute or chronic HBV infection requires serologic testing (Table 5). Because HBsAg is present in both acute and chronic infection, presence of IgM antibody to hepatitis B core antigen (IgM anti-HBc) is diagnostic of acute or recently acquired HBV infection. Antibody to HBsAg (anti-HBs) is produced after a resolved infection and is the only HBV antibody marker present after vaccination. The presence of HBsAg and anti-HBc, with a negative test for IgM anti-HBc, indicates chronic HBV infection. The presence of total anti-HBc alone might indicate acute, resolved, or chronic infection or a false-positive result.

Treatment

No specific therapy is available for persons with acute HBV infection; treatment is supportive. Persons with chronic HBV infection should be referred for evaluation to a provider experienced in managing such infections. Therapeutic agents approved by FDA for treatment of chronic HBV infection can achieve sustained suppression of HBV replication and remission of liver disease (*1323*).

其来源于经冷乙醇分馏处理的混合人血浆。在美国，IG仅由HBsAg、HIV和HCV抗体以及HIV和HCV RNA检测均为阴性的血浆生产。此外，IG的生产工艺可灭活病毒(例如HBV、HCV和HIV)。在暴露于HAV后<2周内IM给予时,IG预防HAV感染的有效性>85%(1308)。

如果向同时也推荐接种甲型肝炎疫苗的人员给予IG，则应尽快在不同解剖部位(例如不同肢体)同时给予一剂疫苗与IG，并应按许可的免疫程序给予第二剂疫苗以完成全程接种。对于同时推荐接种甲型肝炎和乙型肝炎疫苗的人员，可考虑使用联合疫苗(*13*、*1297*、*1302* - *1304*)。

特殊考虑

对于HIV感染者，抗体应答可与CD4 + T细胞水平直接相关。尽管CD4 + T细胞计数或百分比较低的HIV感染者对疫苗的应答可能较弱，但不应因等待CD4 + T细胞计数超过某一阈值而延迟接种，因为错过接种机会会造成HAV暴露的长期风险。

肝炎B病毒感染

HBV感染的潜伏期从暴露时至症状出现为6周至6个月。HBV浓度最高的是血液，其他体液包括伤口渗出液、精液、阴道分泌物和唾液中的浓度较低(*1309*,*1310*)。HBV比其他血源性病原体(例如HCV或HIV)更具传染性，在环境中也更稳定。

HBV感染既可为自限性，也可为慢性。在成人中，约半数新获得的HBV感染有症状，约1%的报告病例导致急性肝衰竭和死亡(1311)。慢性感染的风险与获得感染时的年龄呈负相关；约90%的受感染婴儿和30%的<5岁受感染儿童会转为慢性感染,而成人感染者为2%-6%(1312)。在慢性HBV感染者中,因肝硬化或肝细胞癌而过早死亡的风险为15%-25%(1313)。

HBV可通过经皮或黏膜暴露于含HBV的HBV感染血液或体液而有效传播。青少年和成人中与感染相关的主要风险因素是与感染伴侣进行无保护性行为、有多个性伴侣、男男性行为有其他STI病史以及注射吸毒(233)。此外，研究表明其他HBV传播方式，包括咀嚼喂食和卫生保健感染控制程序失误，是较少见的传播来源(*1314* - *1317*)。

CDC消除HBV感染传播的国家策略包括：通过对所有孕妇进行HBsAg常规筛查，并对HBsAg阳性母亲或HBsAg状态不明母亲所生婴儿进行免疫预防，来预防围产期感染；常规婴儿疫苗接种；对既往未接种疫苗的儿童和18岁以下青少年进行疫苗接种；以及对感染风险增加且既往未接种疫苗的成人进行疫苗接种(12)。婴儿和青少年中已实现高疫苗接种覆盖率，随后急性HBV感染发病率下降(1318)。儿童和青少年时期接种疫苗可能已导致<30岁成人的疫苗接种覆盖率提高(1319),并相应降低了该人群的急性HBV感染率。相比之下,大多数≥30岁高危成人人群(例如有多个性伴侣者、MSM和注射吸毒者)的疫苗接种覆盖率仍然较低(*1320*、*1321*)；这些人群占可预防急性感染的最高发病率(*12*、*1319*、*1322*)。为高危成人提供STI服务的STD诊所和其他卫生保健机构应向未接种者接种乙型肝炎疫苗。

诊断

急性或慢性HBV感染的诊断需要血清学检测(表5)。由于HBsAg在急性和慢性感染中均存在，乙型肝炎核心抗原IgM抗体(IgM anti-HBc)的存在可诊断急性或近期获得的HBV感染。HBsAg抗体(anti-HBs)在感染消退后产生，是疫苗接种后唯一存在的HBV抗体标志物。HBsAg和anti-HBc存在，而IgM anti-HBc检测阴性，提示慢性HBV感染。仅总anti-HBc存在可能提示急性、已消退或慢性感染，或假阳性结果。

治疗

急性HBV感染者无特异性治疗可用；治疗为支持性。慢性HBV感染者应转诊至有管理此类感染经验的提供者进行评估。FDA批准用于治疗慢性HBV感染的药物可实现HBV复制的持续抑制和肝病缓解(1323)。

TABLE 5. Interpretation of serologic test results* for hepatitis B virus infection

Serologic marker				
HBSAG	Total anti-HBc	IgM anti-HBc	Anti-HBs	Interpretation
–	–	–	–	Never infected
+†	–	–	–	Early acute infection; transient (≤18 days) after vaccination
+	+	+	–	Acute infection
–	+	+	–	Acute resolving infection
–	+	–	+	Recovered from past infection and immune
+	+	–	–	Chronic infection
–	+	–	–	Past infection; low-level chronic infection§; passive transfer to infant born to HBsAg-positive mother; false positive (no infection)
–	–	–	+	Immune if concentration is >10 mIU/mL after vaccination, passive transfer after HBIG administration

Source: Adapted from Schillie S, Vellozzi C, Reingold A, et al. Prevention of hepatitis B virus infection in the United States: recommendations of the Advisory Committee on Immunization Practices. MMWR Recomm Rep 2018;67(No. RR-1).
Abbreviations: anti-HBc = antibody to hepatitis B core antigen; anti-HBs = antibody to hepatitis B surface antigen; HBIG = hepatitis B immune globulin; HBsAg = hepatitis B surface antigen; IgM = immunoglobulin M.
* – = negative test result; + = positive test result.
† To ensure that an HBsAg-positive test result is not false positive, samples with repeatedly reactive HBsAg results should be tested with a neutralizing confirmatory test cleared by the Food and Drug Administration.
§ Persons positive for only anti-HBc are unlikely to be infectious, except under unusual circumstances involving direct percutaneous exposure to large quantities of blood (e.g., blood transfusion or organ transplantation) or mutant HBsAg-related infection.

Prevention

Two products have been approved for HBV prevention: hepatitis B immune globulin (HBIG) for PEP and hepatitis B vaccine (*12*). HBIG provides temporary (i.e., 3–6 months) protection from HBV infection and is typically used as PEP as an adjunct to hepatitis B vaccination for previously unvaccinated persons or for persons who have not responded to vaccination. HBIG is prepared from plasma known to contain high concentrations of anti-HBs. The recommended dose of HBIG is 0.06 mL/kg body weight.

Hepatitis B vaccine contains HBsAg produced in yeast by recombinant DNA technology and provides protection from HBV infection when used for both pre-exposure vaccination and PEP. The three available monovalent hepatitis B vaccines for use in the United States are Recombivax HB, Engerix-B, and Heplisav-B. A combination hepatitis A and hepatitis B vaccine for use among persons aged ≥18 years, Twinrix, also is available.

When selecting a hepatitis B vaccination schedule, health care providers should consider the need to achieve completion of the vaccine series. The recommended HBV dose and schedule varies by product and age of recipient (Table 6). Three different 3-dose schedules for adolescents and adults have been approved for both monovalent hepatitis B vaccines (i.e., Engerix-B and Recombivax HB); these vaccines can be administered at 0, 1, and 6 months; 0, 1, and 4 months; or 0, 2, and 4 months. A 4-dose schedule of Engerix-B at 0, 1, 2, and 12 months is licensed for all age groups. A 2-dose schedule of Recombivax HB adult formulation (10 μg) is licensed for adolescents aged 11–15 years, with a 4-month minimal interval between doses. When scheduled to receive the second dose, adolescents aged 16–19 years should be switched to a 3-dose series, with doses 2 and 3 consisting of the pediatric formulation (5 μg) administered on a recommended schedule. Heplisav-B is a new single-antigen recombinant hepatitis B vaccine with a novel cytosine-phosphate-guanine 1018 oligodeoxynucleotide adjuvant for prevention of HBV infection among persons aged ≥18 years, administered as a 2-dose series at 0 and 1 month (>4 weeks apart) (*156*). Twinrix is a 3-dose schedule administered at 0, 1, and 6 months to persons aged ≥18 years at risk for both HAV and HBV infections.

Hepatitis B vaccine should be administered IM in the deltoid muscle and can be administered simultaneously with other vaccines. If the vaccine series is interrupted after the first or second dose of vaccine, the missed dose should be administered as soon as possible. The series does not need to be restarted after a missed dose. HBV vaccination is available for eligible children and adolescents aged <19 years through the VFC program (https://www.cdc.gov/vaccines/programs/vfc/contacts-state.html). When feasible, the same manufacturer's vaccines should be used to complete the series; however, vaccination should not be deferred when the manufacturer of the previously administered vaccine is unknown or when the vaccine from the same manufacturer is unavailable (*1324*).

Among adolescents and healthy adults aged <40 years, approximately 30%–55% achieve a protective antibody response (i.e., anti-HBs ≥10 mIU/mL) after the first single-antigen vaccine dose, 75% after the second, and >90% after the third. Recent clinical trials reported a protective antibody response achieved among approximately 90% of participants receiving Heplisav-B, compared with 70.5%–90.2% of participants receiving Engerix-B (*12*). Vaccine-induced immune memory has been demonstrated to persist for >30 years (*1325*–*1327*).

TABLE 5. 乙型肝炎病毒感染血清学检测结果的解读*

血清学标志物				
HBSAG	总抗-HBc IgM 抗-HBc		抗-HBs	解读
?	?	?	?	从未感染
+?				早期急性感染；接种疫苗后一过性(≤18天)急性感染
+	+	+	?	
?				急性消退期感染
	+	?	+	既往感染恢复并免疫慢性感染
+			?	
?	+	?		既往感染；低水平慢性感染;HBsAg 阳性母亲所生婴儿的被动转移；假阳性(无感染)
?	?	?	+	接种疫苗后浓度 >10 mIU/mL 即为免疫，HBIG 后为被动转移给药

来源： 改编自 Schillie S, Vellozzi C, Reingold A, et al.Prevention of hepatitis B virus infection in the United States: recommendations of the Advisory Committee **缩写：** anti-HBc = 乙型肝炎核心抗原抗体；anti-HBs = 乙型肝炎表面抗原抗体；HBIG = 乙型肝炎免疫球蛋白；HBsAg = " – = 阴性检测结果；+ = 阳性检测结果。
免疫实践咨询委员会。MMWR推荐报告 2018;67(编号 RR-1)。
乙型肝炎表面抗原；IgM = 免疫球蛋白 M。
† 为确保 HBsAg 阳性检测结果不是假阳性，HBsAg 结果反复反应性的样本应使用中和确认试验进行检测
经美国食品药品监督管理局批准的检测。
仅抗-HBc阳性者不太可能具有传染性，除非在涉及大量直接经皮暴露于大量血液的特殊情况下
血液(例如输血或器官移植)或突变HBsAg相关感染。

预防

有两种产品已获批用于HBV预防：用于PEP的乙型肝炎免疫球蛋白(HBIG)和乙型肝炎疫苗(12)。HBIG提供针对HBV感染的临时(即3-6个月)保护，通常作为PEP用于既往未接种疫苗者或对疫苗接种无应答者，作为乙型肝炎疫苗接种的辅助。HBIG由已知含有高浓度抗-HBs的血浆制备。HBIG的推荐剂量为0.06 mL/kg体重。

乙型肝炎疫苗含有通过重组DNA技术在酵母中产生的HBsAg，当用于暴露前疫苗接种和PEP时均可提供针对HBV感染的保护。美国可用的三种单价乙型肝炎疫苗为Recombivax HB、Engerix-B和Heplisav-B。还有一种用于≥18岁人群的甲型肝炎和乙型肝炎联合疫苗Twinrix。

在选择乙型肝炎疫苗接种程序时，卫生保健提供者应考虑完成疫苗系列接种的需要。推荐的HBV剂量和接种程序因产品和受种者年龄而异(表6)。针对青少年和成人，已有三种不同的3剂次程序获批用于单价乙型肝炎疫苗(即Engerix-B和Recombivax HB)；这些疫苗可按0、1和6个月；0、1和4个月；或0、2和4个月接种。Engerix-B的4剂次程序(0、1、2和12个月)已获批用于所有年龄组。Recombivax HB成人剂型(10 μg)的2剂次程序已获批用于11-15岁青少年，两剂之间最短间隔为4个月。当计划接种第二剂时，青少年16-19岁者应转换为3剂次系列，其中第2剂和第3剂由儿童剂型(5 μg)组成，按推荐程序接种。Heplisav-B是一种新的单抗原重组乙型肝炎疫苗，含有新型胞嘧啶-磷酸-鸟嘌呤1018寡脱氧核苷酸佐剂，用于预防≥18岁人群的HBV感染，按0和1个月(间隔>4周)2剂次系列接种(156)。Twinrix为3剂次程序，按0、1和6个月接种于≥18岁且同时有HAV和HBV感染风险者。

乙型肝炎疫苗应IM接种于三角肌，并可与其他疫苗同时接种。如果疫苗系列在接种第一剂或第二剂后中断，应尽快补种漏掉的剂次。漏种后无需重新开始系列。符合条件<19岁的儿童和青少年可通过VFC项目(https://www.cdc.gov/vaccines/programs/vfc/contacts-state.html)获得HBV疫苗接种。在可行的情况下,应使用同一制造商的疫苗完成系列;然而,当先前接种疫苗的制造商未知或无法获得同一制造商的疫苗时,不应推迟接种(1324)。

在青少年和<40岁健康成人中,约30%-55%在接种第一剂单抗原疫苗后达到保护性抗体应答(即抗-HBs ≥10 mIU/mL),第二剂后为75%,第三剂后>90%。近期临床试验报告，接受Heplisav-B的参与者中约90%达到保护性抗体应答，而接受Engerix-B的参与者中为70.5%-90.2%(12)。已证明疫苗诱导的免疫记忆可持续>30年(*1325 - 1327*)。

TABLE 6. Recommended doses of licensed formulations of hepatitis B vaccines

	Single-antigen vaccine						Combination vaccine	
	Recombivax HB		Engerix-B		Heplisav-B*		Twinrix†	
Age group (yrs)	Dose (μg)§	Volume (mL)	Dose (μg)§	Volume (mL)	Dose (μg)§	Volume (mL)	Dose (μg)§	Volume (mL)
Infants (<1)	5	0.5	10	0.5	—¶	—¶	NA	NA
Children (1–10)	5	0.5	10	0.5	—¶	—¶	NA	NA
Adolescents (11–15)	10**	1.0	NA	NA	—¶	—¶	NA	NA
Adolescents (11–19)	5	0.5	10	0.5	—¶	—¶	NA	NA
Adults (≥18)	—††	—††	—††	—††	20*	0.5	20†	1
Adults (≥20)	10	1.0	20	1.0	20†	0.5	20†	1
Hemodialysis patients and other immunocompromised persons (<20§§)	5	0.5	10	0.5	20	0.5	NA	NA
Hemodialysis patients and other immunocompromised persons (≥20)	40¶¶	1.0	40***	2.0	20	0.5	NA	NA

Source: Adapted from Schillie S, Vellozzi C, Reingold A, et al. Prevention of hepatitis B virus infection in the United States: recommendations of the Advisory Committee on Immunization Practices. MMWR Recomm Rep 2018;67(No. RR-1).
Abbreviation: NA = not applicable.
* Administered on a 2-dose schedule.
† Combined hepatitis A and B vaccines. This vaccine is recommended for persons aged ≥18 years who are at increased risk for both hepatitis B and hepatitis A virus infections.
§ Recombinant hepatitis B surface antigen protein dose.
¶ Heplisav-B should not be used for vaccination of infants, children, or adolescents because the safety and effectiveness of Heplisav-B has not been established in persons aged <8 years and is not approved for use in these populations.
** Adult formulation administered on a 2-dose schedule.
†† Engerix-B and Recombivax HB are approved for use in persons of all ages.
§§ Higher doses might be more immunogenic; however, no specific recommendations have been made.
¶¶ Dialysis formulation administered on a 3-dose schedule at 0, 1, and 6 months.
*** Two 1.0-mL doses administered at one site, on a 4-dose schedule at 0, 1, 2, and 6 months.

Periodic testing to determine antibody levels after routine vaccination among immunocompetent persons is unnecessary, and booster doses of vaccine are not recommended.

Hepatitis B vaccination is usually well tolerated by the majority of recipients. Pain at the injection site and low-grade fever are reported by a minority of recipients. For children and adolescents, a causal association exists between receipt of hepatitis B vaccination and anaphylaxis. For each 1.1 million doses of vaccine administered, approximately one recipient will experience this type of reaction (*1328*); however, no deaths have been reported among these patients (*1318*,*1328*). Vaccine is contraindicated for persons with a history of anaphylaxis after a previous dose of hepatitis B vaccine and persons with a known anaphylactic reaction to any vaccine component (*1329*). No other adverse events after administration of hepatitis B vaccine have been demonstrated.

Pre-Exposure Vaccination

Hepatitis B vaccination is recommended for all unvaccinated children and adolescents; all unvaccinated adults at risk for HBV infection, especially injecting drug users; MSM; adults with multiple sex partners; sex partners, needle-sharing contacts, or household contacts of persons with chronic hepatitis B; and persons with diabetes and all adults seeking protection from HBV infection (*1318*). For adults, acknowledgment of a specific risk factor is not a requirement for vaccination.

Hepatitis B vaccine should be routinely offered to all unvaccinated persons attending STD clinics and to all unvaccinated persons seeking evaluation or treatment for STIs in other settings, especially correctional facilities, facilities providing substance misuse treatment and prevention services, Federally Qualified Health Centers, and settings serving MSM (e.g., HIV infection care and prevention settings). If hepatitis B vaccine is unavailable at a particular facility, persons should be linked to a setting where they can receive vaccine. Persons with a reliable vaccination history (i.e., a written, dated record of each dose of a complete series) or reliable history of hepatitis B infection (i.e., a written record of infection and serologic results providing evidence of previous infection) do not require vaccination. In all settings, vaccination should be initiated at the initial visit, even if concerns about completion of the vaccine series exist.

Prevaccination Serologic Testing

Conducting prevaccination serologic testing for susceptibility just before the initial vaccine dose is administered can be considered for identifying persons with chronic HBV infection and, potentially, reducing the cost of completing the vaccination series for adult populations that have an expected high prevalence (20%–30%) of HBV infection (e.g., injecting drug users and MSM, especially those among older age groups, or persons born where HBV endemicity is moderate to high). In addition, prevaccination testing for susceptibility is

表6. 已获批乙型肝炎疫苗制剂的推荐剂量

	单价疫苗						联合疫苗	
	Recombivax HB		Engerix-B		Heplisav-B*		Twinrix †	
年龄组(岁)	剂量(μg)	体积(mL)	剂量(μg)	体积(mL)	剂量(μg)	体积(mL)	剂量(μg)	体积(mL)
婴儿（<1岁）	5	0.5	10	0.5	-¶	-¶	不适用	不适用
儿童（1–10岁）								
青少年（11–15岁）	10**	1.0	不适用	不适用	-¶	-¶	不适用	不适用
青少年（11–19岁）	5	0.5	10	0.5				
成人（≥18岁）	-??	-??	-??	-??	20*	0.5	20†	1
成人（≥20岁）	10	1.0	20	1.0	20†			
血液透析患者及其他免疫功能低下者(<20）	5	0.5	10	0.5	20	0.5	不适用	不适用
血液透析患者及其他免疫功能低下者（≥20）	40 ¶¶	1.0	40***	2.0	20	0.5	不适用	不适用

来源：改编自Schillie S, Vellozzi C, Reingold A, et al. Prevention of hepatitis B virus infection in the United States: recommendations of the Advisory Committee on Immunization Practices. MMWR Recomm Rep 2018;67(No. RR-1)。缩写：NA = 不适用。

* 按2剂次程序接种。

† 甲型和乙型肝炎联合疫苗。该疫苗推荐用于≥18岁且同时存在乙型肝炎和甲型肝炎病毒感染风险增加的人群重组乙型肝炎表面抗原蛋白剂量。

¶ Heplisav-B不应用于婴儿、儿童或青少年的疫苗接种，因为Heplisav-B的安全性和有效性尚未在**中确立。成人制剂按2剂次程序接种。年龄<8岁的人群,且未获准在这些人群中使用。

†† Engerix-B 和 Recombivax HB 获批用于所有年龄段人群。
更高剂量可能更具免疫原性；然而，尚未作出具体推荐。*** 在两个部位各接种1.0-mL剂量，按0、1、2和6个月4剂次程序接种。¶¶ 透析制剂按0、1和6个月3剂次程序接种。

免疫功能正常者常规接种后无需定期检测以确定抗体水平，也不推荐接种加强剂量。

乙型肝炎疫苗接种通常为大多数受种者所良好耐受。少数受种者报告注射部位疼痛和低热。对于儿童和青少年，接种乙型肝炎疫苗与过敏反应之间存在因果关联。每接种110万剂疫苗，约有一名受种者会出现此类反应(1328)；然而，这些患者中未见死亡报告(*1318*, *1328*)。对既往接种乙型肝炎疫苗后发生过敏反应者以及已知对任何疫苗成分有过敏反应者，禁忌接种疫苗(1329)。乙型肝炎疫苗接种后未证实存在其他不良事件。

暴露前疫苗接种

推荐所有未接种疫苗的儿童和青少年接种乙型肝炎疫苗；所有有HBV感染风险的未接种疫苗成人，尤其是注射吸毒者；MSM；有多个性伴侣的成人；慢性乙型肝炎患者的性伴侣、共用针具接触者或家庭接触者；以及糖尿病患者和所有寻求HBV感染保护的成人(1318)。对于成人，无需确认具体危险因素即可接种疫苗。

应常规向所有到STD诊所就诊的未接种者，以及在其他场所(尤其是惩教机构、提供物质滥用治疗和预防服务的机构、联邦合格健康中心，以及服务MSM的场所，例如HIV感染照护和预防场所)寻求STI评估或治疗的所有未接种者提供乙型肝炎疫苗。如果某一特定机构无法获得乙型肝炎疫苗，应将患者转介至可获得疫苗的场所。有可靠疫苗接种史(即完整系列每一剂次均有书面、注明日期的记录)或可靠乙型肝炎感染史(即书面感染记录和提供既往感染证据的血清学结果)者无需接种疫苗。在所有场所，即使存在对完成疫苗系列的担忧，也应在初次就诊时开始接种。

接种前血清学检测

在接种首剂疫苗前进行接种前血清学易感性检测，可考虑用于识别慢性HBV感染者，并可能降低HBV感染预期高流行率(20%-30%)的成人人群(例如注射吸毒者和MSM，尤其是年龄较大群体中的这些人，或出生在HBV中度至高度地方性流行地区的人)完成疫苗接种系列的费用。此外，接种前易感性检测应

recommended for unvaccinated household, sexual, and needle-sharing contacts of HBsAg-positive persons (*1318*). Serologic testing should not be a barrier to vaccination. The first vaccine dose should be administered immediately after collection of the blood sample for serologic testing. Vaccination of persons who are immune to HBV infection because of current or previous infection or vaccination is not harmful and does not increase the risk for adverse events.

Prevaccination testing should be performed with HBsAg, anti-HBs, and total anti-HBc to define patients' HBV clinical status and deliver recommended care (*1330*). Persons who test HBsAg positive should receive prevention counseling and evaluation for antiviral treatment (see Management of Persons Who Are HBsAg Positive). Persons who test total anti-HBc positive and anti-HBs positive should be counseled that they have had previous HBV infection and are immune. Those persons with isolated anti-HBc (i.e., negative HBsAg and anti-HBs) need further assessment to rule out occult HBV infection, and they are at higher risk for reactivation if exposed to immunosuppressants. Persons who test negative to all three HBV seromarkers should receive the complete vaccination series, with the first vaccine dose administered immediately.

Postvaccination Serologic Testing for Response

Postvaccination serologic testing for immunity is unnecessary after routine vaccination of adolescents or adults. However, such testing is recommended for persons whose subsequent clinical management depends on knowledge of their immune status. Persons recommended to receive postvaccination serologic testing include health care personnel and public safety workers, persons with HIV infection, sex and needle-sharing partners of HBsAg-positive persons, hemodialysis patients and others who might require outpatient hemodialysis (e.g., predialysis, peritoneal dialysis, or home dialysis), and other immunocompromised persons (e.g., hematopoietic stem-cell transplant recipients or persons receiving chemotherapy) (*1318*).

If indicated, anti-HBs testing should be performed 1–2 months after administration of the last dose of the vaccine series. Persons determined to have anti-HBs levels of <10 mIU/mL after the primary vaccine series should be revaccinated with a 3-dose series and tested again for anti-HBs 1–2 months after the third dose. Persons who do not respond to revaccination should be tested for HBsAg and HBc. If HBsAg positive, persons should receive recommended management (see Management of Persons Who Are HBsAg Positive). If HBsAg negative, persons should be considered susceptible to HBV infection and counseled about precautions for preventing HBV infection and the need for HBIG PEP for any known exposure. If isolated anti-HBc positive (i.e., negative HBsAg and anti-HBs), persons will need further assessment to rule out occult HBV infection and are at higher risk for reactivation if exposed to immunosuppressants.

Postexposure Prophylaxis

Both passive and active PEP (simultaneous administration of HBIG [i.e., 0.06 mL/kg body weight] and hepatitis B vaccine at separate anatomic sites) and active PEP (administration of hepatitis B vaccination alone) have been demonstrated to be highly effective in preventing transmission after exposure to HBV (*12*). HBIG alone also has been demonstrated to be effective in preventing HBV transmission; however, with the availability of hepatitis B vaccine, HBIG typically is used as an adjunct to vaccination.

Exposure to a Source Who Is HBsAg Positive

Unvaccinated persons or persons known not to have responded to a complete hepatitis B vaccine series should receive both HBIG and hepatitis vaccine as soon as possible (preferably ≤24 hours) after a discrete, identifiable exposure to blood or body fluids that contain blood from a person with HBsAg (Table 7). Hepatitis B vaccine should be administered simultaneously with HBIG at a separate anatomic site, and the vaccine series should be completed by using the age-appropriate vaccine dose and schedule (Table 6). Exposed persons who are not fully vaccinated because they have not completed the vaccine series should receive HBIG (i.e., 0.06 mL/kg body weight) and complete the vaccine series. Persons who have written documentation of a complete hepatitis B vaccine series who did not receive postvaccination testing should receive a single vaccine booster dose. Exposed persons who are known to have responded to vaccination by postvaccination testing are considered protected; therefore, they need no additional doses of vaccine or HBIG. All persons with an occupational exposure to blood or body fluids that contain HBV should be managed according to guidelines (*12*).

Exposure to a Source with Unknown HBsAg Status

Unvaccinated persons and persons with previous nonresponse to hepatitis B vaccination who have a discrete, identifiable exposure to blood or body fluids containing blood from a person with unknown HBsAg status should receive the hepatitis B vaccine series, with the first dose initiated as soon as possible after exposure (preferably <24 hours) and the series completed according to the age-appropriate dose and schedule. Exposed persons who are not fully vaccinated but started the series should complete the vaccine series. Exposed persons with written documentation of a complete hepatitis B vaccine series who did not receive postvaccination testing require no further treatment.

推荐HBsAg阳性者的未接种疫苗家庭接触者、性接触者和共用针具接触者接种(1318)。血清学检测不应成为疫苗接种的障碍。第一剂疫苗应在采集血样进行血清学检测后立即接种。因当前或既往感染或接种疫苗而对HBV感染免疫者接种疫苗无害，且不增加不良事件风险。

接种前检测应使用HBsAg、anti-HBs和总anti-HBc进行，以明确患者的HBV临床状态并提供推荐医疗照护(1330)。HBsAg检测阳性者应接受预防咨询和抗病毒治疗评估(见HBsAg阳性者的管理)。总anti-HBc阳性和anti-HBs阳性者应被告知其既往感染过HBV并已具有免疫力。单纯anti-HBc阳性者(即HBsAg和anti-HBs阴性)需要进一步评估以排除隐匿性HBV感染，且若暴露于免疫抑制剂，其再激活风险较高。三项HBV血清标志物均阴性者应接受完整疫苗接种系列，并立即接种首剂疫苗。

疫苗接种后血清学应答检测

青少年或成人常规接种后无需进行接种后血清学免疫检测。然而，对于后续临床管理取决于其免疫状态知晓情况的人员，推荐进行此类检测。推荐接受接种后血清学检测的人员包括医护人员和公共安全工作人员、HIV感染者、HBsAg阳性者的性伴侣和共用针具伴侣、血液透析患者及其他可能需要门诊血液透析者(例如透析前、腹膜透析或家庭透析)，以及其他免疫功能低下者(例如造血干细胞移植受者或接受化疗者)(1318)。

如有指征，应在接种疫苗系列最后一剂后1-2个月进行anti-HBs检测。初次疫苗系列后确定anti-HBs水平<10 mIU/mL者应重新接种3剂系列,并在第三剂后1-2个月再次检测anti-HBs。对重新接种无应答者应检测HBsAg和HBc。若HBsAg阳性,应接受推荐管理(见HBsAg阳性者的管理)。若HBsAg阴性,应视为对HBV感染易感,并接受关于预防HBV感染注意事项的咨询,以及任何已知暴露均需HBIG PEP。若单纯anti-HBc阳性(即HBsAg和anti-HBs阴性),则需要进一步评估以排除隐匿性HBV感染，若暴露于免疫抑制剂，其再激活风险更高。

暴露后预防

被动和主动PEP(在不同解剖部位同时给予HBIG[即0.06 mL/kg体重]和乙型肝炎疫苗)以及主动PEP(单独给予乙型肝炎疫苗接种)均已被证明在暴露于HBV后预防传播方面高度有效(12)。单独使用HBIG也已被证明可有效预防HBV传播；然而，随着乙型肝炎疫苗的可及性，HBIG通常被用作疫苗接种的辅助手段。

暴露于HBsAg阳性传染源

未接种疫苗者或已知对完整乙型肝炎疫苗系列无应答者，在明确、可识别的暴露于HBsAg阳性者的血液或含血液的体液后，应尽快(最好≤24小时)同时接受HBIG和乙型肝炎疫苗(表7)。乙型肝炎疫苗应与HBIG在不同解剖部位同时给予，并应使用适龄疫苗剂量和程序完成疫苗系列(表6)。因未完成疫苗系列而未完全接种的暴露者应接受HBIG(即0.06 mL/kg体重)并完成疫苗系列。有书面文件证明已完成乙型肝炎疫苗系列但未接受接种后检测者，应接受单剂疫苗加强针。经接种后检测已知对疫苗接种有应答的暴露者被视为已受保护；因此，他们无需额外剂量的疫苗或HBIG。所有职业性暴露于含HBV的血液或体液者应按指南管理(12)。

暴露于HBsAg状态不明的传染源

未接种疫苗者以及既往对乙型肝炎疫苗接种无应答者，在明确、可识别的暴露于HBsAg状态不明者的血液或含血液的体液后，应接受乙型肝炎疫苗系列，首剂应在暴露后尽快开始(最好<24小时),并按适龄剂量和程序完成系列。未完全接种但已开始系列的暴露者应完成疫苗系列。有书面文件证明已完成乙型肝炎疫苗系列但未接受接种后检测的暴露者无需进一步治疗。

TABLE 7. Guidelines for postexposure prophylaxis* of persons with nonoccupational exposure† to blood or body fluids that contain blood, by exposure type and hepatitis B vaccination status

Source of exposure	Unvaccinated person§	Previously vaccinated person¶
HBsAg-positive source Percutaneous (e.g., bite or needlestick) or mucosal exposure to HBsAg-positive blood or body fluids ***or*** Sex or needle-sharing contact with an HBsAg-positive person ***or*** Victim of sexual assault or abuse by an assailant who is HBsAg positive	Administer hepatitis B vaccine series and HBIG	Complete hepatitis B vaccine series and HBIG, if vaccine series not completed ***or*** Administer hepatitis B vaccine booster dose, if previous vaccination without testing**
Source with unknown HBsAg status Percutaneous (e.g., bite or needlestick) or mucosal exposure to potentially infectious blood or body fluids from a source with unknown HBsAg status ***or*** Sex or needle-sharing contact with person with unknown HBsAg status ***or*** Victim of sexual assault or abuse by a perpetrator with unknown HBsAg status	Administer hepatitis B vaccine series	Complete hepatitis B vaccine series

Sources: CDC. CDC guidance for evaluating health-care personnel for hepatitis B virus protection and for administering postexposure management. MMWR Recomm Rep 2013;62(No. RR-10); CDC. Postexposure prophylaxis to prevent hepatitis B virus infection. MMWR Recomm Rep 2006;55(No. RR-16).
Abbreviations: HBIG = hepatitis B immune globulin; HBsAg = hepatitis B surface antigen.

* When indicated, immunoprophylaxis should be initiated as soon as possible, preferably within 24 hours. Studies are limited regarding the maximum interval after exposure during which postexposure prophylaxis is effective, but the interval is unlikely to exceed 7 days for percutaneous exposures or 14 days for sexual exposures. The hepatitis B vaccine series should be completed. These guidelines apply to nonoccupational exposures.
† These guidelines apply to nonoccupational exposures.
§ A person who is in the process of being vaccinated but who has not completed the vaccine series should complete the series and receive treatment for hepatitis B as indicated.
¶ A person who has written documentation of a complete hepatitis B vaccine series and who did not receive postvaccination testing.
** No booster dose is needed for persons who have written documentation of hepatitis B vaccine series with serologic response.

Other Management Considerations

All persons with HBV infection should be tested for HIV, syphilis, gonorrhea, and chlamydia.

Management of Persons Who Are HBsAg Positive

Recommendations for management of all persons with HBsAg include the following:

- All persons with HBsAg documented on laboratory results should be reported to the state or local health department.
- To verify the presence of chronic HBV infection, persons with HBsAg should be retested. The absence of IgM anti-HBc or the persistence of HBsAg for ≥6 months indicates chronic HBV infection.
- Persons with chronic HBV infection should be referred for evaluation to a specialist experienced in managing chronic hepatitis B infection.
- Household, sexual, and needle-sharing contacts of persons with chronic infection should be evaluated. Unvaccinated sex partners and household and needle-sharing contacts should be tested for susceptibility to HBV infection and receive the first dose of hepatitis B vaccine immediately after collection of the blood sample for serologic testing (see Prevaccination Serologic Testing). Susceptible persons should complete the vaccine series by using an age-appropriate vaccine dose and schedule.
- Sex partners of persons with HBsAg should be counseled to use latex condoms (*1331*) to protect themselves from sexual exposure to infectious body fluids (e.g., semen and vaginal secretions), unless they have been demonstrated to be immune after vaccination (anti-HBs ≥10 mIU/mL) or previously infected (anti-HBc positive).
- To prevent or reduce the risk for transmission to others in addition to vaccination, persons with HBsAg also should be advised to
  - use methods (e.g., condoms) to protect nonimmune sex partners from acquiring HBV infection from sexual activity until the partner can be vaccinated and immunity documented;
  - cover cuts and skin lesions to prevent spread by infectious secretions or blood;
  - refrain from donating blood, plasma, body organs, other tissue, or semen; and
  - refrain from sharing household articles (e.g., toothbrushes, razors, or personal injecting equipment) that could become contaminated with blood, and refrain from premastication of food.
- To protect the liver from further harm, persons with HBsAg should be advised to

表7. 非职业性暴露 † 于含血液的血液或体液者暴露后预防*指南，按暴露类型和乙型肝炎疫苗接种状态

暴露来源	未接种疫苗者	既往接种过疫苗者 ¶
HBsAg阳性传染源 经皮(如咬伤或针刺)或黏膜 接触HBsAg阳性血液或体液 或 与HBsAg-者发生性接触或共用针具 阳性者 或 性侵犯或性虐待受害者，其侵害者为攻击者 HBsAg阳性者	接种乙型肝炎疫苗系列和HBIG	完成乙型肝炎疫苗系列接种和HBIG，如果 疫苗系列未完成 或 接种乙型肝炎疫苗加强剂量，如果 既往接种疫苗但未检测**
HBsAg 状态不明的来源 经皮(如咬伤或针刺)或黏膜 接触可能具有传染性的血液或体液 来自HBsAg状态不明的来源的体液 或 与患有以下疾病的人发生性接触或共用针具接触： HBsAg状态未知 或 性侵犯或虐待行为的受害者 HBsAg状态未知者	接种乙型肝炎疫苗系列	完成乙型肝炎疫苗系列

来源： CDC.CDC guidance for evaluating health-care personnel for hepatitis B virus protection and for administering postexposure management.MMWR Recomm Rep 2013;62(No.RR-10); CDC.postexposure prophylaxis to prevent hepatitis B virus infection.MMWR Recomm Rep 2006;55(No.RR-16).**缩写：** HBIG = 乙型肝炎免疫球蛋白；HBsAg = 乙型肝炎表面抗原。

* 如有指征，应尽快启动免疫预防，最好在24小时内。关于最长间隔时间的研究有限，之后
暴露后预防有效的最大间隔时间的研究有限，但经皮暴露的间隔不太可能超过7天，性暴露不太可能超过14天。应完成乙型肝炎疫苗系列接种。这些指南适用于非职业性暴露。

† 这些指南适用于非职业性暴露。

正在接种疫苗但尚未完成疫苗系列接种者应完成系列接种并接受乙型肝炎治疗 ¶ 有完整乙型肝炎疫苗系列接种书面记录但未接受接种后检测者。** 有乙型肝炎疫苗系列接种书面记录且血清学应答者无需加强剂量。

如所示。

其他管理考虑

所有HBV感染者均应检测HIV、梅毒、淋病和衣原体。

HBsAg阳性者的管理

对所有HBsAg阳性者的管理建议包括以下内容：

- 所有实验室结果记录有 HBsAg 的人员
  应报告至州或地方卫生部门。
- 为确认慢性HBV感染的存在，人员
  HBsAg阳性者应重新检测。IgM抗-HBc缺失或HBsAg持续≥6个月表明慢性HBV感染。

- 慢性HBV感染者应转诊
  转诊至有慢性乙型肝炎感染管理经验的专科医生进行评估。

- 家庭、性接触及共用针具接触者
  慢性感染者应进行评估。未接种疫苗的性伴侣以及家庭和共用针具接触者应检测HBV感染易感性，并在采集血样进行血清学检测后立即接种第一剂乙型肝炎疫苗(见接种前血清学检测)。
  易感者

应使用适龄疫苗剂量和程序完成疫苗系列接种。

- 应向 HBsAg 阳性者的性伴侣提供咨询
  使用乳胶避孕套(1331)以保护自己免受感染性体液(例如精液和阴道分泌物)的性暴露，除非已证明接种疫苗后免疫(抗-HBs ≥10 mIU/mL)或既往感染(抗-HBc阳性)。

- 为预防或降低向他人传播的风险，在
  除接种疫苗外，HBsAg阳性者还应被建议
  - 使用 methods(例如 condoms)来保护 nonimmune sex
    伴侣在接种疫苗并记录免疫之前避免通过性活动感染HBV;
  - 覆盖割伤和皮肤病变，以防止通过以下方式传播
    感染性分泌物或血液；
  - 避免捐献血液、血浆、身体器官、其他
    组织、或精液；以及
  - 避免共用家庭用品(例如，
    牙刷、剃刀或个人注射器具)可能被血液污染，并避免预先咀嚼食物。

- 为保护肝脏免受进一步损害，患有
  应建议HBsAg

- avoid or limit alcohol consumption because of the effects of alcohol on the liver;
- refrain from starting any new medicines, including over-the-counter and herbal medicines, without checking with their health care provider; and
- obtain vaccination against hepatitis A.

When seeking medical or dental care, persons who are HBsAg positive should be advised to inform their health care providers of their HBsAg status so that they can be evaluated and managed. The following are key counseling messages for persons with HBsAg:

- HBV is not usually spread by hugging, coughing, food or water, sharing eating utensils or drinking glasses, or casual contact.
- Persons should not be excluded from work, school, play, childcare, or other settings because they are infected with HBV.
- Involvement with a support group might help patients cope with chronic HBV infection.
- HBV infection is a chronic condition that can be treated, and patients should receive prevention counseling and be evaluated for antiviral treatment.

Special Considerations

Pregnancy

Regardless of whether they have been previously tested or vaccinated, all pregnant women should be tested for HBsAg at the first prenatal visit and again at delivery if at high risk for HBV infection (see STI Detection Among Special Populations). Pregnant women at risk for HBV infection and without documentation of a complete hepatitis B vaccine series should receive hepatitis B vaccination. All pregnant women with HBsAg should be reported to state and local perinatal hepatitis B prevention programs and referred to a specialist. Information about management of pregnant women with HBsAg and their infants is available at https://www.cdc.gov/hepatitis/hbv/perinatalxmtn.htm.

HIV Infection

HIV infection can impair the response to hepatitis B vaccination. Persons with HIV should be tested for anti-HBs 1–2 months after the third vaccine dose (see Postvaccination Serologic Testing). Modified dosing regimens, including a doubling of the standard antigen dose and administration of additional doses, might increase the response rate and should be managed in consultation with an infectious disease specialist. Additional recommendations for management of persons with HBsAg and HIV infection are available (*98*).

Hepatitis C Virus Infection

HCV infection is the most common chronic bloodborne infection in the United States, with an estimated 2.4 million persons living with chronic infection (*1332*). HCV is not efficiently transmitted through sex (*1333–1335*). Studies of HCV transmission between heterosexual couples and MSM have yielded mixed results; however, studies have reported either no or minimally increased rates of HCV infection among partners of persons with HCV infection compared with partners of those without HCV (*1334*,*1336–1338*). However, data indicate that sexual transmission of HCV can occur, especially among persons with HIV infection. Increasing incidence of acute HCV infection among MSM with HIV infection has been reported in multiple U.S. (*96*,*236*,*239*,*1339*) and European cities (*237*,*1340–1342*). A recent systematic review reported an HCV incidence of 6.35 per 1,000 person years among MSM with HIV infection (*1343*). An association exists with high-risk and traumatic sexual practices (e.g., condomless receptive anal intercourse or receptive fisting) and concurrent genital ulcerative disease or STI-related proctitis (*237*,*1342*). HCV transmission among MSM with HIV infection has also been associated with group sex and chemsex (i.e., using recreational drugs in a sexual context) (*1344–1348*). Shedding of HCV in the semen and in the rectum of men with HIV infection has been documented (*1349*,*1350*). Certain studies have revealed that risk increases commensurate with increasing numbers of sex partners among heterosexual persons (*1337*,*1338*,*1351–1353*) and MSM with HIV infection (*1349*,*1354–1357*), especially if their partners are also coinfected with HIV (*237*,*1340*,*1354–1356*,*1358*). More recently, acute HCV infections have been reported among MSM on PrEP, increasing concerns that certain MSM might be at increased risk for incident HCV infection through condomless sexual intercourse with MSM with HCV infection (*1359*,*1360*).

Persons newly infected with HCV typically are either asymptomatic or have a mild clinical illness. HCV RNA can be detected in blood within 1–3 weeks after exposure. The average time from exposure to antibody to HCV (anti-HCV) seroconversion is 4–10 weeks, and anti-HCV can be detected among approximately 97% of persons by 6 months after exposure (*1361–1364*) (https://www.cdc.gov/hepatitis/hcv/hcvfaq.htm#section3).

Chronic HCV infection develops among 75%–85% of persons with HCV infection (*1365*,*1366*), and 10%–20% of persons with chronic infection develop cirrhosis in 20–30 years of active liver disease (*1367*). The majority of infected persons remain unaware of their infection because they are not clinically

- 避免或限制饮酒，因其影响
  酒精对肝脏的影响；
- 避免开始使用任何新药物，包括非处方药
  非处方药和草药，而未咨询其医疗保健提供者；以及
- 接种甲型肝炎疫苗。

在寻求医疗或牙科护理时，HBsAg阳性者应被告知向其医疗保健提供者告知其HBsAg状态，以便进行评估和管理。以下是针对HBsAg阳性者的关键咨询信息：

- HBV 通常不通过拥抱、咳嗽、食物或水传播，
  共用餐具或水杯，或日常接触。
- 不应将人员排除在工作、学校、玩耍之外，
  托儿所或其他场所，因为他们感染了HBV
- 参与支持小组可能对患者有所帮助
  应对慢性HBV感染。
- HBV 感染是一种可以治疗的慢性疾病，
  患者应接受预防咨询并评估抗病毒治疗。

特殊考虑

妊娠

无论既往是否接受过检测或接种疫苗，所有孕妇应在首次产前检查时检测HBsAg，如果HBV感染高风险，应在分娩时再次检测(见特殊人群中的STI检测)。有HBV感染风险且无完整乙型肝炎疫苗系列文件的孕妇应接受乙型肝炎疫苗接种。所有HBsAg阳性孕妇应报告至州和地方围产期乙型肝炎预防项目，并转诊至专科医生。关于HBsAg阳性孕妇及其婴儿管理的信息可在https://www.cdc.gov/ hepatitis/hbv/perinatalxmtn.htm获取。

HIV感染

HIV感染可损害对乙型肝炎疫苗接种的反应。HIV感染者应在第三剂疫苗后1-2个月检测anti-HBs(见接种后血清学检测)。改良给药方案，包括将标准抗原剂量加倍和给予额外剂量，可能提高应答率，应与感染病专家协商管理。针对HBsAg和HIV感染者的其他管理建议可参见(98)。

肝炎C病毒感染

HCV感染是美国最常见的慢性血源性感染，估计有240万人患有慢性感染(1332)。HCV不通过性行为有效传播(*1333 - 1335*)。关于异性伴侣和MSM之间HCV传播的研究结果不一；然而，研究报告称，与无HCV感染者的伴侣相比，HCV感染者的伴侣中HCV感染率要么没有增加，要么仅轻微增加(*1334*, *1336 - 1338*)。然而，数据表明HCV的性传播可以发生，尤其是在HIV感染者中。美国多个城市(*96*, *236*, *239*, *1339*)和欧洲城市(*237*, *1340 - 1342*)已报告HIV感染MSM中急性HCV感染发病率增加。最近一项系统综述报告HIV感染MSM中HCV发病率为6.35/1000人年(1343)。与高风险和创伤性性行为(如无套接受性肛交或接受性拳交)以及并发生殖器溃疡性疾病或STI相关直肠炎存在关联(*237*, *1342*)。HIV感染MSM中的HCV传播还与群交和chemsex(即在性情境中使用娱乐性药物)相关(*1344 - 1348*)。已有文献记录HIV感染男性精液和直肠中HCV的排放(*1349*, *1350*)。某些研究显示，风险随异性恋者(*1337*, *1338*, *1351 - 1353*)和HIV感染MSM(*1349*, *1354 - 1357*)性伴侣数量增加而相应增加，尤其是当其伴侣也合并感染HIV时(*237*, *1340*, *1354 - 1356*, *1358*)。最近，已报告接受PrEP的MSM中发生急性HCV感染，这增加了以下担忧：某些MSM可能因与HCV感染MSM进行无套性交而面临更高的新发HCV感染风险(*1359*, *1360*)。

新感染HCV的人通常无症状或表现为轻度临床疾病。暴露后1-3周内可在血液中检测到HCV RNA。从暴露到HCV抗体(抗-HCV)血清学阳转的平均时间为4-10周，暴露后6个月时约97%的人可检测到抗-HCV(*1361 - 1364*)(https://www.cdc.gov/hepatitis/hcv/ hcvfaq.htm#section3)。

75%-85%的HCV感染者会发展为慢性HCV感染(*1365*, *1366*),10%-20%的慢性感染者会在20-30年的活动性肝病后发展为肝硬化(1367)。大多数感染者不知道自己已感染，因为他们没有临床症状

ill. However, infected persons are a source of transmission to others and are at risk for cirrhosis and hepatocellular carcinoma decades after infection.

HCV is primarily transmitted parenterally, usually through shared drug-injecting needles and paraphernalia. HCV also can be transmitted through exposures in health care settings as a consequence of inadequate infection control practices (*1314*). Transmission after receipt of blood from donors and from transplantation of tissues and organs with HCV infection has occurred only rarely since 1992, when routine screening of these donated products was mandated in the United States (*1367*,*1369*). Tattoos applied in regulated settings have not been associated with HCV transmission, although those obtained in certain settings have been linked to such transmission (*1336*). Occupational and perinatal exposures also can result in transmission of HCV; however, such transmission is uncommon.

Acute HCV infection is a reportable condition in 49 states. Matching viral hepatitis and HIV surveillance registries, and molecular epidemiologic assessments, can facilitate early detection of social networks of HCV transmission among MSM with HIV infection.

CDC recommends hepatitis C screening at least once in a lifetime for all adults aged ≥18 years and for all women during each pregnancy, except in settings where the prevalence of HCV infection is <0.1% (*156*). One-time hepatitis C testing is also recommended regardless of age, setting, or recognized conditions or exposures (e.g., HIV infection, history of injecting drug use, or children born to women with HCV infection). Routine periodic HCV testing is recommended for persons with ongoing risk factors (e.g., injecting drug use or hemodialysis).

Diagnosis

Testing for HCV infection should include use of an FDA-cleared test for antibody to HCV (i.e., immunoassay, EIA, or enhanced CIA and, if recommended, a supplemental antibody test) followed by NAAT to detect HCV RNA for those with a positive antibody result (*1370*). Persons with HIV infection with low $CD4^+$ T-cell count might require further testing by NAAT because of the potential for a false-negative antibody assay.

Persons determined to have HCV infection (i.e., positive for HCV RNA) should be evaluated for treatment. Antibody to HCV remains positive after spontaneously resolving or successful treatment; therefore, subsequent testing for HCV reinfection among persons with ongoing risk factors should be limited to HCV RNA. Persons who have spontaneous resolution or who have undergone successful treatment are not immune to reinfection.

Treatment

HCV infection is curable, and persons with diagnosed HCV infection should be linked to care and treatment. Providers should consult existing guidelines to learn about the latest advances in treating HCV infection (https://www.hcvguidelines.org) and with hepatitis specialists, as needed. Persons at high risk for transmitting HCV to others should be treated both for individual benefit and to prevent HCV transmission.

Management of Sex Partners

Because incident HCV has not been demonstrated to occur among heterosexual couples followed over time (*1334*,*1371*–*1373*), condom use might not be necessary in such circumstances. Persons with HCV infection with one long-term, steady sex partner do not need to change their sexual practices. However, they should discuss the risk for transmission with their partner and discuss the need for testing (*234*) (https://www.cdc.gov/hepatitis/hcv/index.htm). Heterosexual persons and MSM with HCV infection and more than one partner, especially those with concurrent HIV infection, should protect their partners against HCV and HIV acquisition by using external latex condoms (*237*,*1358*,*1374*) and HIV PrEP. Partners of persons with HCV and HIV should be tested for both infections.

Other Management Considerations

All persons with HCV infection for whom HIV and HBV infection status is unknown should be tested for these infections. Those who have HIV or HBV infection should be referred for or provided with recommended care and treatment. Persons without previous exposure to HAV or HBV should be vaccinated.

Prevention

Reducing the burden of HCV infection and disease in the United States requires implementing both primary and secondary prevention activities. Primary prevention reduces or eliminates HCV transmission, whereas secondary prevention identifies persons through screening and then provides treatment to reduce chronic liver disease and other chronic diseases and HCV transmission. No vaccine for hepatitis C is available, and prophylaxis with IG is not effective in preventing HCV infection after exposure. PEP using direct-acting antivirals is not recommended.

Persons with HCV infection should be provided information about how to protect their liver from further harm (i.e., hepatotoxic agents); for instance, persons with HCV infection should be advised to avoid drinking alcohol and taking any new medicines, including over-the-counter or herbal medications, without checking with their clinician. In addition, a need for

疾病。然而，感染者是向他人的传播源，并且在感染数十年后面临肝硬化和肝细胞癌的风险。

HCV主要经胃肠外传播，通常通过共用注射毒品针具和器具。HCV也可通过卫生保健环境中的暴露传播，原因是感染控制措施不充分(1314)。自1992年美国强制对这些捐献产品进行常规筛查以来，接受HCV感染献血者血液以及移植HCV感染组织和器官后发生传播的情况极少(*1367*, *1369*)。在受监管场所进行的纹身未与HCV传播相关，尽管在某些场所获得的纹身与这种传播有关(1336)。职业和围产期暴露也可导致HCV传播；然而，这种传播不常见。

急性HCV感染在49个州属于需报告疾病。匹配病毒性肝炎和HIV监测登记，以及分子流行病学评估，有助于早期发现HIV感染MSM人群中HCV传播的社会网络。

CDC建议所有≥18岁成年人一生至少进行一次丙型肝炎筛查，并建议所有女性在每次妊娠期间进行筛查，但HCV感染患病率<0.1%的场所除外(156)。还建议无论年龄、场所或已识别的状况或暴露(例如HIV感染、注射吸毒史,或HCV感染女性所生儿童)如何,均进行一次丙型肝炎检测。对于存在持续危险因素(例如注射吸毒或血液透析)者,建议进行常规周期性HCV检测。

诊断

HCV感染检测应包括使用FDA批准的HCV抗体检测(即免疫测定、EIA或增强型CIA，以及如推荐，补充抗体检测)，随后对 antibody 结果阳性者进行NAAT以检测HCV RNA(1370)。$CD4^+$ T细胞计数低的HIV感染者可能需要进一步进行NAAT检测，因为抗体检测可能出现假阴性。

确定患有HCV感染(即HCV RNA阳性)的人应接受治疗评估。HCV抗体在自发性清除或成功治疗后仍保持阳性；因此，对于持续存在风险因素的人，后续HCV再感染检测应仅限于HCV RNA。自发性清除或成功接受治疗的人对再感染没有免疫力。

治疗

HCV感染是可治愈的，确诊HCV感染的人应被联系到护理和治疗。提供者应查阅现有指南以了解HCV感染治疗的最新进展(https://www.hcvguidelines.org)，并根据需要咨询肝炎专家。将HCV传播给他人的高风险人群应接受治疗，既为个人获益，也为预防HCV传播。

性伴侣的管理

由于在长期随访的异性 couples 中未证实发生新发HCV(*1334*, *1371* - *1373*)，在这种情况下可能不需要使用安全套。有一个长期稳定性伴侣的HCV感染者不需要改变其性行为。然而，他们应与伴侣讨论传播风险并讨论检测的必要性(234)(https://www.cdc.gov/hepatitis/hcv/index.htm)。HCV感染且有多个伴侣的异性 persons 和MSM，尤其是合并HIV感染者，应通过使用外用乳胶安全套(*237*, *1358*, *1374*)和HIV PrEP来保护其伴侣免于获得HCV和HIV。HCV和HIV感染者的伴侣应检测这两种感染。

其他管理考虑

所有HIV和HBV感染状态未知的HCV感染者都应接受这些感染的检测。HIV或HBV感染者应被转诊或提供推荐的护理和治疗。既往未暴露于HAV或HBV的人应接种疫苗。

预防

降低美国HCV感染和疾病负担需要实施一级和二级预防活动。一级预防减少或消除HCV传播，而二级预防通过筛查识别 persons，然后提供治疗以减少慢性肝病和其他慢性疾病以及HCV传播。目前没有丙型肝炎疫苗，暴露后使用IG进行预防不能有效预防HCV感染。不建议使用直接抗病毒药物进行PEP。

应向HCV感染者提供关于如何保护肝脏免受进一步损害(即肝毒性物质)的信息；例如，应建议HCV感染者避免饮酒和服用任何新药，包括非处方药或草药，除非与临床医生确认。此外，需要确定

hepatitis A and B vaccination should be determined; persons who are not immune should be vaccinated.

To reduce the risk for transmission to others, persons with HCV infection should be advised not to donate blood, body organs, other tissue, or semen; not to share any personal items that might have blood on them (e.g., toothbrushes or razors); and to cover cuts and sores on the skin to keep the virus from spreading by blood or secretions. Women with HCV infection do not need to avoid pregnancy or breastfeeding, although children born to women with HCV also should be tested for HCV.

Persons who use or inject drugs should be counseled about the importance of prevention and provided access to substance misuse treatment, including medication-assisted treatment, if indicated. Persons who inject drugs should be encouraged to take the following additional steps to reduce personal and public health risks:

- Never reuse or share syringes, water, or drug preparation equipment.
- Only use syringes obtained from a reliable source (e.g., a syringe services program or a pharmacy).
- Use a new, sterile syringe to prepare and inject drugs each time.
- If possible, use sterile water to prepare drugs; otherwise, use clean water from a reliable source (e.g., fresh tap water).
- Use a new or disinfected container (i.e., cooker) and a new filter (i.e., cotton) to prepare drugs.
- Clean the injection site with a new alcohol swab before injection.
- Safely dispose of syringes after one use.

Postexposure Follow-Up

No PEP has been demonstrated to be effective against HCV infection. Testing for HCV is recommended for health care workers after percutaneous or perimucosal exposures to HCV-positive blood. Prompt identification of acute infection is vital because outcomes are improved when treatment is initiated early during the illness course.

Special Considerations

Pregnancy

All pregnant women should be screened with each pregnancy for HCV antibodies at the first prenatal visit in settings where the HCV prevalence is >0.1% (https://www.cdc.gov/hepatitis/hcv/index.htm) (*154*,*155*). Although the rate of transmission is highly variable, more than six of every 100 infants born to women with HCV infection become infected; this infection occurs predominantly during or near delivery, and no treatment or delivery method (e.g., cesarean delivery) has been demonstrated to decrease this risk (*1375*). However, the risk is increased by the presence of maternal HCV viremia at delivery and is twofold to threefold greater if the woman has HIV infection. Although no recommendations are available for HCV treatment during pregnancy, discussion about the individual risks and benefits of postpartum treatment can be considered in accordance with existing guidance (https://www.hcvguidelines.org/unique-populations/pregnancy).

HCV has not been reported to be transmitted through breast milk, although mothers with HCV infection should consider abstaining from breastfeeding if their nipples are cracked or bleeding. Infants born to mothers with HCV infection should be tested for HCV infection; children should be tested for anti-HCV no sooner than age 18 months because anti-HCV from the mother might last until that age. If diagnosis is desired before the child reaches age 18 months, testing for HCV RNA can be performed at or after the infant's first well-child visit at age 1–2 months. HCV RNA testing can be repeated at a subsequent visit, independent of the initial HCV RNA test result (*1376*) (https://www.cdc.gov/hepatitis/hcv/hcvfaq.htm#section3).

HIV Infection

All persons with HIV infection should undergo serologic screening for HCV at initial evaluation (*98*) (https://www.hcvguidelines.org). Providers should be aware of the likelihood that MSM with HIV infection can acquire HCV after initial screening. Because acute HCV infection acquisition among persons with HIV infection can occur, especially among MSM, and regular screening of those with HIV is cost-effective (*238*,*239*,*1377*), periodic HCV screening should be conducted (*1378–1380*). For persons with HIV infection, hepatitis C screening with HCV antibody assays (followed by HCV RNA if antibody positive) can be considered at least yearly, for those at high risk for infection, and more frequently depending on specific circumstances (e.g., community HCV infection prevalence and incidence, high-risk sexual behavior, and concomitant ulcerative STIs and proctitis). Antibody to HCV remains positive after spontaneously resolved infection or successful treatment; therefore, subsequent testing for potential HCV reinfection among persons with ongoing risk should be limited to HCV RNA testing only. Indirect testing (e.g., alanine aminotransferase [ALT]) is not recommended for detecting incident HCV infections because such testing, especially if performed once a year, can miss persons who have reverted after acute HCV infection to a normal ALT level at the time of testing (*239*) (https://www.hcvguidelines.org). Conversely, ALT can be elevated by antiretroviral and other medications, alcohol, and toxins. If ALT levels are being monitored, persons with HIV infection who experience new or unexplained increases in ALT should be tested for acute

甲型和乙型肝炎疫苗接种的必要性；无免疫力的人应接种疫苗。

为减少向他人传播的风险，应建议HCV感染者不要捐献血液、器官、其他组织或精液；不要共用任何可能沾有血液的个人物品(如牙刷或剃刀)；并覆盖皮肤上的伤口和疮口，以防止病毒通过血液或分泌物传播。HCV感染女性不需要避免妊娠或母乳喂养，尽管HCV感染女性所生的孩子也应接受HCV检测。

应就预防的重要性对使用或注射药物的人进行咨询，并在有指征时提供物质滥用治疗，包括药物辅助治疗。应鼓励注射药物的人采取以下额外措施以降低个人和公共卫生风险：

- 绝不重复使用或共用注射器、水或药物制备用具设备。
- 仅使用从可靠来源获得的注射器(例如，a注射器服务项目或药房)。
- 每次准备和注射药物时使用新的无菌注射器。
- 如有可能，使用无菌水配制药物；否则，使用来自可靠水源的清洁水(例如，新鲜的自来水)。
- 使用新的或消毒过的容器(即锅具)和新的过滤(即棉花)以制备药物。
- 注射前使用新的酒精棉片清洁注射部位注射。
- 注射器使用一次后应安全处置。

暴露后随访

尚无暴露后预防被证明对HCV感染有效。建议医护人员在经皮或经黏膜暴露于HCV阳性血液后进行HCV检测。及时识别急性感染至关重要，因为在疾病病程早期开始治疗可改善结局。

特殊考虑

妊娠

所有孕妇每次妊娠均应在首次产前检查时接受HCV抗体筛查，适用于HCV患病率>0.1%的环境(https://www.cdc.gov/hepatitis/hcv/index.htm)(*154*, *155*)。尽管传播率差异很大，HCV感染母亲所生婴儿中每100名有超过6名被感染；该感染主要发生在分娩时或分娩前后，且尚无治疗方法或分娩方式(例如剖宫产)被证明可降低该风险(1375)。然而，母体HCV病毒血症的存在会增加风险分娩时，如果女性感染HIV，则风险增加两到三倍。尽管没有关于妊娠期间HCV治疗的建议，但可以根据现有指南(https://www.hcvguidelines.org/unique-populations/pregnancy)讨论产后治疗的个体风险与获益。

尚未有报道称HCV可通过母乳传播，但HCV感染母亲若乳头皲裂或出血，应考虑停止母乳喂养。HCV感染母亲所生婴儿应接受HCV感染检测；儿童应在满18月龄后检测抗-HCV，因为来自母亲的抗-HCV可能持续至该年龄。若希望在儿童满18月龄前作出诊断，可在婴儿1-2月龄首次健康儿童访视时或之后进行HCV RNA检测。HCV RNA检测可在后续访视时重复进行，与初始HCV RNA检测结果无关(1376)(https://www.cdc.gov/hepatitis/hcv/hcvfaq.htm#section3)。

HIV感染

所有HIV感染者均应在初始评估时接受HCV血清学筛查(98)(https://www.hcvguidelines.org)。医务人员应意识到HIV感染MSM在初始筛查后获得HCV感染的可能性。由于HIV感染者中可发生急性HCV感染，尤其是MSM，且对HIV感染者进行定期筛查具有成本效益(*238*, *239*, *1377*)，应进行定期HCV筛查(*1378 - 1380*)。对于HIV感染者，可考虑至少每年使用HCV抗体检测进行丙型肝炎筛查(抗体阳性者随后进行HCV RNA检测)，适用于感染高风险者，并根据具体情况更频繁地进行(例如，社区HCV感染患病率和发病率、高风险性行为以及合并溃疡性STI和直肠炎)。HCV抗体在感染自行消退或治疗成功后仍保持阳性；因此，对于持续存在风险者，后续针对潜在HCV再感染的检测应仅限于HCV RNA检测。不推荐使用间接检测(例如丙氨酸氨基转移酶[ALT])来发现新发HCV感染，因为此类检测，尤其是每年进行一次时，可能漏诊急性HCV感染后于检测时ALT水平已恢复正常的患者(239)(https://www.反之，ALT可因抗逆转录病毒药物和其他药物、酒精及毒素而升高。若正在监测ALT水平，HIV感染者出现新的或原因不明的ALT升高时应检测急性

HCV infection and evaluated for possible medication toxicity or excessive alcohol use.

Continued unprotected sexual contact between partners with HIV can facilitate spread of HCV infection because the virus can be recovered from the semen of men with HIV infection (*1349*,*1381*). Specific prevention practices (e.g., barrier precautions that limit contact with body fluids during sexual contact with other MSM) should be discussed.

Because a minimal percentage of persons with HIV infection do not develop HCV antibodies, HCV RNA testing should be performed for persons with HIV infection and unexplained liver disease who are anti-HCV negative. The course of liver disease is more rapid among persons with HIV and HCV, and the risk for cirrhosis is higher than that for persons with HCV infection alone.

Proctitis, Proctocolitis, and Enteritis

Sexually transmitted gastrointestinal syndromes include proctitis, proctocolitis, and enteritis. Evaluation for these syndromes should include recommended diagnostic procedures, including anoscopy or sigmoidoscopy, stool examination for WBCs, and microbiologic workup (e.g., gonorrhea, chlamydia [LGV PCR if available], herpes simplex NAAT, and syphilis serology). For those with enteritis, stool culture or LGV PCR also is recommended.

Proctitis is inflammation of the rectum (i.e., the distal 10–12 cm) that can be associated with anorectal pain, tenesmus, or rectal discharge. Fecal leukocytes are common. Proctitis occurs predominantly among persons who have receptive anal exposures (oral-anal, digital-anal, or genital-anal). *N. gonorrhoeae*, *C. trachomatis* (including LGV serovars), HSV, and *T. pallidum* are the most common STI pathogens. Genital HSV and LGV proctitis are more prevalent among persons with HIV infection (*545*,*556*,*1382*). *M. genitalium* has been detected in certain cases of proctitis and might be more common among persons with HIV infection (*937*,*1382*). *N. meningitidis* has been identified as an etiology of proctitis among MSM with HIV infection (*1383*).

Proctocolitis is associated with symptoms of proctitis, diarrhea or abdominal cramps, and inflammation of the colonic mucosa extending to 12 cm above the anus. Fecal leukocytes might be detected on stool examination, depending on the pathogen. Proctocolitis can be acquired through receptive anal intercourse or by oral-anal contact, depending on the pathogen.

Pathogenic organisms include *Campylobacter* species, *Shigella* species, *E. histolytica*, LGV serovars of *C. trachomatis,* and *T. pallidum*. Among immunosuppressed persons with HIV infection, CMV or other opportunistic agents should be considered. The clinical presentation can be mistaken for inflammatory bowel disease or malignancy, resulting in a delayed diagnosis (*1384*,*1385*).

Enteritis usually results in diarrhea and abdominal cramping without signs of proctitis or proctocolitis. Fecal leukocytes might be detected on stool examination, depending on the pathogen. When outbreaks of gastrointestinal illness occur among social or sexual networks of MSM, clinicians should consider sexual transmission as a mode of spread and provide counseling accordingly. Sexual practices that can facilitate transmission of enteric pathogens include oral-anal contact or, in certain instances, direct genital-anal contact. *G. lamblia* is the most frequently implicated parasite, and bacterial pathogens include *Shigella* species, *Salmonella*, *E. coli, Campylobacter* species, and *Cryptosporidium*. Outbreaks of *Shigella* species, *Campylobacter*, *Cryptosporidium*, and microsporidiosis have been reported among MSM (*259*,*274*,*1386*,*1387*). Multiple enteric pathogens and concurrent STIs have also been reported. Among immunosuppressed persons with HIV infection, CMV or other opportunistic pathogens should be considered.

Diagnostic and Treatment Considerations for Acute Proctitis

Diagnosis

Persons with symptoms of acute proctitis should be examined by anoscopy. A Gram-stained smear of any anorectal exudate from anoscopic or anal examination should be examined for polymorphonuclear leukocytes. All persons should be evaluated for herpes simplex (preferably by NAAT of rectal lesions), *N. gonorrhoeae* (NAAT or culture), *C. trachomatis* (NAAT), and *T. pallidum* (darkfield of lesion if available and serologic testing). If the *C. trachomatis* NAAT test is positive on a rectal swab and severe symptoms associated with LGV are present (including rectal ulcers, anal discharge, bleeding, ≥10 WBCs on Gram stain, and tenesmus), patients should be treated empirically for LGV. Molecular testing for LGV is not widely available or not FDA cleared, and results are not typically available in time for clinical decision-making. However, if available, molecular PCR testing for *C. trachomatis* serovars L1, L2, or L3 can be considered for confirming LGV (*553*).

The pathogenic role of *M. genitalium* in proctitis is unclear. For persons with persistent symptoms after standard treatment, providers should consider testing for *M. genitalium* with NAAT and treat if positive (see *Mycoplasma genitalium*).

Treatment

Acute proctitis among persons who have anal exposure through oral, genital, or digital contact is usually sexually acquired (*1382*,*1388*). Presumptive therapy should be

HCV感染，并评估可能的药物毒性或过量饮酒。

HIV感染者伴侣之间持续的无保护性接触可促进HCV感染的传播，因为可以从HIV感染男性的精液中回收病毒(*1349*, *1381*)。应讨论具体的预防措施(例如，在与其他MSM性接触时限制体液接触的屏障预防措施)。

由于极少数HIV感染者不产生HCV抗体，对于HIV感染且患有不明原因肝病但抗-HCV阴性的人，应进行HCV RNA检测。HIV合并HCV感染者的肝病病程更迅速，肝硬化风险高于单纯HCV感染者。

直肠炎，直肠结肠炎，和肠炎

性传播胃肠道综合征包括直肠炎、直肠结肠炎和肠炎。对这些综合征的评估应包括推荐的诊断程序，包括肛门镜检查或乙状结肠镜检查、粪便WBC检查以及微生物学检查(例如，淋病、衣原体[如可用，LGV PCR]、单纯疱疹NAAT和梅毒血清学)。对于肠炎患者，还推荐粪便培养或LGV PCR。

直肠炎是直肠(即远端10-12 cm)的炎症，可伴有肛门直肠疼痛、里急后重或直肠分泌物。粪便白细胞常见。直肠炎主要发生于有接受性肛交暴露(口-肛、指-肛或生殖器-肛)者。*N.gonorrhoeae*、*C.trachomatis*(包括LGV血清型)、HSV和*T.pallidum*是最常见的STI病原体。生殖器HSV和LGV直肠炎在HIV感染者中更为常见(*545*, *556*, *1382*)。*M.genitalium*已在某些直肠炎病例中检出，并可能在HIV感染者中更为常见(*937*, *1382*)。meningitidis已被确定为HIV感染MSM中直肠炎的病因之一(1383)。

直肠结肠炎与直肠炎症状、腹泻或腹部绞痛相关，并且结肠黏膜炎症延伸至肛缘以上12 cm。根据病原体不同，粪便检查可能检测到粪便白细胞。直肠结肠炎可通过接受性肛交或口-肛接触获得，取决于病原体。

致病微生物包括弯曲杆菌属(Campylobacter)菌种，志贺菌属、溶组织内阿米巴、沙眼衣原体的LGV血清型以及苍白密螺旋体。在免疫抑制的HIV感染者中，应考虑CMV或其他机会性病原体。临床表现可能被误认为炎症性肠病或恶性肿瘤，导致诊断延迟(*1384*, *1385*)。

肠炎通常导致腹泻和腹部绞痛，而无直肠炎或直肠结肠炎的体征。粪便检查可能检出粪便白细胞，取决于病原体。当MSM的社交或性网络中发生胃肠道疾病暴发时，临床医生应考虑性传播作为传播方式，并相应提供咨询。可促进肠道病原体传播的性行为包括口-肛接触，或在某些情况下直接生殖器-肛接触。*G.lamblia*是最常涉及的寄生虫，细菌病原体包括*Shigella*属、*Salmonella*、*E.coli*、*Campylobacter*属和*Cryptosporidium*。已有MSM中*Shigella*属、Campylobacter、*Cryptosporidium*和微孢子虫病的暴发报道(*259*, *274*, *1386*, *1387*)。也有多种肠道病原体和合并STI的报道。在免疫抑制的HIV感染者中，应考虑CMV或其他机会性病原体。

诊断和治疗考虑 用于急性直肠炎

诊断

有急性直肠炎症状的人应接受肛门镜检查。应对肛门镜或肛门检查中获取的任何肛门直肠渗出物进行革兰染色涂片，检查多形核白细胞。所有患者均应评估单纯疱疹(最好通过对直肠病变进行NAAT)、*N.gonorrhoeae*(NAAT或培养)、*C.trachomatis*(NAAT)和*T.pallidum*(如可行，取病变暗视野检查，并进行血清学检测)。如果直肠拭子*C.trachomatis* NAAT检测为阳性，且存在与LGV相关的严重症状(包括直肠溃疡、肛门分泌物、出血、革兰染色显示≥10个WBC以及里急后重)，应按LGV进行经验性治疗。LGV的分子检测尚未广泛可用或未获FDA批准，且结果通常无法及时用于临床决策。然而，如可行，可考虑对*C.trachomatis*血清型L1、L2或L3进行分子PCR检测以确认LGV(553)。

生殖支原体在直肠炎中的致病作用尚不清楚。对于标准治疗后症状持续的人，提供者应考虑通过NAAT检测生殖支原体，如阳性则治疗(见生殖支原体)。

治疗

通过口、生殖器或手指接触而有肛门暴露的人的急性直肠炎通常是性获得的(*1382*, *1388*)。推定治疗应

initiated while awaiting results of laboratory tests for persons with anorectal exudate detected on examination or polymorphonuclear leukocytes detected on a Gram-stained smear of anorectal exudate or secretions. Such therapy also should be initiated when anoscopy or Gram stain is not available and the clinical presentation is consistent with acute proctitis for persons reporting receptive anal exposures.

Recommended Regimen for Acute Proctitis
Ceftriaxone 500 mg* IM in a single dose *plus* **Doxycycline** 100 mg orally 2 times/day for 7 days†

* For persons weighing ≥150 kg, 1 g of ceftriaxone should be administered.
† Doxycycline course should be extended to 100 mg orally 2 times/day for 21 days in the presence of bloody discharge, perianal or mucosal ulcers, or tenesmus and a positive rectal chlamydia test.

Bloody discharge, perianal ulcers, or mucosal ulcers among persons with acute proctitis and rectal chlamydia (NAAT) should receive presumptive treatment for LGV with an extended course of doxycycline 100 mg orally 2 times/day for 3 weeks (*1389*,*1390*) (see Lymphogranuloma Venereum). If painful perianal ulcers are present or mucosal ulcers are detected on anoscopy, presumptive therapy should also include a regimen for genital herpes (see Genital Herpes).

Diagnostic and Treatment Considerations for Proctocolitis or Enteritis

Treatment for proctocolitis or enteritis should be directed to the specific enteric pathogen identified. Multiple stool examinations might be necessary for detecting *Giardia*, and special stool preparations are required for diagnosing cryptosporidiosis and microsporidiosis. Diagnostic and treatment recommendations for all enteric infections are beyond the scope of these guidelines. Providers should be aware of the potential for antimicrobial-resistant pathogens, particularly during outbreaks of *Shigella* and *Campylobacter* among sexual networks of MSM where increased resistance to azithromycin, fluoroquinolones, and isolates resistant to multiple antibiotics have been described (*266*,*272*,*273*,*1391*,*1392*).

Other Management Considerations

To minimize transmission and reinfection, patients treated for acute proctitis should be instructed to abstain from sexual intercourse until they and their partners have been treated (i.e., until completion of a 7-day regimen and symptoms have resolved). Studies have reported that behaviors that facilitate enteric pathogen transmission might be associated with acquisition of other STIs, including HIV infection. All persons with acute proctitis and concern for sexually transmitted proctocolitis or enteritis should be tested for HIV, syphilis, gonorrhea, and chlamydia (at other exposed sites). PEP should be considered for exposures that present a risk for HIV acquisition. For ongoing risk for HIV acquisition, PrEP should be considered.

Evidence-based interventions for preventing acquisition of sexually transmitted enteric pathogens are not available. However, extrapolating from general infection control practices for communicable diseases and established STI prevention practices, recommendations include avoiding contact with feces during sex, using barriers, and washing hands after handing materials that have been in contact with the anal area (i.e., barriers and sex toys) and after touching the anus or rectal area.

Follow-Up

Follow-up should be based on specific etiology and severity of clinical symptoms. For proctitis associated with gonorrhea or chlamydia, retesting for the respective pathogen should be performed 3 months after treatment.

Management of Sex Partners

Partners who have had sexual contact with persons treated for gonorrhea or chlamydia <60 days before the onset of the persons symptoms should be evaluated, tested, and presumptively treated for the respective infection. Partners of persons with proctitis should be evaluated for any diseases diagnosed in the index partner. Sex partners should abstain from sexual contact until they and their partners are treated. No specific recommendations are available for screening or treating sex partners of persons with diagnosed sexually transmitted enteric pathogens; however, partners should seek care if symptomatic.

Special Considerations

Drug Allergy, Intolerance, and Adverse Reactions

Allergic reactions with third-generation cephalosporins (e.g., ceftriaxone) are uncommon among persons with a history of penicillin allergy (*620*,*631*,*658*,*896*).

HIV Infection

Persons with HIV infection and acute proctitis might present with bloody discharge, painful perianal ulcers, or mucosal ulcers and LGV and herpes proctitis are more prevalent among this population. Presumptive treatment in such cases should include a regimen for genital herpes and LGV.

在等待实验室检测结果期间，对于检查发现肛门直肠渗出物或肛门直肠渗出物或分泌物革兰染色涂片检测到多形核白细胞的人，应开始推定治疗。当肛门镜检查或革兰染色不可用且临床表现与急性直肠炎一致时，对于报告接受性肛门暴露的人，也应开始此类治疗。

急性直肠炎推荐治疗方案
头孢曲松 500 mg* 单次肌内注射 加 **多西环素** 100 mg 口服每日2次连用7天†

* 对于体重≥150 kg的人，应给予ceftriaxone 1 g。† 在出现血性分泌物、肛周或黏膜溃疡，或里急后重且直肠衣原体检测阳性时，Doxycycline疗程应延长至100 mg口服，每日2次，共

在出现血性分泌物、肛周或黏膜溃疡或里急后重且直肠衣原体检测阳性的情况下为21天。

急性直肠炎且直肠衣原体(NAAT)阳性的人，如有血性分泌物、肛周溃疡或黏膜溃疡，应接受LGV的推定治疗，doxycycline 100 mg口服，每日2次，共3周(*1389*, *1390*)(见性病性淋巴肉芽肿)。如果存在疼痛性肛周溃疡或肛门镜检查发现黏膜溃疡，推定治疗还应包括生殖器疱疹的方案(见生殖器疱疹)。

诊断和治疗考虑
对于直肠结肠炎或肠炎

直肠结肠炎或肠炎的治疗应针对所鉴定的特定肠道病原体。检测*Giardia*可能需要多次粪便检查，而诊断隐孢子虫病和微孢子虫病需要特殊的粪便制备。所有肠道感染的诊断和治疗建议超出了本指南的范围。提供者应意识到抗菌药物耐药病原体的可能性，特别是在MSM性网络中*Shigella*和*Campylobacter*暴发期间，已有报道对阿奇霉素、氟喹诺酮类药物的耐药性增加以及对多种抗生素耐药的分离株(*266*, *272*, *273*, *1391*, *1392*)。

其他管理注意事项

为尽量减少传播和再感染，接受急性直肠炎治疗的患者应被指示在他們和他们的伴侣接受治疗之前(即完成7天方案且症状消退之前)避免性交。研究报告称，促进肠道病原体传播的行为可能与获得其他STI(包括HIV感染)相关。所有急性直肠炎患者以及担心性传播

经性传播的直肠结肠炎或肠炎患者应接受HIV、梅毒、淋病和衣原体(及其他暴露部位)检测。对于存在HIV感染风险的暴露，应考虑暴露后预防。对于持续存在HIV感染风险者，应考虑暴露前预防。

目前尚无预防性传播肠道病原体感染的循证干预措施。然而，从传染病的一般感染控制实践和已建立的STI预防实践中外推，建议包括：性行为期间避免接触粪便、使用屏障保护、在处理接触过肛周区域的物品(即屏障和性玩具)后以及触摸肛门或直肠区域后洗手。

随访

随访应基于具体病因和临床症状的严重程度。对于淋病或衣原体相关的直肠炎，应在治疗后3个月对相应病原体进行复检。

管理的性伴侣

在患者症状出现前<60天内与接受淋病或衣原体治疗者有过性接触的性伴,应针对相应感染进行评估、检测和推定治疗。直肠炎患者的性伴应评估指示病例所诊断的任何疾病。性伴应避免性接触,直至他们及其性伴均完成治疗。对于确诊性传播肠道病原体感染者的性伴,目前尚无筛查或治疗的具体建议;但性伴如有症状应就医。

特殊注意事项

药物过敏、不耐受及不良反应

在有青霉素过敏史的人群中，对第三代头孢菌素(如头孢曲松)的过敏反应并不常见(*620*, *631*, *658*, *896*)。

HIV感染

HIV感染者合并急性直肠炎可能表现为血性分泌物、肛周疼痛性溃疡或黏膜溃疡，且性病性淋巴肉芽肿和疱疹性直肠炎在该人群中更为常见。此类情况下的推定治疗应包括针对生殖器疱疹和性病性淋巴肉芽肿的方案。

Ectoparasitic Infections

Pediculosis Pubis

Persons who have pediculosis pubis (i.e., pubic lice) usually seek medical attention because of pruritus or because they notice lice or nits on their pubic hair. Pediculosis pubis is caused by the parasite *Phthirus pubis* and is usually transmitted by sexual contact (*1393*).

Diagnosis

The clinical diagnosis is based on typical symptoms of itching in the pubic region. Lice and nits can be observed on pubic hair.

Treatment

Recommended Regimens for Pediculosis Pubis
Permethrin 1% cream rinse applied to affected areas and washed off after 10 minutes *or* **Pyrethrin with piperonyl butoxide** applied to the affected area and washed off after 10 minutes

Alternative Regimens
Malathion 0.5% lotion applied to affected areas and washed off after 8–12 hours *or* **Ivermectin** 250 μg/kg body weight orally, repeated in 7–14 days

Reported resistance to pediculicides (permethrin and pyrethrin) has been increasing and is widespread (*1394*,*1395*). Malathion can be used when treatment failure is believed to have occurred as a result of resistance. The odor and longer duration of application associated with malathion therapy make it a less attractive alternative compared with the recommended pediculicides. Ivermectin has limited ovicidal activity (*1396*). Ivermectin might not prevent recurrences from eggs at the time of treatment, and therefore treatment should be repeated in 7–14 days (*1397*,*1398*). Ivermectin should be taken with food because bioavailability is increased, thus increasing penetration of the drug into the epidermis. Adjustment of ivermectin dosage is not required for persons with renal impairment; however, the safety of multiple doses among persons with severe liver disease is unknown. Lindane is not recommended for treatment of pediculosis because of toxicity, contraindications for certain populations (pregnant and breastfeeding women, children aged <10 years, and those with extensive dermatitis), and complexity of administration.

Other Management Considerations

The recommended regimens should not be applied to the eyes. Pediculosis of the eyelashes should be treated by applying occlusive ophthalmic ointment or petroleum jelly to the eyelid margins 2 times/day for 10 days. Bedding and clothing should be decontaminated (i.e., machine washed and dried by using the heat cycle or dry cleaned) or removed from body contact for at least 72 hours. Fumigation of living areas is unnecessary. Pubic hair removal has been associated with atypical patterns of pubic lice infestation and decreasing incidence of infection (*537*,*1399*). Persons with pediculosis pubis should be evaluated for HIV, syphilis, chlamydia, and gonorrhea.

Follow-Up

Evaluation should be performed after 1 week if symptoms persist. Retreatment might be necessary if lice are found or if eggs are observed at the hair-skin junction. If no clinical response is achieved to one of the recommended regimens, retreatment with an alternative regimen is recommended.

Management of Sex Partners

Sex partners within the previous month should be treated. Sexual contact should be avoided until patients and partners have been treated, bedding and clothing decontaminated, and reevaluation performed to rule out persistent infection.

Special Considerations

Pregnancy

Existing data from human participants demonstrate that pregnant and lactating women should be treated with either permethrin or pyrethrin with piperonyl butoxide. Because no teratogenicity or toxicity attributable to ivermectin has been observed during human pregnancy experience, ivermectin is classified as "human data suggest low risk" during pregnancy and probably compatible with breastfeeding (*431*).

HIV Infection

Persons who have pediculosis pubis and HIV infection should receive the same treatment regimen as those who do not have HIV.

Scabies

Scabies is a skin infestation caused by the mite *Sarcoptes scabiei*, which causes pruritus. Sensitization to *S. scabiei* occurs before pruritus begins. The first time a person is infested with *S. scabiei*, sensitization takes weeks to develop. However, pruritus might occur <24 hours after a subsequent reinfestation. Scabies among adults frequently is sexually acquired, although scabies among children usually is not (*1400–1402*).

Diagnosis

Scabies diagnosis is made by identifying burrows, mites, eggs, or the mites' feces from affected areas. Skin scrapings can be examined under the microscope to identify organisms, although

体外寄生虫感染

虱病耻骨

患有阴虱病(即阴虱)的人通常因瘙痒或发现阴毛上有虱或虱卵而就医。阴虱病由寄生虫*Phthirus pubis*引起，通常通过性接触传播(1393)。

诊断

临床诊断基于耻骨区域瘙痒的典型症状。可在阴毛上观察到虱和虱卵。

治疗

阴虱病的推荐治疗方案
氯菊酯 1% 乳膏洗剂涂抹于患处，10 分钟后洗去 或 **除虫菊酯加胡椒基丁醚**涂抹于患处，10 分钟后洗去

替代方案
马拉硫磷 0.5% 洗剂涂抹于患处，8-12 小时后洗去 或 **伊维菌素** 250 μg/kg 体重口服，7-14 天后重复

已报道的对灭虱剂(permethrin 和 pyrethrin)的耐药性不断增加且广泛存在(*1394*,*1395*)。当认为治疗失败是由于耐药性所致时，可使用 malathion。与推荐的灭虱剂相比，malathion 治疗相关的异味和较长用药时间使其成为较不受欢迎的替代选择。Ivermectin 的杀卵活性有限(1396)。Ivermectin 可能无法防止治疗时虫卵导致的复发，因此应在 7-14 天内重复治疗(*1397*,*1398*)。Ivermectin 应与食物同服，因为生物利用度增加，从而增加药物渗透进入表皮。肾功能损害者无需调整 Ivermectin 剂量；然而，严重肝病患者多次给药的安全性尚不清楚。Lindane 因毒性、特定人群(孕妇和哺乳期妇女、年龄 <10 岁儿童以及广泛性皮炎患者)的禁忌证以及给药复杂性,不推荐用于治疗虱病。

其他管理考虑

推荐方案不应应用于眼部。睫毛虱病应通过将封闭性眼膏或凡士林涂抹于眼睑进行治疗

边缘 2 次/天，共 10 天。床上用品和衣物应进行净化处理(即机洗并使用加热循环烘干或干洗)或移除至少 72 小时以避免身体接触。居住区域无需熏蒸。剃除阴毛与阴虱感染的非典型模式和感染发生率下降相关(*537*,*1399*)。阴虱病患者应接受 HIV、梅毒、衣原体和淋病评估。

随访

如果症状持续，应在 1 周后进行评价。如果发现虱子或在毛发-皮肤交界处观察到虫卵，可能需要再次治疗。如果对某一推荐方案未获得临床应答，推荐使用替代方案再次治疗。

性伴侣的管理

应治疗前 1 个月内的性伴侣。在患者和伴侣接受治疗、床上用品和衣物去污染，并进行重新评估以排除持续感染之前，应避免性接触。

特殊考虑

妊娠

来自人类参与者的现有数据表明，妊娠期和哺乳期女性应使用氯菊酯或除虫菊酯加胡椒基丁醚治疗。由于在人类妊娠经验中未观察到归因于伊维菌素的致畸性或毒性，伊维菌素在妊娠期被归类为"人类数据提示低风险"，并且可能与母乳喂养相容(431)。

HIV感染

患有阴虱病和 HIV 感染的人应接受与无 HIV 感染者相同的治疗方案。

疥疮

疥疮是由疥螨*Sarcoptes scabiei*引起的皮肤感染，可导致瘙痒。对*S.scabiei*的致敏发生在瘙痒开始之前。人首次感染*S.scabiei*时，致敏需要数周才能形成。然而，在随后的再感染后，瘙痒可能在<24 小时内发生。成人疥疮常经性途径获得,尽管儿童疥疮通常不是(*1400 - 1402*)。

诊断

疥疮的诊断通过识别患处的隧道、螨虫、虫卵或螨虫粪便来作出。可对皮肤刮取物进行显微镜检查以识别病原体，尽管

this method has low sensitivity and is time consuming (*1403*). Alternatively, noninvasive examination of the affected skin by using videodermatoscopy, videomicroscopy, or dermoscopy can be used, each of which has high sensitivity and specificity, particularly when performed by experienced operators (*1404*). Low-technology strategies include the burrow ink test and the adhesive tape test.

Treatment

Recommended Regimens for Scabies
Permethrin 5% cream applied to all areas of the body from the neck down and washed off after 8–14 hours *or* **Ivermectin** 200 ug/kg body weight orally, repeated in 14 days* *or* **Ivermectin 1% lotion** applied to all areas of the body from the neck down and washed off after 8–14 hours; repeat treatment in 1 week if symptoms persist
* Oral ivermectin has limited ovicidal activity; a second dose is required for eradication.

Alternative Regimen
Lindane 1% 1 oz of lotion or 30 g of cream applied in a thin layer to all areas of the body from the neck down and thoroughly washed off after 8 hours*
* Infants and children aged <10 years should not be treated with lindane.

Topical permethrin and oral and topical ivermectin have similar efficacy for cure of scabies (*1405–1410*). Choice of treatment might be based on patient preference for topical versus oral therapy, drug interactions with ivermectin (e.g., azithromycin, trimethoprim/sulfamethoxazole [Bactrim], or cetirizine [Zytrec]), and cost. Permethrin is safe and effective with a single application (*1411*). Ivermectin has limited ovicidal activity and might not prevent recurrences of eggs at the time of treatment; therefore, a second dose of ivermectin should be administered 14 days after the first dose (*1412*). Ivermectin should be taken with food because bioavailability is increased, thereby increasing penetration of the drug into the epidermis. Adjustments to ivermectin dosing are not required for patients with renal impairment; however, the safety of multiple doses among patients with severe liver disease is unknown.

Lindane is an alternative regimen because it can cause toxicity (*1413*); it should be used only if the patient cannot tolerate the recommended therapies or if these therapies have failed (*1414–1416*). Lindane is not recommended for pregnant and breastfeeding women, children aged <10 years, and persons with extensive dermatitis. Seizures have occurred when lindane was applied after a bath or used by patients who had extensive dermatitis. Aplastic anemia after lindane use also has been reported (*1413*). Lindane resistance has been reported in some areas of the world, including parts of the United States (*1413*).

Other Management Considerations

Bedding and clothing should be decontaminated (i.e., either machine washed and dried by using the heat cycle or dry cleaned) or removed from body contact for >72 hours. Fumigation of living areas is unnecessary. Persons with scabies should be advised to keep fingernails closely trimmed to reduce injury from excessive scratching (*1417*).

Crusted Scabies

Crusted scabies is an aggressive infestation that usually occurs among immunodeficient, debilitated, or malnourished persons, including persons receiving systemic or potent topical glucocorticoids, organ transplant recipients, persons with HIV infection or human T-lymphotropic virus-1 infection, and persons with hematologic malignancies. Crusted scabies is transmitted more easily than scabies (*1418*). No controlled therapeutic studies for crusted scabies have been conducted, and a recommended treatment remains unclear. Substantial treatment failure might occur with a single-dose topical scabicide or with oral ivermectin treatment. Combination treatment is recommended with a topical scabicide, either 5% topical permethrin cream (full-body application to be repeated daily for 7 days then 2 times/week until cure) or 25% topical benzyl benzoate, and oral ivermectin 200 *u*g/kg body weight on days 1, 2, 8, 9, and 15. Additional ivermectin treatment on days 22 and 29 might be required for severe cases (*1419*). Lindane should be avoided because of the risks for neurotoxicity with heavy applications on denuded skin.

Follow-Up

The rash and pruritus of scabies might persist for <2 weeks after treatment. Symptoms or signs persisting for >2 weeks can be attributed to multiple factors. Treatment failure can occur as a result of resistance to medication or faulty application of topical scabicides. These medications do not easily penetrate into thick, scaly skin of persons with crusted scabies, perpetuating the harboring of mites in these difficult-to-penetrate layers. In the absence of recommended contact treatment and decontamination of bedding and clothing, persisting symptoms can be attributed to reinfection by family members or fomites. Finally, other household mites can cause symptoms to persist as a result of cross-reactivity between antigens. Even when treatment is successful, reinfection is avoided, and cross-reactivity does not occur, symptoms can persist or worsen as a result of allergic dermatitis.

Retreatment 2 weeks after the initial treatment regimen can be considered for those persons who are still symptomatic or when live mites are observed. Use of an alternative regimen is recommended for those persons who do not respond initially to the recommended treatment.

该方法敏感性低且耗时(1403)。或者，可使用视频皮肤镜、视频显微镜或皮肤镜检查受累皮肤，每种方法均具有高敏感性和特异性，尤其是在由经验丰富的操作者执行时(1404)。低技术策略包括隧道墨汁试验和胶带试验。

治疗

疥疮的推荐治疗方案
Permethrin 5% cream涂抹于颈部以下全身所有部位，8-14小时后洗去 或 **伊维菌素** 200 ug/kg体重口服，14天后重复* 或 **Ivermectin 1% lotion**涂抹于颈部以下全身所有部位，8-14小时后洗去；若症状持续，1周后重复治疗
口服伊维菌素杀卵活性有限；需给予第二剂用于根除。

替代方案
Lindane 1% 1 oz洗剂或30 g乳膏薄层涂抹于颈部以下全身所有部位，8小时后彻底洗去*
* 年龄小于10岁的婴幼儿和儿童不应使用林丹治疗。

局部氯菊酯与外用和口服伊维菌素在治愈疥疮方面疗效相似(*1405 - 1410*)。治疗选择可基于患者对局部治疗与口服治疗的偏好、与伊维菌素的药物相互作用(如阿奇霉素、甲氧苄啶/磺胺甲噁唑[复方新诺明]或西替利嗪[仙特明])以及费用。氯菊酯单次应用安全有效(1411)。伊维菌素的杀卵活性有限，可能无法在治疗时防止虫卵复发；因此，应在首剂后14天给予第二剂伊维菌素(1412)。伊维菌素应随餐服用，因为生物利用度增加，从而增加药物渗透进入表皮。肾功能损害患者无需调整伊维菌素剂量；然而，严重肝病患者多次给药的安全性尚不清楚。

林丹是替代方案，因为它可引起毒性(1413)；仅应在患者不能耐受推荐疗法或这些疗法失败时使用(*1414 - 1416*)。林丹不推荐用于孕妇和哺乳期妇女、<10岁儿童以及广泛性皮炎患者。在沐浴后应用林丹或广泛性皮炎患者使用林丹时曾发生癫痫发作。也有林丹使用后发生再生障碍性贫血的报告(1413)。世界某些地区,包括美国部分地区,已报告林丹耐药(1413)。

其他管理考虑

床上用品和衣物应进行净化处理(即使用加热循环进行机洗和烘干，或干洗)，或移除使其不与身体接触>72小时。居住区域无需熏蒸。应建议疥疮患者将指甲剪短，以减少过度搔抓造成的损伤(1417)。

结痂性疥疮

结痂性疥疮是一种侵袭性感染，通常发生于免疫缺陷、衰弱或营养不良者，包括接受全身或强效局部糖皮质激素者、器官移植受者、HIV感染或人类T淋巴细胞病毒-1感染者以及血液系统恶性肿瘤患者。结痂性疥疮比疥疮更易传播(1418)。尚无针对结痂性疥疮的对照治疗研究，推荐治疗仍不明确。单剂局部杀疥药或口服伊维菌素治疗可能出现显著治疗失败。推荐联合治疗：局部杀疥药，即5%局部氯菊酯乳膏(全身应用，每日重复，共7天，然后每周2次直至治愈)或25%局部苯甲酸苄酯，以及口服伊维菌素200 *u* g/kg体重，在第1、2、8、9和15天给药。重症病例可能需要在第22和29天追加伊维菌素治疗(1419)。应避免使用林丹，因为在裸露皮肤上大量应用有神经毒性风险。

随访

疥疮的皮疹和瘙痒可能在治疗后持续<2周。症状或体征持续>2周可归因于多种因素。治疗失败可因药物耐药或局部杀疥药使用不当而发生。这些药物不易渗透进入结痂性疥疮患者厚而鳞屑的皮肤，使螨在这些难以渗透的层中持续藏匿。在缺乏推荐的接触者治疗以及床上用品和衣物去污染的情况下，持续症状可归因于家庭成员或污染物再感染。最后，其他家庭螨类可因抗原交叉反应而导致症状持续。即使治疗成功、避免再感染且未发生交叉反应，症状也可因过敏性皮炎而持续或加重。

对于仍有症状或观察到活螨的患者，可考虑在初始治疗方案后2周进行重复治疗。对于初始对推荐方案无应答的患者，建议使用替代方案。

Management of Sex Partners and Household Contacts

Persons who have had sexual, close personal, or household contact with the patient within the month preceding scabies infestation should be examined. Those identified as being infested should be provided treatment.

Management of Outbreaks in Communities, Nursing Homes, and Other Institutional Settings

Scabies epidemics frequently occur in nursing homes, hospitals, residential facilities, and other communities (*1420*,*1421*). Control of an epidemic can only be achieved by treating the entire population at risk. Ivermectin can be considered in these settings, especially if treatment with topical scabicides fails. Mass treatment with oral ivermectin is highly effective in decreasing prevalence in settings where scabies is endemic (*1422*). Epidemics should be managed in consultation with a specialist.

Special Considerations

Infants, Young Children, and Pregnant or Lactating Women

Infants and young children should be treated with permethrin; the safety of ivermectin for children weighing <15 kg has not been determined. Infants and children aged <10 years should not be treated with lindane. Ivermectin likely poses a low risk to pregnant women and is likely compatible with breastfeeding; however, because of limited data regarding ivermectin use for pregnant and lactating women, permethrin is the preferred treatment (*431*) (see Pediculosis Pubis).

HIV Infection

Persons with HIV infection who have uncomplicated scabies should receive the same treatment regimens as those who do not have HIV. Persons with HIV infection and others who are immunosuppressed are at increased risk for crusted scabies and should be managed in consultation with a specialist.

Sexual Assault and Abuse and STIs

Adolescents and Adults

These guidelines are primarily limited to the identification, prophylaxis, and treatment of STIs and conditions among adolescent and adult female sexual assault survivors. However, some of the following guidelines might still apply to male sexual assault survivors. Documentation of findings, collection of nonmicrobiologic specimens for forensic purposes, and management of potential pregnancy or physical and psychological trauma are beyond the scope of these guidelines. Examinations of survivors of sexual assault should be conducted by an experienced clinician in a way that minimizes further trauma to the person. The decision to obtain genital or other specimens for STI diagnosis should be made on an individual basis. Care systems for survivors should be designed to ensure continuity, including timely review of test results, support adherence, and monitoring for adverse reactions to any prescribed therapeutic or prophylactic regimens. Laws in all 50 states limit the evidentiary use of a survivor's previous sexual history, including evidence of previously acquired STIs, as part of an effort to undermine the credibility of the survivor's testimony. Evidentiary privilege against revealing any aspect of the examination or treatment also is enforced in most states. Although it rarely occurs, STI diagnoses might later be accessed, and the survivor and clinician might opt to defer testing for this reason. Although collection of specimens at initial examination for laboratory STI diagnosis gives the survivor and clinician the option of deferring empiric prophylactic antimicrobial treatment, compliance with follow-up visits is typically poor (*1423*–*1425*). Among sexually active adults, identification of an STI might represent an infection acquired before the assault, and therefore might be more important for the medical management of the patient than for legal purposes.

Trichomoniasis, BV, gonorrhea, and chlamydia are the most frequently diagnosed infections among women who have been sexually assaulted. Such conditions are prevalent among the population, and detection of these infections after an assault does not necessarily imply acquisition during the assault. However, a postassault examination presents an important opportunity for identifying or preventing an STI. Chlamydial and gonococcal infections among women are of particular concern because of the possibility of ascending infection. In addition, HBV infection can be prevented through postexposure vaccination (see Hepatitis B Virus Infection). Because persons who have been sexually assaulted also are at risk for acquiring HPV infection, and the efficacy of the HPV vaccine is high (*1426*,*1427*), HPV vaccination is also recommended for females and males through age 26 years (https://www.cdc.gov/vaccines/hcp/acip-recs/vacc-specific/hpv.html) (*11*). Reproductive-aged female survivors should be evaluated for pregnancy and offered emergency contraception.

Evaluating Adolescents and Adults for STIs

Initial Examination

Decisions to perform the following tests should be made on an individual basis. An initial examination after a sexual assault might include the following:

性伴侣及家庭接触者的管理

在疥疮感染前一个月内与患者有性接触、密切个人接触或家庭接触者应接受检查。被确定为感染者应给予治疗。

社区、养老院及其他机构环境中暴发的管理

疥疮流行经常发生在养老院、医院、寄宿机构和其他社区(*1420*, *1421*)。只有治疗整个高危人群才能控制流行。在这些环境中可考虑伊维菌素，尤其是局部杀疥药治疗失败时。在疥疮流行地区，口服伊维菌素群体治疗在降低患病率方面高度有效(1422)。流行应与专科医生协商管理。

特殊考虑

婴儿、幼儿及妊娠期或哺乳期妇女

婴儿和幼儿应使用permethrin治疗；ivermectin用于体重<15 kg儿童的安全性尚未确定。年龄<10岁的婴儿和儿童不应使用lindane治疗。ivermectin对孕妇可能风险较低,且可能与母乳喂养相容;然而,由于ivermectin用于孕妇和哺乳期妇女的数据有限,permethrin是首选治疗(431)(见阴虱病)。

HIV感染

HIV感染者患无并发症疥疮应接受与非HIV感染者相同的治疗方案。HIV感染者及其他免疫抑制者发生结痂性疥疮的风险增加，应咨询专科医生进行管理。

性侵犯和虐待和STIs

青少年和成人

这些指南主要限于青少年和成年女性性侵犯幸存者中STIs和相關情况的识别、预防和治疗。然而，以下部分指南可能仍适用于男性性侵犯幸存者。检查结果的记录、用于法医学目的的非微生物学标本采集，以及潜在妊娠或身体和心理创伤超出本指南范围。性侵幸存者的检查应由经验丰富的临床医生进行，以尽量减少对该人的进一步创伤。是否获取生殖器或其他标本用于STI诊断的决定应个体化。幸存者的照护系统应设计为确保连续性，包括及时审查检测结果、支持依从性，并监测对任何处方治疗或预防方案的不良反应。所有50个州的法律限制幸存者既往性史的证据使用，包括既往获得的STI证据，以防止削弱幸存者证词的可信度。大多数州还强制执行证据特权，禁止透露检查或治疗的任何方面。尽管很少发生，STI诊断可能 later 被访问，幸存者和临床医生可能因此选择推迟检测。尽管在初次检查时采集标本用于实验室STI诊断给幸存者和临床医生提供了推迟经验性预防性抗菌治疗的选择，但随访就诊的依从性通常较差(*1423*-*1425*)。在性活跃成人中，识别STI可能代表在袭击前获得的感染，因此可能对患者的医疗管理比法律目的更重要。

滴虫感染、BV、淋病和衣原体是性侵女性中最常诊断的感染。这些状况在人群中流行，袭击后检测到这些感染并不一定意味着在袭击期间获得。然而，袭击后检查提供了识别或预防STI的重要机会。女性中的衣原体和淋球菌感染特别令人担忧，因为可能上行感染。此外，HBV感染可通过暴露后疫苗接种预防(见乙型肝炎病毒感染)。由于性侵者也有获得HPV感染的风险，且HPV疫苗效力高(*1426*, *1427*)，也推荐女性和男性至26岁接种HPV疫苗(https://www.cdc.gov/vaccines/hcp/acip-recs/vacc-specific/ hpv.html)(11)。生殖年龄女性幸存者应评估妊娠并提供紧急避孕。

评估青少年和成人性传播感染

初步检查

是否进行以下检测应根据个体情况决定。性侵犯后的初始检查可能包括以下内容：

- NAATs for *C. trachomatis* and *N. gonorrhoeae* at the sites of penetration or attempted penetration should be performed (*553*). These tests are preferred for diagnostic evaluation of adolescent or adult sexual assault survivors.
- Females should be offered NAAT testing for *T. vaginalis* from a urine or vaginal specimen. POC or wet mount with measurement of vaginal pH and KOH application for the whiff test from vaginal secretions should be performed for evidence of BV and candidiasis, especially if vaginal discharge, malodor, or itching is present.
- MSM should be offered screening for *C. trachomatis* and *N. gonorrhoeae* if they report receptive oral or anal sex during the preceding year, regardless of whether sexual contact occurred at these anatomic sites during the assault. Anoscopy should be considered in instances of reported anal penetration.
- A serum sample should be performed for HIV, HBV, and syphilis infection.

Treatment

Compliance with follow-up visits is poor among survivors of sexual assault (*1423–1425*). Consequently, the following routine presumptive treatments after a sexual assault are recommended:

- An empiric antimicrobial regimen for chlamydia, gonorrhea, and trichomonas for women and chlamydia and gonorrhea for men.
- Emergency contraception should be considered when the assault could result in pregnancy (see Emergency Contraception).
- Postexposure hepatitis B vaccination (without HBIG) if the hepatitis status of the assailant is unknown and the survivor has not been previously vaccinated. If the assailant is known to be HBsAg positive, unvaccinated survivors should receive both hepatitis B vaccine and HBIG. The vaccine and HBIG, if indicated, should be administered to sexual assault survivors at the time of the initial examination, and follow-up doses of vaccine should be administered 1–2 and 4–6 months after the first dose. Survivors who were previously vaccinated but did not receive postvaccination testing should receive a single vaccine booster dose (see Hepatitis B Virus Infection).
- HPV vaccination for female and male survivors aged 9–26 years who have not been vaccinated or are incompletely vaccinated (*11*) (https://www.cdc.gov/vaccines/hcp/acip-recs/vacc-specific/hpv.html). The vaccine should be administered to sexual assault survivors at the time of the initial examination, and follow-up doses should be administered at 1–2 months and 6 months after the first dose. A 2-dose schedule (0 and 6–12 months) is recommended for persons initiating vaccination before age 15 years.
- Recommendations for HIV PEP are made on a case-by-case basis according to risk (see Risk for Acquiring HIV Infection; Recommendations for Postexposure HIV Risk Assessment of Adolescents and Adults <72 Hours After Sexual Assault).

Recommended Regimen for Adolescent and Adult Female Sexual Assault Survivors

Ceftriaxone 500 mg* IM in a single dose
plus
Doxycycline 100 mg 2 times/day orally for 7 days
plus
Metronidazole 500 mg 2 times/day orally for 7 days

* For persons weighing ≥150 kg, 1 g of ceftriaxone should be administered.

Recommended Regimen for Adolescent and Adult Male Sexual Assault Survivors

Ceftriaxone 500 mg* IM in a single dose
plus
Doxycycline 100 mg 2 times/day orally for 7 days

* For persons weighing ≥150 kg, 1 g of ceftriaxone should be administered.

Clinicians should counsel persons regarding the possible benefits and toxicities associated with these treatment regimens; gastrointestinal side effects can occur with this combination. The efficacy of these regimens in preventing infections after sexual assault has not been evaluated. For those requiring alternative treatments, refer to the specific sections in this report relevant to the specific organisms.

Other Management Considerations

At the initial examination and, if indicated, at follow-up examinations, patients should be counseled regarding symptoms of STIs and the need for immediate examination if symptoms occur. Further, they should be instructed to abstain from sexual intercourse until STI prophylactic treatment is completed.

Follow-Up

After the initial postassault examination, follow-up examinations provide an opportunity to detect new infections acquired during or after the assault, complete hepatitis B and HPV vaccinations, if indicated, complete counseling and treatment for other STIs, and monitor side effects and adherence to PEP, if prescribed. If initial testing was performed, follow-up evaluation should be conducted in <1 week to ensure that results of positive tests can be discussed promptly with the survivor, treatment is provided if not administered at the initial visit, and any follow-up for infections can be arranged. If initial tests are negative and treatment was not provided,

- 应在插入或企图插入部位进行*C.trachomatis*和*N.gonorrhoeae*的NAATs检测(553)。这些检测是青少年或成年性侵犯幸存者诊断评估的首选方法。
- 应为女性提供阴道毛滴虫的 NAAT 检测从尿液或阴道标本中。应进行POC或湿片检查，测量阴道pH并使用KOH进行嗅味试验，以获取BV和念珠菌病的证据，尤其是当存在阴道分泌物、恶臭或瘙痒时。
- 应向 MSM 提供沙眼衣原体筛查，并*N.gonorrhoeae*，如果其报告在过去一年内有接受性口交或肛交，无论侵犯期间是否在这些解剖部位发生性接触。在报告肛门插入的情况下，应考虑肛门镜检查。
- 应采集血清样本进行 HIV、HBV 和梅毒感染。

治疗

性侵犯幸存者对随访就诊的依从性较差(*1423 - 1425*)。因此，建议性侵犯后采取以下常规推定治疗：

- 针对衣原体的经验性抗菌治疗方案，淋病和滴虫病用于女性，衣原体和淋病用于男性。
- 当出现以下情况时，应考虑紧急避孕：性侵犯可能导致怀孕(见紧急避孕)。
- 暴露后乙型肝炎疫苗接种(不使用HBIG)如果袭击者的肝炎状态未知且幸存者先前未接种疫苗。如果已知袭击者HBsAg阳性，未接种疫苗的幸存者应同时接受乙型肝炎疫苗和HBIG。疫苗和HBIG，如果有指征，应在初次检查时给予性侵幸存者，疫苗的后续剂量应在第一剂后1-2和4-6个月给予。先前接种疫苗但未接受接种后检测的幸存者应接受单剂疫苗加强剂(见乙型肝炎病毒感染)。
- 为以下年龄的女性与男性幸存者接种 HPV 疫苗：9-26岁未接种疫苗或接种不完全者(11)(https://www.cdc.gov/vaccines/hcp/acip-recs/vacc-specific/hpv.html)。疫苗应在初始检查时给予性侵犯幸存者，后续剂量应在首剂后1-2个月和6个月给予。2剂次方案(0和6-12个月)是建议15岁前开始接种疫苗者接种。
- HIV PEP 的建议是根据具体情况做出的根据风险进行个体化决策(见获得HIV感染的风险；青少年和成人性侵犯后<72小时暴露后HIV风险评估建议)。

青少年和成年女性性侵犯幸存者的推荐方案

头孢曲松 500 mg* 单次肌内注射
加
多西环素 100 mg，每日2次，口服，共7天
加
甲硝唑 500 mg，每日2次，口服，连用7天

* 对于体重≥150 kg的人员，应给予1 g的头孢曲松。

青少年和成年男性性侵犯幸存者的推荐方案

头孢曲松 500 mg* 单次肌内注射
加
多西环素 100 mg，每日2次，口服，共7天

* 对于体重≥150 kg的人员，应给予1 g的头孢曲松。

临床医生应就这些治疗方案可能带来的益处和毒性向患者提供咨询；该联合方案可能发生胃肠道副作用。这些方案在性侵犯后预防感染方面的疗效尚未评估。对于需要替代治疗者，请参阅本报告中与特定病原体相关的具体章节。

其他管理考虑

在初始检查时以及(如有指征)随访检查时，应就STIs症状及出现症状时需立即检查的必要性向患者提供咨询。此外，应指导其在STI预防性治疗完成前避免性交。

随访

在初次袭击后检查后，随访检查提供机会检测袭击期间或之后获得的新感染，完成乙型肝炎和HPV疫苗接种，如果有指征，完成其他STI的咨询和治疗，并监测PEP的副作用和依从性，如果处方。如果进行了初始检测，随访评估应在<1周内进行,以确保阳性检测结果能及时与幸存者讨论,如果未在初次就诊时给予治疗则提供治疗,并安排任何感染的随访。如果初始检测为阴性且未提供治疗,

examination for STIs can be repeated 1–2 weeks after the assault; repeat testing detects infectious organisms that might not have reached sufficient concentrations to produce positive test results at the time of initial examination. For survivors who are treated during the initial visit, regardless of whether testing was performed, posttreatment testing should be conducted only if the person reports having symptoms. If initial test results were negative and infection in the assailant cannot be ruled out, serologic tests for syphilis can be repeated at 4–6 weeks and 3 months; HIV testing can be repeated at 6 weeks and at 3 months by using methods to identify acute HIV infection.

Risk for Acquiring HIV Infection

HIV seroconversion has occurred among persons whose only known risk factor was sexual assault or sexual abuse; however, the frequency of this occurrence likely is low (*1428*,*1429*). In consensual sex, the per-act risk for HIV transmission from vaginal intercourse is 0.08%, and for receptive anal intercourse, 1.38% (*192*). The per-act risk for HIV transmission from oral sex is substantially lower. Specific circumstances of an assault (e.g., bleeding, which often accompanies trauma) might increase risk for HIV transmission in cases involving vaginal, anal, or oral penetration. Site of exposure to ejaculate, viral load in ejaculate, and the presence of an STI or genital lesions in the assailant or survivor also might increase risk for HIV acquisition.

PEP with a 28-day course of zidovudine was associated with an 81% reduction in risk for acquiring HIV in a study of health care workers who had percutaneous exposures to HIV-infected blood (*1430*). On the basis of these results and results from animal studies, PEP has been recommended for health care workers who have occupational exposures to HIV (*1431*). These findings have been extrapolated to nonoccupational injecting drug and sexual HIV exposures, including sexual assault. The possibility of HIV exposure from the assault should be assessed at the initial examination; survivors determined to be at risk for acquiring HIV should be informed about the possible benefit of PEP in preventing HIV infection. Initiation of PEP as soon as possible after the exposure increases the likelihood of prophylactic benefit.

Multiple factors affect the medical recommendation for PEP and affect the assault survivor's acceptance of that recommendation. These factors include the likelihood of the assailant having HIV, any exposure characteristics that might increase the risk for HIV transmission, the time elapsed after the event, and the potential benefits and risks associated with PEP (*1431*). Determination of the assailant's HIV status at the time of the postassault examination is usually not possible. Therefore, health care providers should assess any available information concerning the characteristics and HIV risk behaviors of the assailant (e.g., being an MSM or using injecting drugs), local epidemiology of HIV/AIDS, and exposure characteristics of the assault. When an assailant's HIV status is unknown, determinations about risk for HIV transmission to the survivor should be based on whether vaginal or anal penetration occurred; whether ejaculation occurred on mucous membranes; whether multiple assailants were involved; whether mucosal lesions were present in the assailant or survivor; and any other characteristics of the assault, survivor, or assailant that might increase risk for HIV transmission.

If PEP is offered, the following information should be discussed with the survivor: the necessity of early initiation of PEP to optimize potential benefits (i.e., as soon as possible after and <72 hours after the assault), the importance of close follow-up, the benefit of adherence to recommended dosing, and potential adverse effects of antiretroviral medications. Providers should emphasize that severe adverse effects are rare from PEP (*1431*–*1435*). Clinical management of the survivor should be implemented according to the HIV PEP guidelines and in collaboration with specialists (*1436*). Health care providers should provide an initial course of 3–7 days of medication (i.e., a starter pack) with a prescription for the remainder of the course, or, if starter packs are unavailable, they should provide a prescription for an entire 28-day course. Provision of the entire 28-day PEP medication supply at the initial visit has been reported to increase likelihood of adherence, especially when patients have difficulty returning for multiple follow-up visits (*1437*). Routinely providing starter packs or the entire 28-day course requires that health care providers stock PEP drugs in their practice setting or have an established agreement with a pharmacy to stock, package, and urgently dispense PEP drugs with required administration instructions. Uninsured patients or those with high copayments can be enrolled in a patient-assistance program to ensure access to PEP medications. An early follow-up visit should be scheduled at which health care providers can discuss the results of HIV and STI testing, provide additional counseling and support, provide indicated vaccines not administered at the initial evaluation, assess medication side effects and adherence, or provide an altered PEP medication regimen if indicated by side effects or laboratory test results.

Recommendations for Postexposure HIV Risk Assessment of Adolescents and Adults <72 Hours After Sexual Assault

Health care providers should do the following:

- Assess risk for HIV infection in the assailant, and test that person for HIV whenever possible.
- Use the algorithm to evaluate the survivor for the need for HIV PEP (Figure) (*1436*).

STI检查可在袭击后1-2周重复；重复检测可检测可能在初次检查时未达到足够浓度以产生阳性检测结果的感染生物体。对于在初次就诊时接受治疗的幸存者，无论是否进行了检测，仅在报告有症状时进行治疗后检测。如果初始检测结果为阴性且不能排除袭击者感染，梅毒血清学检测可在4-6周和3个月重复；HIV检测可在6周和3个月重复，使用识别急性HIV感染的方法。

感染HIV的风险

在仅已知风险因素为性侵犯或性虐待的人群中，已发生HIV血清转换；然而，这种情况的发生频率可能较低(*1428*, *1429*)。在自愿性行为中，阴道性交每次行为传播HIV的风险为0.08%，接受性肛交为1.38%(192)。口交每次行为传播HIV的风险显著较低。性侵犯的具体情况(例如，常伴随创伤的出血)可能在涉及阴道、肛门或口腔插入的案例中增加HIV传播风险。精液暴露部位、精液中的病毒载量，以及施暴者或幸存者存在STI或生殖器病变，也可能增加HIV感染风险。

在一项针对经皮暴露于HIV感染血液的医护人员的研究中，使用28天疗程齐多夫定进行PEP与HIV感染风险降低81%相关(1430)。基于这些结果及动物研究结果，PEP已被推荐用于有职业性HIV暴露的医护人员(1431)。这些发现已被外推至非职业性注射吸毒和性HIV暴露，包括性侵犯。应在初次检查时评估性侵犯导致HIV暴露的可能性；被判定有HIV感染风险的幸存者应被告知PEP在预防HIV感染方面的可能获益。暴露后尽快启动PEP可增加预防获益的可能性。

多种因素影响PEP的医学建议，并影响性侵犯幸存者对该建议的接受程度。这些因素包括施暴者感染HIV的可能性、可能增加HIV传播风险的任何暴露特征、事件后经过的时间，以及与PEP相关的潜在获益和风险(1431)。在性侵犯后检查时通常无法确定施暴者的HIV状态。因此，医疗保健提供者应评估有关施暴者特征和HIV风险行为(例如，为MSM或使用注射毒品)、当地HIV/AIDS流行病学以及性侵犯的暴露特征的任何可用信息。当施暴者的HIV状态未知时，关于向幸存者传播HIV风险的判断应基于是否发生阴道或肛门插入；是否在黏膜上发生射精；是否涉及多名施暴者；施暴者或幸存者是否存在黏膜病变；以及性侵犯、幸存者或施暴者中可能增加HIV传播风险的任何其他特征。

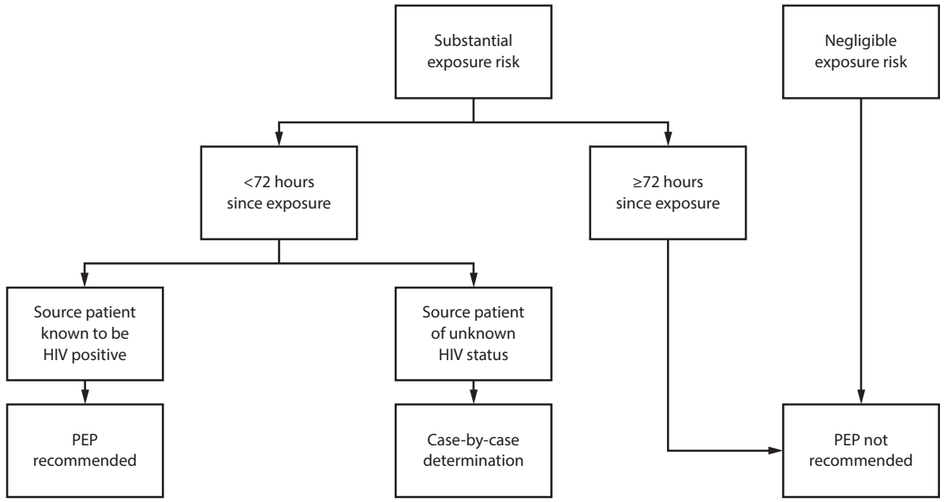
如果提供PEP，应与幸存者讨论以下信息：早期启动PEP以优化潜在获益的必要性(即，性侵犯后尽快且<72小时内),密切随访的重要性,依从推荐剂量的获益,以及抗逆转录病毒药物的潜在不良反应。提供者应强调PEP的严重不良反应罕见(*1431 - 1435*)。幸存者的临床管理应根据HIV PEP指南并与专科医生协作实施(1436)。医疗保健提供者应提供3-7天的初始药物疗程(即，起始包装)并附剩余疗程的处方，或者，如果无法获得起始包装，则应提供整个28天疗程的处方。据报道，在初次就诊时提供整个28天PEP药物供应可提高依从性，尤其是当患者难以多次返回随访时(1437)。常规提供起始包装或整个28天疗程要求医疗保健提供者在其实践场所储备PEP药物，或与药房建立既定协议，以储备、包装并紧急分发PEP药物并提供所需用药说明。无保险患者或自付额较高的患者可加入患者援助计划，以确保获得PEP药物。应安排早期随访就诊，医疗保健提供者可在其中讨论HIV和STI检测结果，提供额外咨询和支持，提供初次评估时未接种的指示疫苗，评估药物副作用和依从性，或在副作用或实验室检查结果提示时提供调整后的PEP药物方案。

青少年和成人性侵犯后数小时暴露后HIV风险评估建议

卫生保健提供者应做到以下几点：

- 评估袭击者的HIV感染风险，并进行检测尽可能为患者进行HIV检测。
- 使用算法评估幸存者是否需要HIV PEP(图)(1436)。

FIGURE. Algorithm to evaluate the need for nonoccupational HIV postexposure prophylaxis among adult and adolescent survivors of sexual assault



Substantial Risk for HIV Acquisition

Exposure of
vagina, rectum, eye, mouth, or other mucous membrane, nonintact skin, or percutaneous contact

With
blood, semen, vaginal secretions, rectal secretions, breast milk, or any body fluid that is visibly contaminated with blood

When
the source is known to be HIV positive

Negligible Risk for HIV Acquisition

Exposure of
vagina, rectum, eye, mouth, or other mucous membrane, intact or nonintact skin, or percutaneous contact

With
urine, nasal secretions, saliva, sweat, or tears if not visibly contaminated with blood

Regardless
of the known or suspected HIV status of the source

Source: Adapted from Announcement: updated guidelines for antiretroviral postexposure prophylaxis after sexual, injection-drug use, or other nonoccupational exposure to HIV—United States, 2016. MMWR Morb Mortal Wkly Rep 2016;65:458.
Abbreviation: PEP = postexposure prophylaxis.

- Consult with a specialist in HIV treatment if PEP is being considered.
- If the survivor appears to be at risk for acquiring HIV from the assault, discuss PEP, including benefits and risks.
- If the survivor chooses to start PEP, provide an initial course of 3–7 days of medication (i.e., a starter pack) with a prescription for the remainder of the course or provide a prescription for an entire 28-day course. Schedule an early follow-up visit to discuss test results and provide additional counseling (*1438*).
- If PEP is started, obtain serum creatinine, AST, and alanine aminotransferase at baseline.
- Perform an HIV antibody test at original assessment; repeat at 6 weeks and 3 months.
- Counsel the survivor regarding ongoing risk for HIV acquisition and about HIV PrEP, and provide referrals to a PrEP provider.

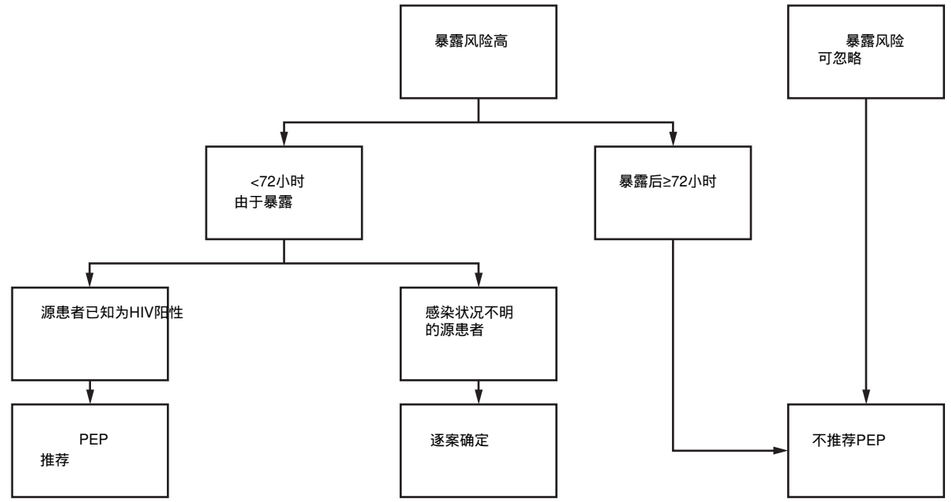
Assistance with PEP-related decisions can be obtained by calling the National Clinician's Post Exposure Prophylaxis Hotline (PEP Line) (telephone: 888-448-4911).

Sexual Assault or Abuse of Children

These guidelines are limited to the identification and treatment of STIs in prepubertal children. Management of the psychosocial or legal aspects of the sexual assault or abuse of children is beyond the scope of these guidelines.

Identification of STIs in children past the neonatal period strongly indicates sexual abuse (*1438*). The importance of

图.评估成年和青少年性侵犯幸存者非职业性HIV暴露后预防需求的算法



HIV感染的重大风险

暴露于阴道、直肠、眼、口或其他黏膜、非完整皮肤或经皮接触

接触血液、精液、阴道分泌物、直肠分泌物、母乳或任何肉眼可见被血液污染的体液当

已知传染源HIV阳性

HIV 感染风险可忽略暴露于阴道、直肠、眼、口或其他黏膜、完整或非完整皮肤，或经皮接触

接触尿液、鼻分泌物、唾液、汗液或泪液，且未见明显血液污染

无论传染源的HIV状态是已知还是疑似

来源：改编自公告：性行为、注射吸毒或其他非职业性暴露后抗逆转录病毒暴露后预防更新指南**缩写：**PEP = 暴露后预防。

暴露于HIV--美国，2016年。MMWR Morb Mortal Wkly Rep 2016;65:458。

- 如果正在考虑 PEP，应咨询 HIV 治疗专家
  已考虑。
- 如果幸存者似乎有从以下途径感染HIV的风险
  在遭受侵害后，讨论PEP，包括其益处和风险。
- 如果幸存者选择开始 PEP，提供初始
  3-7天药物疗程(即起始包)并附剩余疗程处方，或提供整个28天疗程的处方。安排早期随访就诊以讨论检测结果并提供额外咨询(1438)。
- 如果开始 PEP，则获取血清肌酐、AST 和丙氨酸
  基线转氨酶。
- 在初次评估时进行HIV抗体检测；
  在6周和3个月时重复。
- 向幸存者提供关于持续HIV风险的咨询
  获取相关信息以及关于HIV PrEP的知识，并提供转介至PrEP提供者的服务。

可通过致电 National Clinician's Post Exposure Prophylaxis Hotline(PEP Line)(电话：888-448-4911)获取PEP 相关决策的协助。

性侵犯或虐待儿童

本指南仅限于青春期前儿童 STI 的识别和治疗。儿童性侵犯或虐待的心理社会或法律方面的管理超出本指南范围。

新生儿期后儿童 STI 的识别强烈提示性虐待(1438)。以下的重要性

identifying a sexually transmitted organism for such children as evidence of possible child sexual abuse varies by pathogen. Postnatally acquired gonorrhea, syphilis, chlamydia, and *T. vaginalis* infection and nontransfusion, nonperinatally acquired HIV infection are indicative of sexual abuse. Sexual abuse should be suspected when anogenital herpes or anogenital warts are diagnosed. Investigation of sexual abuse among children who have an infection that might have been transmitted sexually should be conducted in compliance with recommendations by clinicians who have experience and training in all elements of the evaluation of child abuse, neglect, and assault. The social significance of an infection that might have been acquired sexually varies by the specific organism, as does the threshold for reporting suspected child sexual abuse (Table 8). When any STI has been diagnosed in a child, efforts should be made in consultation with a specialist to evaluate the possibility of sexual abuse, including conducting a history and physical examination for evidence of abuse and diagnostic testing for other commonly occurring STIs (*1439–1441*).

The general rule that STIs beyond the neonatal period are evidence of sexual abuse has exceptions. For example, genital infection with *T. vaginalis* (*1442*) or rectal or genital infection with *C. trachomatis* among young children might be the result of perinatally acquired infection and has, in certain cases of chlamydial infection, persisted for as long as 2–3 years (*1443–1445*), although perinatal chlamydial infection is now uncommon because of prenatal screening and treatment of pregnant women. Genital warts have been diagnosed among children who have been sexually abused (*1426*) but also among children who have no other evidence of sexual abuse (*1446*,*1447*); lesions appearing for the first time in a child aged >5 years are more likely to have been caused by sexual transmission (*1448*). BV has been diagnosed among children who have been abused but its presence alone does not prove sexual abuse. The majority of HBV infections among children result from household exposure to persons who have chronic HBV infection rather than sexual abuse.

Reporting

All U.S. states and territories have laws that require reporting of child abuse. Although the exact requirements differ by state or territory, if a health care provider has reasonable cause to suspect child abuse, a report must be made (*1448*). Health care providers should contact their state or local child protection service agency regarding child abuse reporting requirements.

Evaluating Children for STIs

Evaluating children for sexual assault or abuse should be conducted in a manner designed to minimize pain and trauma to the child. Examinations and collection of vaginal specimens in prepubertal girls can be extremely uncomfortable and should be performed by an experienced clinician to avoid psychological and physical trauma to the child. The decision to obtain genital or other specimens from a child to evaluate for STIs should be made on an individual basis. However, children who received a diagnosis of one STI should be screened for other STIs. History and reported type of sexual contact might not be a reliable indicator, and urogenital, pharyngeal, and rectal testing should be considered for preverbal children and children who cannot verbalize details of the assault (*1438*,*1449*). Factors that should lead the physician to consider testing for STIs include the following (*1449*):

- The child has experienced penetration or has evidence of recent or healed penetrative injury to the genitals, anus, or oropharynx.
- The child has been abused by a stranger.

TABLE 8. Implications of commonly encountered sexually transmitted or sexually associated infections for diagnosis and reporting of sexual abuse among infants and prepubertal children

Infection	Evidence for sexual abuse	Recommended action
Gonorrhea*	Diagnostic	Report†
Syphilis*	Diagnostic	Report†
HIV§	Diagnostic	Report†
*Chlamydia trachomatis**	Diagnostic	Report†
*Trichomonas vaginalis**	Diagnostic	Report†
Anogenital herpes	Suspicious	Consider report†,¶
Condylomata acuminata (anogenital warts)*	Suspicious	Consider report†,¶,**
Anogenital molluscum contagiosum	Inconclusive	Medical follow-up
Bacterial vaginosis	Inconclusive	Medical follow-up

Sources: Adapted from Kellogg N; American Academy of Pediatrics Committee on Child Abuse and Neglect. The evaluation of child abuse in children. Pediatrics 2005;16:506–12; Adams JA, Farst KJ, Kellogg ND. Interpretation of medical findings in suspected child abuse: an update for 2018. J Pediatr Adolesc Gynecol 2018;31:225–31.

* If unlikely to have been perinatally acquired and vertical transmission, which is rare, is excluded.
† Reports should be made to the local or state agency mandated to receive reports of suspected child abuse or neglect.
§ If unlikely to have been acquired perinatally or through transfusion.
¶ Unless a clear history of autoinoculation exists.
** Report if evidence exists to suspect abuse, including history, physical examination, or other identified infections. Lesions appearing for the first time in a child aged >5 years are more likely to have been caused by sexual transmission.

对于此类儿童，鉴定性传播病原体作为可能的儿童性虐待证据因病原体而异。出生后获得的淋病、梅毒、衣原体和阴道毛滴虫感染以及非输血、非围产期获得的HIV感染提示性虐待。当诊断出肛门生殖器疱疹或肛门生殖器疣时，应怀疑性虐待。对于感染可能经性传播的儿童，性虐待调查应遵循在儿童虐待、忽视和攻击评估各方面具有经验和培训的临床医生的建议进行。可能经性获得感染的社会意义因特定病原体而异，报告疑似儿童性虐待的阈值也因病原体而异(表8)。当儿童被诊断出任何STI时，应与专家协商评估性虐待的可能性，包括进行病史采集和体格检查以寻找虐待证据，并对其他常见STI进行诊断检测(*1439 - 1441*)。

新生儿期后STI是性虐待证据的一般规则存在例外。例如，幼儿生殖器感染阴道毛滴虫(1442)或直肠或生殖器感染沙眼衣原体可能是围产期获得性感染的结果，并且在某些衣原体感染病例中，已持续长达2-3年(*1443 - 1445*)，尽管由于产前筛查和孕妇治疗，围产期衣原体感染现已不常见。生殖器疣已在遭受性虐待的儿童中被诊断(1426)，但也在没有其他性虐待证据的儿童中被诊断(*1446*,*1447*)；在年龄>5岁的儿童中首次出现的病变更可能是由性传播引起的(1448)。BV已在儿童中被诊断

遭受虐待，但其存在本身并不能证明性虐待。儿童中大多数HBV 感染源于家庭接触慢性 HBV 感染者，而非性虐待。

报告

美国所有州和领地均有要求报告儿童虐待的法律。尽管具体要求因州或领地而异，如果医疗保健提供者有合理理由怀疑儿童虐待，则必须报告(1448)。医疗保健提供者应就儿童虐待报告要求联系其州或当地儿童保护服务机构。

评估儿童性传播感染

对儿童进行性攻击或性虐待评估应以尽量减少儿童疼痛和创伤的方式进行。青春期前女孩的检查和阴道标本采集可能极度不适，应由经验丰富的临床医生进行，以避免对儿童造成心理和身体创伤。从儿童获取生殖器或其他标本以评估STI的决定应个体化做出。然而，被诊断出一种STI的儿童应筛查其他STI。病史和报告的性接触类型可能不是可靠的指标，对于不会说话的儿童和无法口述攻击细节的儿童，应考虑进行泌尿生殖器、咽部和直肠检测(*1438*,*1449*)。应促使医生考虑进行STI检测的因素包括以下(1449):

- 儿童曾遭受插入或存在证据表明近期或已愈合的生殖器、肛门或口咽部插入性损伤。
- 孩子遭到了陌生人的虐待。

表8. 常见性传播感染或性相关感染对性行为诊断和报告的影响
婴儿和青春期前儿童中的虐待

感染	性虐待的证据	建议措施
淋病*	诊断性	Report †
梅毒*		
HIV	诊断性	Report †
沙眼衣原体*		
阴道毛滴虫 *	诊断性	Report †
肛门生殖器疱疹	可疑	考虑报告†,¶
尖锐湿疣(肛门生殖器疣)*		考虑报告†,¶, **
肛门生殖器传染性软疣	无结论	医疗随访
细菌性阴道病		

来源：改编自Kellogg N；美国儿科学会儿童虐待与忽视委员会。儿童虐待的评估。Pediatrics 2005;16:506–12；Adams JA, Farst KJ, Kellogg ND. 疑似儿童虐待中医学发现的解读：2018年更新。J Pediatr Adolesc Gynecol 2018;31:225–31。

* 如果不太可能是围产期获得，且已排除罕见的垂直传播。
† 应向被授权接收疑似儿童虐待或忽视报告的当地或州机构报告。
如果不太可能是围产期或经输血获得。¶ 除非存在明确的自体接种史。
** 如果存在怀疑虐待的证据，包括病史、体格检查或其他已识别的感染，则应报告。儿童首次出现的病变年龄为5 岁以上的更可能是由性传播引起的。

- The child has been abused by an assailant known to be infected with an STI or at high risk for STIs (e.g., injecting drug user, MSM, person with multiple sex partners, or person with a history of STIs).
- The child has a sibling, other relative, or another person in the household with an STI.
- The child lives in an area with a high rate of STIs in the community.
- The child has signs or symptoms of STIs (e.g., vaginal discharge or pain, genital itching or odor, urinary symptoms, or genital lesions or ulcers).
- The child or parent requests STI testing.
- The child is unable to verbalize details of the assault.

If a child has symptoms, signs, or evidence of an infection that might be sexually transmitted, the child should be tested for common STIs before initiation of any treatment that might interfere with diagnosing other STIs. Because of the legal and psychosocial consequences of a false-positive diagnosis, only tests with high specificities should be used. The potential benefit to the child of a reliable STI diagnosis justifies deferring presumptive treatment until specimens for highly specific tests are obtained by providers with experience in evaluating sexually abused and assaulted children.

Evaluations should be performed on a case-by-case basis, according to history of assault or abuse and in a manner that minimizes the possibility for psychological trauma and social stigma. If the initial exposure was recent, the infectious organisms acquired through the exposure might not have produced sufficient concentrations to result in positive test results or examination findings (*1450*). Alternatively, positive test results after a recent exposure might represent the assailant's secretions (but would nonetheless be an indication for treatment of the child). A second visit approximately 2–6 weeks after the most recent sexual exposure should be scheduled to include a repeat physical examination and collection of additional specimens to identify any infection that might not have been detected at the time of initial evaluation. A single evaluation might be sufficient if the child was abused for an extended period and if a substantial amount of time elapsed between the last suspected episode of abuse and the medical evaluation. Compliance with follow-up appointments might be improved when law enforcement personnel or child protective services are involved.

Initial Examination

Visual inspection of the genital, perianal, and oral areas for genital discharge, odor, bleeding, irritation, warts, and ulcerative lesions should be performed during initial examination. The clinical manifestations of certain STIs are different for children than for adults. For example, typical vesicular lesions might be absent even in the presence of HSV infection. The following should be performed during the initial examination, if STI testing is indicated:

- Testing for *N. gonorrhoeae* and *C. trachomatis* can be performed from specimens collected from the pharynx and rectum, as well as the vagina for girls and urine for boys. Cervical specimens are not recommended for prepubertal girls. For boys with a urethral discharge, a meatal specimen discharge is an adequate substitute for an intraurethral swab specimen. Culture or NAAT can be used to test for *N. gonorrhoeae* and *C. trachomatis.* Although data regarding NAAT for children are more limited and performance is test dependent (*553*), no evidence demonstrates that performance of NAAT for detection of *N. gonorrhoeae* or *C. trachomatis* among children differs from that among adults. Only FDA-cleared NAAT assays should be used. Consultation with an expert is necessary before using NAAT in this context, both to minimize the possibility of cross-reaction with nongonococcal *Neisseria* species and other commensals (e.g., *N. meningitidis*, *N. sicca*, *N. lactamica*, *N. cinerea*, or *M. catarrhalis*) and to ensure correct interpretation of results. Because of the implications of a diagnosis of *N. gonorrhoeae* or *C. trachomatis* infection in a child, only CLIA-validated, FDA-cleared NAATs should be used (*837*). If culture for the isolation of *N. gonorrhoeae* or *C. trachomatis* is performed, only standard culture procedures should be followed. Specimens from the vagina, urethra, pharynx, or rectum should be streaked onto selective media for isolation of *N. gonorrhoeae*, and all presumptive isolates of *N. gonorrhoeae* should be identified definitively by at least two tests that involve different approaches (e.g., biochemical, enzyme substrate, or molecular probes). Gram stains are inadequate for evaluating prepubertal children for gonorrhea and should not be used to diagnose or exclude gonorrhea. Specimens (either NAAT or culture, including any isolates) obtained before treatment should be preserved for further validation if needed. When a specimen is positive, the result should be confirmed either by retesting the original specimen or obtaining another. Because of the overall low prevalence of *N. gonorrhoeae* and *C. trachomatis* among children, false-positive results can occur, and all specimens that are initially positive should be confirmed.
- Testing for *T. vaginalis* should not be limited to girls with vaginal discharge if other indications for vaginal testing exist because evidence indicates that asymptomatic sexually abused children might be infected with *T. vaginalis* and might benefit from treatment (*1451*,*1452*). NAAT can be used as an alternative or in addition to culture and wet

- 儿童曾遭已知感染 STI 或 STI 高风险者(例如注射吸毒者、MSM、有多名性伴侣者或有 STI 史者)侵犯。
- 孩子有兄弟姐妹、其他亲属或另一个人与STI患者同住一户。
- 该儿童生活在STI高发地区社区。
- 儿童有性传播感染(STI)的体征或症状(例如，阴道分泌物或疼痛、生殖器瘙痒或异味、泌尿系统症状，或生殖器病变或溃疡)。
- 儿童或家长要求进行STI检测。
- 儿童无法口述攻击细节。如果儿童有症状、体征或可能经性传播感染的证据，应在开始任何可能干扰诊断其他STI的治疗之前对儿童进行常见STI检测。由于假阳性诊断的法律和社会心理后果，应仅使用高特异性检测。可靠STI诊断对儿童的潜在益处证明，应将推定治疗推迟到由在评估遭受性虐待和性攻击儿童方面有经验的提供者获取用于高特异性检测的标本之后。

评估应根据攻击或虐待史逐案进行，并以减少心理创伤和社会污名可能性的方式进行。如果初始暴露是近期的，通过暴露获得的感染病原体可能尚未产生足够浓度以导致阳性检测结果或检查发现(1450)。或者，近期暴露后的阳性检测结果可能代表攻击者的分泌物(但仍应作为治疗儿童的指征)。应安排在最近一次性暴露后约2-6周进行第二次就诊，包括重复体格检查和采集额外标本，以识别初始评估时可能未检测到的任何感染。如果儿童被虐待时间较长，且最后一次疑似虐待事件与医学评估之间已过去相当长时间，单次评估可能足够。当执法人员或儿童保护服务机构参与时，随访预约的依从性可能会提高。

初步检查

初次检查时应进行生殖器、肛周和口腔区域的视诊，以检查生殖器分泌物、异味、出血、刺激、疣和溃疡性病变。某些 STI 的临床表现儿童与成人不同。例如，典型即使存在 HSV 感染，也可能无水疱性病变。如果提示进行 STI 检测，初次检查时应进行以下操作：

- 对*N.gonorrhoeae*和*C.trachomatis*的检测可以从咽部和直肠采集的标本，以及女孩的阴道标本和男孩的尿液标本进行检测。不建议对青春期前女孩采集宫颈标本。对于有尿道分泌物的男孩，尿道口分泌物标本可充分替代尿道内拭子标本。可使用培养或NAAT检测淋球菌和沙眼衣原体。尽管关于儿童NAAT的数据较为有限且性能取决于具体检测方法(553)，但尚无证据表明儿童中检测淋球菌或沙眼衣原体的NAAT性能与成人不同。应仅使用FDA批准的NAAT检测方法。在此背景下使用NAAT前需咨询专家，以减少与非淋球菌奈瑟菌属及其他共生菌(如脑膜炎奈瑟菌、干燥奈瑟菌、乳糖奈瑟菌、灰奈瑟菌或卡他莫拉菌)交叉反应的可能性，并确保正确解读结果。由于儿童淋球菌或沙眼衣原体感染诊断的影响重大，应仅使用经CLIA验证、FDA批准的NAAT(837)。如进行淋球菌或沙眼衣原体分离培养，应仅遵循标准培养程序。来自阴道、尿道、咽部或直肠的标本应接种于选择性培养基以分离淋球菌，所有淋球菌推定分离株应通过至少两种不同方法(如生化、酶底物或分子探针)进行确定性鉴定。革兰染色不足以评估青春期前儿童的淋病，不应用于诊断或排除淋病。治疗前获取的标本(NAAT或培养，包括任何分离株)应保存以备需要时进一步验证。当标本呈阳性时，应通过重新检测原始标本或获取另一标本进行确认。由于儿童中淋球菌和沙眼衣原体的总体患病率较低，可能出现假阳性结果，所有初次阳性的标本均应予以确认。
- 滴虫(T.vaginalis)检测不应仅限于有以下情况的女孩如果存在其他阴道检测指征，则进行阴道分泌物检测，因为证据表明无症状的遭受性虐待儿童可能感染*T.vaginalis*，并可能从治疗中获益(*1451*,*1452*)。NAAT可作为培养和湿片的替代方法或补充

mount, especially in settings where culture and wet mount of vaginal swab specimens are not obtainable. Data regarding use of NAATs for detection of *T. vaginalis* among children are limited; however, no evidence indicates that performance of NAAT for detection of *T. vaginalis* for children would differ from that for adults. Consultation with an expert is necessary before using NAAT in this context to ensure correct interpretation of results. Because of the implications of a diagnosis of *T. vaginalis* infection in a child, only CLIA-validated, FDA-cleared NAATs should be used (*837*). POC tests for *T. vaginalis* have not been validated for prepubertal children and should not be used. In the case of a positive specimen, the result should be confirmed either by retesting the original specimen or obtaining another. Because of the overall low prevalence of *T. vaginalis* among children, false-positive results can occur, and all specimens that are initially positive should be confirmed.

- HSV can be indicative of sexual abuse; therefore, specimens should be obtained from all vesicular or ulcerative genital or perianal lesions and sent for NAAT or viral culture.
- Wet mount can be used for a vaginal swab specimen for BV if discharge is present.
- Collection of serum samples should be evaluated, preserved for subsequent analysis, and used as a baseline for comparison with follow-up serologic tests. Sera can be tested for antibodies to *T. pallidum*, HIV, and HBV. Decisions regarding the infectious agents for which to perform serologic tests should be made on a case-by-case basis.

Treatment

The risk for a child acquiring an STI as a result of sexual abuse or assault has not been well studied. Presumptive treatment for children who have been sexually assaulted or abused is not recommended because the incidence of most STIs among children is low after abuse or assault, prepubertal girls appear to be at lower risk for ascending infection than adolescent or adult women, and regular follow-up of children usually can be ensured. However, certain children or their parent or guardian might be concerned about the possibility of infection with an STI, even if the health care provider has perceived the risk to be low. Such concerns might be an indication for presumptive treatment in certain settings and might be considered after all relevant specimens for diagnostic tests have been collected.

Other Management Considerations

Children who are survivors of sexual assault or abuse are at increased risk for future unsafe sexual practices that have been linked to higher risk for HPV acquisition (*1426*,*1453*) and are more likely to engage in these behaviors at an earlier age; therefore, ACIP recommends vaccination of these children at age ≥9 years if they have not initiated or completed HPV vaccination (see Human Papillomavirus Infections, Prevention) (https://www.cdc.gov/vaccines/hcp/acip-recs/vacc-specific/hpv.html). Although HPV vaccine will not protect against progression of infection already acquired or promote clearance of the infection, the vaccine protects against HPV types not yet acquired.

Follow-Up

If no infections were identified at the initial examination after the last suspected sexual exposure, and if this exposure was recent, a follow-up evaluation approximately 2 weeks after the last exposure can be considered. Likewise, if no physical examination or diagnostic testing was performed at the initial visit, a complete examination can be scheduled approximately 2 weeks after the last exposure to identify any evidence of STIs. In circumstances in which transmission of syphilis, HIV, HBV, or HPV is a concern but baseline tests for syphilis, HIV, and HBV are negative and examinations for genital warts are negative, follow-up serologic testing and examination approximately 6 weeks and <3 months after the last suspected sexual exposure is recommended to allow time for antibodies to develop and signs of infection to appear. In addition, results of HBsAg testing should be interpreted carefully because HBV can be transmitted nonsexually. Decisions regarding which tests should be performed should be made on a case-by-case basis.

Risk for Acquiring HIV Infection

HIV has been reported among children for whom sexual abuse was the only known risk factor. Serologic testing for HIV should be considered for sexually abused children. The decision to test for HIV should involve the family, if possible, and be made on a case-by-case basis depending on the likelihood of infection in the assailant (*1448*,*1454*). Although data are insufficient concerning the efficacy of PEP among children, treatment is well tolerated by infants and children with and without HIV, and children have a minimal risk for serious adverse reactions because of the short period recommended for prophylaxis (*1455*).

Recommendations for Postexposure HIV Risk Assessment of Children <72 Hours After Sexual Assault

Providers should do the following:

- Review local HIV epidemiology, assess risk for HIV in the assailant, and test for HIV.

尤其是当无法获得阴道拭子标本的培养和湿片检查时。关于使用NAAT检测儿童T.vaginalis的数据有限；然而，没有证据表明儿童T.vaginalis NAAT检测的表现会与成人不同。在此背景下使用NAAT前必须咨询专家，以确保正确解读结果。由于儿童T.vaginalis感染诊断的影响，应仅使用经CLIA验证、FDA批准的NAAT(837)。T.vaginalis的POC检测尚未在青春期前儿童中验证，不应使用。若标本呈阳性，应通过重新检测原始标本或获取另一份标本进行确认。由于总体患病率低

*T.vaginalis*在儿童中，可能出现假阳性结果，所有初筛阳性的标本均应确认。

- HSV 可能提示性虐待；因此，
  应从所有水疱性或溃疡性生殖器或肛周病变获取标本，并送检 NAAT 或病毒培养。

- 湿片可用于阴道拭子标本以
  如存在分泌物，则考虑BV。
- 应评估和保存血清样本的采集
  以供后续分析，并作为与随访血清学检测比较的基线。血清可检测*T.pallidum*、HIV 和 HBV 抗体。关于进行血清学检测的感染病原体的决定应逐例作出。

治疗

儿童因性虐待或性侵犯而获得性传播感染的风险尚未得到充分研究。不建议对遭受性侵犯或性虐待的儿童进行推定治疗，因为儿童在遭受虐待或侵犯后大多数性传播感染的发病率较低，青春期前女孩发生上行感染的风险似乎低于青少年或成年女性，且通常可以确保对儿童进行定期随访。然而，某些儿童或其父母或监护人可能担心感染性传播感染的可能性，即使医疗保健提供者认为风险较低。此类担忧在某些情况下可能成为推定治疗的指征，并可在收集所有相关诊断检测标本后予以考虑。

其他管理考虑

性侵犯或虐待的儿童幸存者未来发生不安全性行为的风险增加，这些行为已被与获取HPV的风险较高相关(*1426*,*1453*)，并且更可能在较早年龄从事这些行为；因此，ACIP建议这些儿童如果尚未开始或完成HPV疫苗接种，应在≥9岁时接种(见人乳头瘤病毒感染，预防)(https://www.cdc.gov/vaccines/hcp/acip-recs/vacc-specific/ hpv.html)。尽管HPV疫苗不能预防已获得感染的进展或促进感染清除，但疫苗可预防尚未获得的HPV型别。

随访

如在最后一次可疑性暴露后的初次检查中未发现感染，且该暴露为近期发生，可考虑在最后一次暴露后约2周进行随访评估。同样，如初次就诊时未进行体格检查或诊断检测，可安排在最后一次暴露后约2周进行完整检查以发现任何STI证据。在关注梅毒、HIV、HBV或HPV传播但梅毒、HIV和HBV基线检测为阴性且生殖器疣检查为阴性的情况下，建议在最后一次可疑性暴露后约6周和<3个月进行随访血清学检测和检查,以留出抗体产生和感染体征出现的时间。此外,HBsAg检测结果应谨慎解读,因为HBV可经非性途径传播。应逐案决定进行哪些检测。

感染HIV的风险

据报道，在性虐待是唯一已知危险因素的儿童中发现了HIV。对于遭受性虐待的儿童，应考虑进行HIV血清学检测。检测HIV的决定应尽可能让家庭参与，并根据攻击者感染的可能性逐例决定(*1448*,*1454*)。尽管关于儿童PEP疗效的数据不足，但无论是否感染HIV，婴儿和儿童对治疗耐受良好，且由于推荐的预防用药时间较短，儿童发生严重不良反应的风险极小(1455)。

儿童性侵犯后数小时暴露后 HIV 风险评估建议

提供者应执行以下操作：

- 审查当地 HIV 流行病学、评估侵犯者的 HIV 风险，并进行 HIV 检测。

- Evaluate the circumstances of the assault or abuse that might affect risk for HIV transmission.
- Perform HIV antigen or antibody testing (or antibody testing, if antigen or antibody testing is unavailable) during the original assessment and again at follow-up visits, in accordance with CDC guidelines (https://stacks.cdc.gov/view/cdc/38856). In considering whether to offer PEP, health care providers should consider whether the child can be treated soon after the sexual exposure (i.e., <72 hours), the likelihood that the assailant has HIV infection, and the likelihood of high compliance with the prophylactic regimen (*1436*). Potential benefit of treating a sexually abused child should be weighed against the risk for adverse reactions.
- Consult with a provider specializing in evaluating or treating children with HIV infection to determine age-appropriate dosing and regimens and baseline laboratory testing, if PEP is being considered.
- Discuss PEP with the caregivers, including its toxicity, unknown efficacy, and possible benefits, for children determined to be at risk for HIV transmission from the assault or abuse.
- Provided adequate doses of medication, if PEP is begun, to last until the follow-up visit 3–7 days after the initial assessment, at which time the child should be reevaluated and tolerance of medication assessed (*139*).

Conflicts of Interest

All authors have completed and submitted the International Committee of Medical Journal Editors form for disclosure of potential conflicts of interest. Christina Muzny reports other support from CDC, during the conduct of the study; grants from the National Institutes of Health/National Institute of Allergy and Infectious Diseases and Lupin Pharmaceuticals; personal fees from Lupin Pharmaceuticals, PhagoMed, Cepheid, and Beckton Dickinson; and personal fees and other support from Roche Diagnostics, Abbott Molecular, and BioFire Diagnostics, outside the submitted work. Hilary Reno reports grants from Hologic, outside the submitted work. Christine Johnston reports other support from CDC, during the conduct of the study; received research funding from Sanofi-Pasteur; royalties from UpToDate; and personal fees from MedPace, Gilead, AbbVie, and UpToDate, outside the submitted work.

References

1. Workowski KA, Bolan GA; CDC. Sexually transmitted diseases treatment guidelines, 2015. MMWR Recomm Rep 2015;64(No. RR-3). PMID:26042815
2. Barrow RY, Ahmed F, Bolan GA, Workowski KA. Recommendations for providing quality sexually transmitted diseases clinical services, 2020. MMWR Recomm Rep 2020;68(No. RR-5). PMID:31899459 https://doi.org/10.15585/mmwr.rr6805a1
3. CDC. A guide to taking a sexual history. Atlanta, GA: US Department of Health and Human Services, CDC. https://www.cdc.gov/std/treatment/sexualhistory.pdf
4. Henderson JT, Senger CA, Henninger M, Bean SI, Redmond N, O'Connor EA. Behavioral counseling interventions to prevent sexually transmitted infections: updated evidence report and systematic review for the US Preventive Services Task Force. JAMA 2020;324:682–99. PMID:32809007 https://doi.org/10.1001/jama.2020.10371
5. Kamb ML, Fishbein M, Douglas JM Jr, et al.; Project RESPECT Study Group. Efficacy of risk-reduction counseling to prevent human immunodeficiency virus and sexually transmitted diseases: a randomized controlled trial. JAMA 1998;280:1161–7. PMID:9777816 https://doi.org/10.1001/jama.280.13.1161
6. Metsch LR, Feaster DJ, Gooden L, et al. Effect of risk-reduction counseling with rapid HIV testing on risk of acquiring sexually transmitted infections: the AWARE randomized clinical trial. JAMA 2013;310:1701–10. PMID:24150466 https://doi.org/10.1001/jama.2013.280034
7. Brookmeyer KA, Hogben M, Kinsey J. The role of behavioral counseling in sexually transmitted disease prevention program settings. Sex Transm Dis 2016;43(Suppl 1):S102–12. PMID:26779681 https://doi.org/10.1097/OLQ.0000000000000327
8. Patel P, Bush T, Mayer K, et al.; SUN Study Investigators. Routine brief risk-reduction counseling with biannual STD testing reduces STD incidence among HIV-infected men who have sex with men in care. Sex Transm Dis 2012;39:470–4. PMID:22592834 https://doi.org/10.1097/OLQ.0b013e31824b3110
9. Warner L, Klausner JD, Rietmeijer CA, et al.; Safe in the City Study Group. Effect of a brief video intervention on incident infection among patients attending sexually transmitted disease clinics. PLoS Med 2008;5:e135. PMID:18578564 https://doi.org/10.1371/journal.pmed.0050135
10. Mustanski B, Parsons JT, Sullivan PS, Madkins K, Rosenberg E, Swann G. Biomedical and behavioral outcomes of Keep It Up!: an ehealth HIV prevention program RCT. Am J Prev Med 2018;55:151–8. PMID:29937115 https://doi.org/10.1016/j.amepre.2018.04.026
11. Meites E, Szilagyi PG, Chesson HW, Unger ER, Romero JR, Markowitz LE. Human papillomavirus vaccination for adults: updated recommendations of the Advisory Committee on Immunization Practices. MMWR Morb Mortal Wkly Rep 2019;68:698–702. PMID:31415491 https://doi.org/10.15585/mmwr.mm6832a3
12. Schillie S, Vellozzi C, Reingold A, et al. Prevention of hepatitis B virus infection in the United States: recommendations of the Advisory Committee on Immunization Practices. MMWR Recomm Rep 2018;67(No. RR-1). PMID:29939980 https://doi.org/10.15585/mmwr.rr6701a1
13. Doshani M, Weng M, Moore KL, Romero JR, Nelson NP. Recommendations of the Advisory Committee on Immunization Practices for use of hepatitis A vaccine for persons experiencing homelessness. MMWR Morb Mortal Wkly Rep 2019;68:153–6. PMID:30763295 https://doi.org/10.15585/mmwr.mm6806a6
14. Weller S, Davis K. Condom effectiveness in reducing heterosexual HIV transmission. Cochrane Database Syst Rev 2002;(1):CD003255. PMID:11869658 https://doi.org/10.1002/14651858.CD003255
15. Giannou FK, Tsiara CG, Nikolopoulos GK, et al. Condom effectiveness in reducing heterosexual HIV transmission: a systematic review and meta-analysis of studies on HIV serodiscordant couples. Expert Rev Pharmacoecon Outcomes Res 2016;16:489–99. PMID:26488070 https://doi.org/10.1586/14737167.2016.1102635
16. Smith DK, Herbst JH, Zhang X, Rose CE. Condom effectiveness for HIV prevention by consistency of use among men who have sex with men in the United States. J Acquir Immune Defic Syndr 2015;68:337–44. PMID:25469526 https://doi.org/10.1097/QAI.0000000000000461

- 评估性侵犯或虐待发生的情境，
  可能影响HIV传播风险。
- 进行HIV抗原或抗体检测(或抗体检测)
  检测，如果抗原或抗体检测不可用)在初始评估期间以及随访时再次进行，依据CDC指南(https://stacks.cdc.gov/ view/cdc/38856)。在考虑是否提供PEP时，医疗保健提供者应考虑儿童是否能在性暴露后尽快接受治疗(即<72小时)、施暴者感染HIV的可能性以及预防性方案高依从性的可能性(1436)。治疗遭受性虐待儿童的可能获益应与不良反应风险进行权衡。
- 咨询专门从事评估或
  对 HIV 感染儿童进行治疗，以确定适合年龄的剂量和方案以及基线实验室检测，如果正在考虑 PEP。
- 与照护者讨论PEP，包括其毒性，
  疗效未知，以及可能获益，针对被确定因侵犯或虐待而存在 HIV 传播风险的儿童。
- 若开始 PEP，提供足够剂量的药物，
  持续至初次评估后 3-7 天的随访就诊，此时应重新评估儿童并评估药物耐受性(139)。

利益冲突

所有作者均已填写并提交国际医学期刊编辑委员会潜在利益冲突披露表。Christina Muzny报告在研究进行期间获得CDC的其他支持；获得美国国立卫生研究院/国家过敏和传染病研究所及Lupin Pharmaceuticals的资助；获得Lupin Pharmaceuticals、PhagoMed、Cepheid和Beckton Dickinson的个人费用；以及获得Roche Diagnostics、Abbott Molecular和BioFire Diagnostics的个人费用和其他支持，均与所提交工作无关。Hilary Reno报告获得Hologic的资助，与所提交工作无关。Christine Johnston报告在研究进行期间获得CDC的其他支持；获得Sanofi-Pasteur的研究资助；获得UpToDate的版税；以及获得MedPace、Gilead、AbbVie和UpToDate的个人费用，均与所提交工作无关。

参考文献

1. Workowski KA, Bolan GA; CDC.性传播疾病治疗指南，2015. MMWR Recomm Rep 2015;64(No.RR-3).PMID:26042815
2. Barrow RY, Ahmed F, Bolan GA, Workowski KA.提供高质量性传播疾病临床服务的建议，2020. MMWR Recomm Rep 2020;68(No.RR-5).PMID:31899459 https:// doi.org/10.15585/mmwr.rr6805a1
3. CDC。采集性史指南。佐治亚州亚特兰大：美国卫生与公众服务部，CDC。https://www.cdc.gov/std/ treatment/sexual history.pdf
4. Henderson JT, Senger CA, Henninger M, Bean SI, Redmond N, O'Connor EA。预防性传播感染的行为咨询干预：为美国预防服务工作组更新的证据报告和系统评价。JAMA 2020;324:682-99。PMID:32809007 https://doi.org/10.1001/jama.2020.10371
5. Kamb ML, Fishbein M, Douglas JM Jr, et al.; Project RESPECT Study Group。降低风险咨询预防人类免疫缺陷病毒和性传播疾病的效力：一项随机对照试验。JAMA 1998;280:1161-7。PMID:9777816 https://doi.org/10.1001/jama.280.13.1161
6. Metsch LR, Feaster DJ, Gooden L, et al。结合快速HIV检测的降低风险咨询对获得性传播感染风险的影响：AWARE随机临床试验。JAMA 2013;310:1701-10。PMID:24150466 https://doi.org/10.1001/jama.2013.280034
7. Brookmeyer KA, Hogben M, Kinsey J。行为咨询在性传播疾病预防项目环境中的作用。Sex Transm Dis 2016;43(Suppl 1): S102-12。PMID:26779681 https://doi.org/10.1097/OLQ.0000000000000327
8. Patel P, Bush T, Mayer K, et al.; SUN Study Investigators。常规简短降低风险咨询结合每年两次STD检测可降低接受医疗照护的HIV感染男男性行为人群中的STD发病率。Sex Transm Dis 2012;39:470-4。PMID:22592834 https://doi.org/10.1097/ OLQ.0b013e31824b3110
9. Warner L, Klausner JD, Rietmeijer CA, et al.; Safe in the City Study Group。简短视频干预对就诊于性传播疾病门诊患者新发感染的影响。PLoS Med 2008;5:e135。PMID:18578564 https://doi.org/10.1371/journal.pmed.0050135
10. Mustanski B, Parsons JT, Sullivan PS, Madkins K, Rosenberg E, Swann G。Keep It Up!的生物医学和行为学结局：一项ehealth HIV预防项目RCT。Am J Prev Med 2018;55:151-8。PMID:29937115 https://doi.org/10.1016/j.amepre.2018.04.026
11. Meites E, Szilagyi PG, Chesson HW, Unger ER, Romero JR, Markowitz LE。成人人乳头瘤病毒疫苗接种：免疫实践咨询委员会更新建议。MMWR Morb Mortal Wkly Rep 2019;68:698-702。PMID:31415491 https://doi.org/10.15585/mmwr.mm6832a3
12. Schillie S, Vellozzi C, Reingold A, et al。美国乙型肝炎病毒感染的预防：免疫实践咨询委员会建议。MMWR Recomm Rep 2018;67(No.RR-1)。PMID:29939980 https://doi.org/10.15585/mmwr.rr6701a1
13. Doshani M, Weng M, Moore KL, Romero JR, Nelson NP。免疫实践咨询委员会关于经历无家可归者使用甲型肝炎疫苗的建议。MMWR Morb Mortal Wkly Rep 2019;68:153-6。PMID:30763295 https://doi.org/10.15585/mmwr.mm6806a6
14. Weller S, Davis K。安全套在减少异性间HIV传播中的有效性。Cochrane Database Syst Rev 2002;(1): CD003255。PMID:11869658 https://doi.org/10.1002/14651858.CD003255
15. Giannou FK, Tsiara CG, Nikolopoulos GK, et al。安全套在减少异性间HIV传播中的有效性：对HIV血清不一致伴侣研究的系统评价和meta分析。Expert Rev Pharmacoecon Outcomes Res 2016;16:489-99。PMID:26488070 https://doi.org/10.1586/14737167.2016.1102635
16. Smith DK, Herbst JH, Zhang X, Rose CE。美国男男性行为人群中使用安全套预防HIV的有效性按使用一致性分析。J Acquir Immune Defic Syndr 2015;68:337-44。PMID:25469526 https://doi.org/10.1097/QAI.0000000000000461

17. Johnson WD, O'Leary A, Flores SA. Per-partner condom effectiveness against HIV for men who have sex with men. AIDS 2018;32:1499–505. PMID:29794493 https://doi.org/10.1097/QAD.0000000000001832
18. Crosby RA, Charnigo RA, Weathers C, Caliendo AM, Shrier LA. Condom effectiveness against non-viral sexually transmitted infections: a prospective study using electronic daily diaries. Sex Transm Infect 2012;88:484–9. PMID:23002192 https://doi.org/10.1136/sextrans-2012-050618
19. Holmes KK, Levine R, Weaver M. Effectiveness of condoms in preventing sexually transmitted infections. Bull World Health Organ 2004;82:454–61. PMID:15356939
20. Warner L, Stone KM, Macaluso M, Buehler JW, Austin HD. Condom use and risk of gonorrhea and chlamydia: a systematic review of design and measurement factors assessed in epidemiologic studies. Sex Transm Dis 2006;33:36–51. PMID:16385221 https://doi.org/10.1097/01.olq.0000187908.42622.fd
21. Bernabe-Ortiz A, Carcamo CP, Scott JD, Hughes JP, Garcia PJ, Holmes KK. HBV infection in relation to consistent condom use: a population-based study in Peru. PLoS One 2011;6:e24721. PMID:21931828 https://doi.org/10.1371/journal.pone.0024721
22. Ness RB, Hillier SL, Kip KE, et al. Bacterial vaginosis and risk of pelvic inflammatory disease. Obstet Gynecol 2004;104:761–9. PMID:15458899 https://doi.org/10.1097/01.AOG.0000139512.37582.17
23. Martin IE, Gu W, Yang Y, Tsang RS. Macrolide resistance and molecular types of *Treponema pallidum* causing primary syphilis in Shanghai, China. Clin Infect Dis 2009;49:515–21. PMID:19583516 https://doi.org/10.1086/600878
24. Winer RL, Hughes JP, Feng Q, et al. Condom use and the risk of genital human papillomavirus infection in young women. N Engl J Med 2006;354:2645–54. PMID:16790697 https://doi.org/10.1056/NEJMoa053284
25. Bleeker MC, Hogewoning CJ, Voorhorst FJ, et al. Condom use promotes regression of human papillomavirus-associated penile lesions in male sexual partners of women with cervical intraepithelial neoplasia. Int J Cancer 2003;107:804–10. PMID:14566831 https://doi.org/10.1002/ijc.11473
26. Hogewoning CJ, Bleeker MC, van den Brule AJ, et al. Condom use promotes regression of cervical intraepithelial neoplasia and clearance of human papillomavirus: a randomized clinical trial. Int J Cancer 2003;107:811–6. PMID:14566832 https://doi.org/10.1002/ijc.11474
27. Koss CA, Dunne EF, Warner L. A systematic review of epidemiologic studies assessing condom use and risk of syphilis. Sex Transm Dis 2009;36:401–5. PMID:19455075 https://doi.org/10.1097/OLQ.0b013e3181a396eb
28. Hernández-Romieu AC, Siegler AJ, Sullivan PS, Crosby R, Rosenberg ES. How often do condoms fail? A cross-sectional study exploring incomplete use of condoms, condom failures and other condom problems among black and white MSM in southern U.S.A. Sex Transm Infect 2014;90:602–7. PMID:25080511 https://doi.org/10.1136/sextrans-2014-051581
29. D'Anna LH, Margolis AD, Warner L, et al.; Safe City Study Group. Condom use problems during anal sex among men who have sex with men (MSM): findings from the Safe in the City study. AIDS Care 2012;24:1028–38. PMID:22519680 https://doi.org/10.1080/09540121.2012.668285
30. Steiner MJ, Cates W Jr, Warner L. The real problem with male condoms is nonuse. Sex Transm Dis 1999;26:459–62. PMID:10494937 https://doi.org/10.1097/00007435-199909000-00007
31. Kowal D, Hatcher RA, Nelson AL, et al., eds. Contraceptive technology. 21st ed. Atlanta, GA: Managing Contraception; 2017.
32. Gallo MF, Kilbourne-Brook M, Coffey PS. A review of the effectiveness and acceptability of the female condom for dual protection. Sex Health 2012;9:18–26. PMID:22348629 https://doi.org/10.1071/SH11037
33. Mantell JE, Kelvin EA, Exner TM, Hoffman S, Needham S, Stein ZA. Anal use of the female condom: does uncertainty justify provider inaction? AIDS Care 2009;21:1185–94. PMID:20024779 https://doi.org/10.1080/09540120902730005
34. Rosenberg MJ, Davidson AJ, Chen JH, Judson FN, Douglas JM. Barrier contraceptives and sexually transmitted diseases in women: a comparison of female-dependent methods and condoms. Am J Public Health 1992;82:669–74. PMID:1566944 https://doi.org/10.2105/AJPH.82.5.669
35. de Bruyn G, Shiboski S, van der Straten A, et al.; MIRA Team. The effect of the vaginal diaphragm and lubricant gel on acquisition of HSV-2. Sex Transm Infect 2011;87:301–5. PMID:21447515 https://doi.org/10.1136/sti.2010.047142
36. Ramjee G, van der Straten A, Chipato T, et al.; MIRA team. The diaphragm and lubricant gel for prevention of cervical sexually transmitted infections: results of a randomized controlled trial. PLoS One 2008;3:e3488. PMID:18941533 https://doi.org/10.1371/journal.pone.0003488
37. Lusti-Narasimhan M, Merialdi M, Holt B. Multipurpose prevention technologies: maximising positive synergies. BJOG 2014;121:251. PMID:24393212 https://doi.org/10.1111/1471-0528.12606
38. Ahmed K, Baeten JM, Beksinska M, et al.; Evidence for Contraceptive Options and HIV Outcomes (ECHO) Trial Consortium. HIV incidence among women using intramuscular depot medroxyprogesterone acetate, a copper intrauterine device, or a levonorgestrel implant for contraception: a randomised, multicentre, open-label trial. Lancet 2019;394:303–13. PMID:31204114 https://doi.org/10.1016/S0140-6736(19)31288-7
39. Young Holt B, Dellplain L, Creinin MD, Peine KJ, Romano J, Hemmerling A. A strategic action framework for multipurpose prevention technologies combining contraceptive hormones and antiretroviral drugs to prevent pregnancy and HIV. Eur J Contracept Reprod Health Care 2018;23:326–34. PMID:30247084 https://doi.org/10.1080/13625187.2018.1508650
40. Wilkinson D, Tholandi M, Ramjee G, Rutherford GW. Nonoxynol-9 spermicide for prevention of vaginally acquired HIV and other sexually transmitted infections: systematic review and meta-analysis of randomised controlled trials including more than 5000 women. Lancet Infect Dis 2002;2:613–7. PMID:12383611 https://doi.org/10.1016/S1473-3099(02)00396-1
41. McCormack S, Ramjee G, Kamali A, et al. PRO2000 vaginal gel for prevention of HIV-1 infection (Microbicides Development Programme 301): a phase 3, randomised, double-blind, parallel-group trial. Lancet 2010;376:1329–37. PMID:20851460 https://doi.org/10.1016/S0140-6736(10)61086-0
42. Skoler-Karpoff S, Ramjee G, Ahmed K, et al. Efficacy of Carraguard for prevention of HIV infection in women in South Africa: a randomised, double-blind, placebo-controlled trial. Lancet 2008;372:1977–87. PMID:19059048 https://doi.org/10.1016/S0140-6736(08)61842-5
43. Van Damme L, Govinden R, Mirembe FM, et al.; CS Study Group. Lack of effectiveness of cellulose sulfate gel for the prevention of vaginal HIV transmission. N Engl J Med 2008;359:463–72. PMID:18669425 https://doi.org/10.1056/NEJMoa0707957
44. Feldblum PJ, Adeiga A, Bakare R, et al. SAVVY vaginal gel (C31G) for prevention of HIV infection: a randomized controlled trial in Nigeria. PLoS One 2008;3:e1474. PMID:18213382 https://doi.org/10.1371/journal.pone.0001474
45. Cottrell ML, Kashuba AD. Topical microbicides and HIV prevention in the female genital tract. J Clin Pharmacol 2014;54:603–15. PMID:24664786 https://doi.org/10.1002/jcph.292
46. Abdool Karim SS, Abdool Karim Q, Kharsany ABM, et al.; CAPRISA 004 Trial Group. Tenofovir gel for the prevention of herpes simplex virus Type 2 infection. N Engl J Med 2015;373:530–9. PMID:26244306 https://doi.org/10.1056/NEJMoa1410649

17. Johnson WD, O'Leary A, Flores SA。男男性行为人群每性伴安全套预防HIV的有效性。AIDS 2018;32:1499-505。PMID:29794493 https://doi.org/10.1097/QAD.0000000000001832
18. Crosby RA, Charnigo RA, Weathers C, Caliendo AM, Shrier LA。安全套预防非病毒性性传播感染的有效性：一项使用电子日记的前瞻性研究。Sex Transm Infect 2012;88:484-9。PMID:23002192 https://doi.org/10.1136/ sextrans-2012-050618
19. Holmes KK, Levine R, Weaver M。安全套预防性传播感染的有效性。Bull World Health Organ 2004;82:454-61。PMID:15356939
20. Warner L, Stone KM, Macaluso M, Buehler JW, Austin HD。安全套使用与淋病和衣原体风险：对流行病学研究中设计和测量因素的系统评价。Sex Transm Dis 2006;33:36-51。PMID:16385221 https://doi.org/10.1097/01. olq.0000187908.42622.fd
21. Bernabe-Ortiz A, Carcamo CP, Scott JD, Hughes JP, Garcia PJ, Holmes KK。HBV感染与坚持使用安全套的关系：秘鲁一项基于人群的研究。PLoS One 2011;6:e24721。PMID:21931828 https://doi.org/10.1371/journal.pone.0024721
22. Ness RB, Hillier SL, Kip KE, et al。细菌性阴道病与盆腔炎性疾病风险。Obstet Gynecol 2004;104:761-9。PMID:15458899 https://doi.org/10.1097/01.AOG.0000139512.37582.17
23. Martin IE, Gu W, Yang Y, Tsang RS。中国上海引起一期梅毒的*Treponema pallidum*的大环内酯类耐药及分子分型。Clin Infect Dis 2009;49:515-21。PMID:19583516 https://doi.org/10.1086/600878
24. Winer RL, Hughes JP, Feng Q, et al。安全套使用与年轻女性生殖器人乳头瘤病毒感染风险。N Engl J Med 2006;354:2645-54。PMID:16790697 https://doi.org/10.1056/ NEJMoa053284
25. Bleeker MC, Hogewoning CJ, Voorhorst FJ, et al。安全套使用促进宫颈上皮内瘤变女性男性性伴的人乳头瘤病毒相关阴茎病变消退。Int J Cancer 2003;107:804-10。PMID:14566831 https://doi.org/10.1002/ ijc.11473
26. Hogewoning CJ, Bleeker MC, van den Brule AJ, et al。安全套使用促进宫颈上皮内瘤变消退和人乳头瘤病毒清除：一项随机临床试验。Int J Cancer 2003;107:811-6。PMID:14566832 https://doi.org/10.1002/ijc.11474
27. Koss CA, Dunne EF, Warner L。评估安全套使用与梅毒风险的流行病学研究的系统评价。Sex Transm Dis 2009;36:401-5。PMID:19455075 https://doi.org/10.1097/ OLQ.0b013e3181a396eb
28. Hernández-Romieu AC, Siegler AJ, Sullivan PS, Crosby R, Rosenberg ES。安全套失败有多常见?一项横断面研究，探讨美国南部黑人和白人MSM中安全套不完全使用、安全套失败及其他安全套问题。Sex Transm Infect 2014;90:602-7。PMID:25080511 https://doi.org/10.1136/sextrans-2014-051581
29. D'Anna LH, Margolis AD, Warner L, et al.; Safe City Study Group。男男性行为人群(MSM)肛交期间的安全套使用问题：Safe in the City研究结果。AIDS Care 2012;24:1028-38。PMID:22519680 https://doi.org/10.1080/095401 21.2012.668285
30. Steiner MJ, Cates W Jr, Warner L。男用安全套的真正问题是不使用。Sex Transm Dis 1999;26:459-62。PMID:10494937 https://doi.org/10.1097/00007435-199909000-00007
31. Kowal D, Hatcher RA, Nelson AL, et al., eds。避孕技术。第21版。佐治亚州亚特兰大：Managing Contraception;2017。
32. Gallo MF, Kilbourne-Brook M, Coffey PS。女用安全套用于双重保护的有效性和可接受性综述。Sex Health 2012;9:18-26。PMID:22348629 https://doi.org/10.1071/SH11037
33. Mantell JE, Kelvin EA, Exner TM, Hoffman S, Needham S, Stein ZA. 女性避孕套的肛交使用：不确定性是否足以成为提供者不作为的理由? AIDS Care 2009;21:1185-94. PMID:20024779 https://doi.org/10.1080/09540120902730005
34. Rosenberg MJ, Davidson AJ, Chen JH, Judson FN, Douglas JM.屏障避孕法与女性性传播疾病：女性依赖方法与避孕套的比较。Am J Public Health 1992;82:669-74. PMID:1566944 https://doi.org/10.2105/ AJPH.82.5.669
35. de Bruyn G, Shiboski S, van der Straten A, et al.; MIRA Team.阴道隔膜和润滑凝胶对HSV-2获得的影响。Sex Transm Infect 2011;87:301-5. PMID:21447515 https:// doi.org/10.1136/sti.2010.047142
36. Ramjee G, van der Straten A, Chipato T, et al.; MIRA team.隔膜和润滑凝胶预防宫颈性传播感染：随机对照试验结果。PLoS One 2008;3:e3488. PMID:18941533 https://doi.org/10.1371/journal.pone.0003488
37. Lusti-Narasimhan M, Merialdi M, Holt B.多用途预防技术：最大化正向协同效应。BJOG 2014;121:251. PMID:24393212 https://doi.org/10.1111/1471-0528.12606
38. Ahmed K, Baeten JM, Beksinska M, et al.; Evidence for Contraceptive Options and HIV Outcomes(ECHO) Trial Consortium.使用肌内注射醋酸甲羟孕酮、铜宫内节育器或左炔诺孕酮植入剂避孕的女性HIV发病率：一项随机、多中心、开放标签试验。Lancet 2019;394:303-13. PMID:31204114 https://doi.org/10.1016/S0140-6736(19) 31288-7
39. Young Holt B, Dellplain L, Creinin MD, Peine KJ, Romano J, Hemmerling A.结合避孕激素和抗逆转录病毒药物以预防妊娠和HIV的多用途预防技术的战略行动框架。Eur J contracept Reprod Health Care 2018;23:326-34. PMID:30247084 https:// doi.org/10.1080/13625187.2018.1508650
40. Wilkinson D, Tholandi M, Ramjee G, Rutherford GW.Nonoxynol-9杀精剂预防阴道获得性HIV和其他性传播感染：包括超过5000名女性的随机对照试验的系统评价和荟萃分析。Lancet Infect Dis 2002;2:613-7. PMID:12383611 https://doi.org/10.1016/S1473-3099(02) 00396-1
41. McCormack S, Ramjee G, Kamali A, et al.PRO2000阴道凝胶预防HIV-1感染(Microbicides Development Programme 301)：一项3期、随机、双盲、平行组试验。Lancet 2010;376:1329-37. PMID:20851460 https://doi.org/10.1016/ S0140-6736(10) 61086-0
42. Skoler-Karpoff S, Ramjee G, Ahmed K, et al.Carraguard预防南非女性HIV感染的效力：一项随机、双盲、安慰剂对照试验。Lancet 2008;372:1977-87. PMID:19059048 https://doi.org/10.1016/ S0140-6736(08) 61842-5
43. Van Damme L, Govinden R, Mirembe FM, et al.; CS Study Group.纤维素硫酸酯凝胶预防阴道HIV传播缺乏有效性。N Engl J Med 2008;359:463-72. PMID:18669425 https://doi.org/10.1056/NEJMoa0707957
44. Feldblum PJ, Adeiga A, Bakare R, et al.SAVVY阴道凝胶(C31G)预防HIV感染：尼日利亚的一项随机对照试验。PLoS One 2008;3:e1474. PMID:18213382 https://doi.org/10.1371/ journal.pone.0001474
45. Cottrell ML, Kashuba AD.局部杀微生物剂与女性生殖道HIV预防。J Clin Pharmacol 2014;54:603-15. PMID:24664786 https://doi.org/10.1002/jcph.292
46. Abdool Karim SS, Abdool Karim Q, Kharsany ABM, et al.; CAPRISA 004 Trial Group.替诺福韦凝胶预防2型单纯疱疹病毒感染。N Engl J Med 2015;373:530-9. PMID:26244306 https://doi.org/10.1056/NEJMoa1410649

47. Abdool Karim Q, Abdool Karim SS, Frohlich JA, et al.; CAPRISA 004 Trial Group. Effectiveness and safety of tenofovir gel, an antiretroviral microbicide, for the prevention of HIV infection in women. Science 2010;329:1168–74. Erratum in: Science 2011;333:524. PMID:20643915 https://doi.org/10.1126/science.1193748
48. Marrazzo JM, Ramjee G, Richardson BA, et al.; VOICE Study Team. Tenofovir-based preexposure prophylaxis for HIV infection among African women. N Engl J Med 2015;372:509–18. PMID:25651245 https://doi.org/10.1056/NEJMoa1402269
49. Delany-Moretlwe S, Lombard C, Baron D, et al. Tenofovir 1% vaginal gel for prevention of HIV-1 infection in women in South Africa (FACTS-001): a phase 3, randomised, double-blind, placebo-controlled trial. Lancet Infect Dis 2018;18:1241–50. PMID:30507409 https://doi.org/10.1016/S1473-3099(18)30428-6
50. Baeten JM, Palanee-Phillips T, Brown ER, et al.; MTN-020–ASPIRE Study Team. Use of a vaginal ring containing dapivirine for HIV-1 prevention in women. N Engl J Med 2016;375:2121–32. PMID:26900902 https://doi.org/10.1056/NEJMoa1506110
51. Nel A, van Niekerk N, Kapiga S, et al.; Ring Study Team. Safety and efficacy of a dapivirine vaginal ring for HIV prevention in women. N Engl J Med 2016;375:2133–43. PMID:27959766 https://doi.org/10.1056/NEJMoa1602046
52. Cranston RD, Lama JR, Richardson BA, et al.; MTN-017 Protocol Team. MTN-017: a rectal phase 2 extended safety and acceptability study of tenofovir reduced-glycerin 1% gel. Clin Infect Dis 2017;64:614–20. PMID:27986684
53. Hooton TM, Roberts PL, Stamm WE. Effects of recent sexual activity and use of a diaphragm on the vaginal microflora. Clin Infect Dis 1994;19:274–8. PMID:7986899 https://doi.org/10.1093/clinids/19.2.274
54. Fihn SD, Boyko EJ, Normand EH, et al. Association between use of spermicide-coated condoms and *Escherichia coli* urinary tract infection in young women. Am J Epidemiol 1996;144:512–20. PMID:8781467 https://doi.org/10.1093/oxfordjournals.aje.a008958
55. Polis CB, Curtis KM, Hannaford PC, et al. An updated systematic review of epidemiological evidence on hormonal contraceptive methods and HIV acquisition in women. AIDS 2016;30:2665–83. PMID:27500670 https://doi.org/10.1097/QAD.0000000000001228
56. Kiweewa FM, Brown E, Mishra A, et al.; MTN-020/ASPIRE Study Team. Acquisition of sexually transmitted infections among women using a variety of contraceptive options: a prospective study among high-risk African women. J Int AIDS Soc 2019;22:e25257. PMID:30816632 https://doi.org/10.1002/jia2.25257
57. McCarthy KJ, Gollub EL, Ralph L, van de Wijgert J, Jones HE. Hormonal contraceptives and the acquisition of sexually transmitted infections: an updated systematic review. Sex Transm Dis 2019;46:290–6. PMID:30628946 https://doi.org/10.1097/OLQ.0000000000000975
58. Curtis KM, Tepper NK, Jatlaoui TC, et al. U.S. medical eligibility criteria for contraceptive use, 2016. MMWR Recomm Rep 2016;65(No. RR-3). PMID:27467196 https://doi.org/10.15585/mmwr.rr6503a1
59. Curtis KM, Jatlaoui TC, Tepper NK, et al. U.S. selected practice recommendations for contraceptive use, 2016. MMWR Recomm Rep 2016;65(No. RR-4). PMID:27467319 https://doi.org/10.15585/mmwr.rr6504a1
60. Cleland K, Zhu H, Goldstuck N, Cheng L, Trussell J. The efficacy of intrauterine devices for emergency contraception: a systematic review of 35 years of experience. Hum Reprod 2012;27:1994–2000. PMID:22570193 https://doi.org/10.1093/humrep/des140
61. Shen J, Che Y, Showell E, Chen K, Cheng L. Interventions for emergency contraception. Cochrane Database Syst Rev 2019;1:CD001324. PMID:30661244
62. Marcell AV, Waks AB, Rutkow L, McKenna R, Rompalo A, Hogan MT. What do we know about males and emergency contraception? A synthesis of the literature. Perspect Sex Reprod Health 2012;44:184–93. PMID:22958663 https://doi.org/10.1363/4418412
63. Gray RH, Kigozi G, Serwadda D, et al. Male circumcision for HIV prevention in men in Rakai, Uganda: a randomised trial. Lancet 2007;369:657–66. PMID:17321311 https://doi.org/10.1016/S0140-6736(07)60313-4
64. Bailey RC, Moses S, Parker CB, et al. Male circumcision for HIV prevention in young men in Kisumu, Kenya: a randomised controlled trial. Lancet 2007;369:643–56. PMID:17321310 https://doi.org/10.1016/S0140-6736(07)60312-2
65. Auvert B, Taljaard D, Lagarde E, Sobngwi-Tambekou J, Sitta R, Puren A. Randomized, controlled intervention trial of male circumcision for reduction of HIV infection risk: the ANRS 1265 Trial. PLoS Med 2005;2:e298. Erratum in: PLoS Med 2006;3:298. PMID:16231970 https://doi.org/10.1371/journal.pmed.0020298
66. Tobian AA, Serwadda D, Quinn TC, et al. Male circumcision for the prevention of HSV-2 and HPV infections and syphilis. N Engl J Med 2009;360:1298–309. PMID:19321868 https://doi.org/10.1056/NEJMoa0802556
67. Auvert B, Sobngwi-Tambekou J, Cutler E, et al. Effect of male circumcision on the prevalence of high-risk human papillomavirus in young men: results of a randomized controlled trial conducted in Orange Farm, South Africa. J Infect Dis 2009;199:14–9. PMID:19086814 https://doi.org/10.1086/595566
68. Sobngwi-Tambekou J, Taljaard D, Lissouba P, et al. Effect of HSV-2 serostatus on acquisition of HIV by young men: results of a longitudinal study in Orange Farm, South Africa. J Infect Dis 2009;199:958–64. PMID:19220143 https://doi.org/10.1086/597208
69. Gray R, Kigozi G, Kong X, et al. The effectiveness of male circumcision for HIV prevention and effects on risk behaviors in a posttrial follow-up study. AIDS 2012;26:609–15. PMID:22210632 https://doi.org/10.1097/QAD.0b013e3283504a3f
70. Mehta SD, Moses S, Parker CB, Agot K, Maclean I, Bailey RC. Circumcision status and incident herpes simplex virus type 2 infection, genital ulcer disease, and HIV infection. AIDS 2012;26:1141–9. PMID:22382150 https://doi.org/10.1097/QAD.0b013e328352d116
71. World Health Organization/UNAIDS. New data on male circumcision and HIV prevention: policy and programme implications [Internet]. Geneva, Switzerland: WHO/UNAIDS Technical Consultation on Male Circumcision and HIV Prevention: Research Implications for Policy and Programming; 2007. https://www.who.int/hiv/pub/malecircumcision/research_implications/en/
72. American Urological Association. Circumcision policy statement [Internet]. Linthicum, MD: American Urological Association; 2017. https://www.auanet.org/guidelines/guidelines/circumcision
73. Yuan T, Fitzpatrick T, Ko NY, et al. Circumcision to prevent HIV and other sexually transmitted infections in men who have sex with men: a systematic review and meta-analysis of global data. Lancet Glob Health 2019;7:e436–47. PMID:30879508 https://doi.org/10.1016/S2214-109X(18)30567-9
74. Grohskopf LA, Chillag KL, Gvetadze R, et al. Randomized trial of clinical safety of daily oral tenofovir disoproxil fumarate among HIV-uninfected men who have sex with men in the United States. J Acquir Immune Defic Syndr 2013;64:79–86. PMID:23466649 https://doi.org/10.1097/QAI.0b013e31828ece33
75. Grant RM, Lama JR, Anderson PL, et al.; iPrEx Study Team. Preexposure chemoprophylaxis for HIV prevention in men who have sex with men. N Engl J Med 2010;363:2587–99. PMID:21091279 https://doi.org/10.1056/NEJMoa1011205
76. Baeten JM, Donnell D, Ndase P, et al.; Partners PrEP Study Team. Antiretroviral prophylaxis for HIV prevention in heterosexual men and women. N Engl J Med 2012;367:399–410. PMID:22784037 https://doi.org/10.1056/NEJMoa1108524
77. Thigpen MC, Kebaabetswe PM, Paxton LA, et al.; TDF2 Study Group. Antiretroviral preexposure prophylaxis for heterosexual HIV transmission in Botswana. N Engl J Med 2012;367:423–34. PMID:22784038 https://doi.org/10.1056/NEJMoa1110711

47. Abdool Karim Q, Abdool Karim SS, Frohlich JA, et al.; CAPRISA 004 Trial Group.替诺福韦凝胶(一种抗逆转录病毒杀微生物剂)预防女性HIV感染的有效性和安全性。Science 2010;329:1168-74. Erratum in: Science 2011;333:524. PMID:20643915 https://doi.org/10.1126/science.1193748
48. Marrazzo JM, Ramjee G, Richardson BA, et al.; VOICE Study Team.基于替诺福韦的暴露前预防用于非洲女性HIV感染。N Engl J Med 2015;372:509-18. PMID:25651245 https://doi.org/10.1056/NEJMoa1402269
49. Delany-Moretlwe S, Lombard C, Baron D, et al.替诺福韦1%阴道凝胶预防南非女性HIV-1感染(FACTS-001)：一项3期、随机、双盲、安慰剂对照试验。Lancet Infect Dis 2018;18:1241-50. PMID:30507409 https:// doi.org/10.1016/S1473-3099(18) 30428-6
50. Baeten JM, Palanee-Phillips T, Brown ER, et al.; MTN-020-ASPIRE Study Team.使用含达匹韦林的阴道环预防女性HIV-1感染。N Engl J Med 2016;375:2121-32. PMID:26900902 https://doi.org/10.1056/NEJMoa1506110
51. Nel A, van Niekerk N, Kapiga S, et al.; Ring Study Team.达匹韦林阴道环预防女性HIV的安全性和有效性。N Engl J Med 2016;375:2133-43. PMID:27959766 https://doi.org/10.1056/NEJMoa1602046
52. Cranston RD, Lama JR, Richardson BA, et al.; MTN-017 Protocol Team.MTN-017：替诺福韦低甘油1%凝胶的直肠2期扩展安全性和可接受性研究。Clin Infect Dis 2017;64:614-20. PMID:27986684
53. Hooton TM, Roberts PL, Stamm WE.近期性活动和隔膜使用对阴道微生物群的影响。Clin Infect Dis 1994;19:274-8. PMID:7986899 https://doi.org/10.1093/clinids/19.2.274
54. Fihn SD, Boyko EJ, Normand EH, et al.使用杀精剂涂层避孕套与年轻女性*Escherichia coli*尿路感染之间的关联。Am J Epidemiol 1996;144:512-20. PMID:8781467 https://doi.org/10.1093/oxfordjournals.aje.a008958
55. Polis CB, Curtis KM, Hannaford PC, et al.关于激素避孕方法与女性HIV获得之间流行病学证据的最新系统评价。AIDS 2016;30:2665-83. PMID:27500670 https://doi.org/10.1097/QAD.0000000000001228
56. Kiweewa FM, Brown E, Mishra A, et al.; MTN-020/ASPIRE Study Team.使用多种避孕选择的女性中性传播感染的获得：一项在高风险非洲女性中的前瞻性研究。J Int AIDS Soc 2019;22:e25257. PMID:30816632 https:// doi.org/10.1002/jia2.25257
57. McCarthy KJ, Gollub EL, Ralph L, van de Wijgert J, Jones HE.激素避孕药与性传播感染的获得：最新系统评价。Sex Transm Dis 2019;46:290-6. PMID:30628946 https://doi.org/10.1097/OLQ.0000000000000975
58. Curtis KM, Tepper NK, Jatlaoui TC, et al.美国避孕使用医学资格标准，2016。MMWR Recomm Rep 2016;65(No.RR-3).PMID:27467196 https:// doi.org/10.15585/mmwr.rr6503a1
59. Curtis KM, Jatlaoui TC, Tepper NK, et al.美国避孕使用精选实践建议，2016。MMWR Recomm Rep 2016;65(No.RR-4).PMID:27467319 https:// doi.org/10.15585/mmwr.rr6504a1
60. Cleland K, Zhu H, Goldstuck N, Cheng L, Trussell J.宫内节育器用于紧急避孕的效力：35年经验的系统评价。Hum Reprod 2012;27:1994-2000. PMID:22570193 https://doi.org/10.1093/humrep/des140
61. Shen J, Che Y, Showell E, Chen K, Cheng L.紧急避孕的干预措施。Cochrane Database Syst Rev 2019;1:CD001324. PMID:30661244
62. Marcell AV, Waks AB, Rutkow L, McKenna R, Rompalo A, Hogan MT.我们对男性和紧急避孕了解多少?文献综述。Perspect Sex Reprod Health 2012;44:184-93. PMID:22958663 https://doi.org/10.1363/4418412
63. Gray RH, Kigozi G, Serwadda D, et al.乌干达拉凯男性包皮环切术预防HIV感染：一项随机试验。Lancet 2007;369:657-66. PMID:17321311 https://doi.org/10.1016/ S0140-6736(07) 60313-4
64. Bailey RC, Moses S, Parker CB, et al.肯尼亚基苏木年轻男性包皮环切术预防HIV感染：一项随机对照试验。Lancet 2007;369:643-56. PMID:17321310 https://doi.org/10.1016/S0140-6736(07) 60312-2
65. 奥韦尔·B、塔尔雅德·D、拉加德·E、索布恩格维·坦贝库·J、西塔·R、普伦A.男性包皮环切术降低HIV感染风险的随机对照干预试验：ANRS 1265试验。PLoS Med 2005;2:e298. 勘误见：PLoS Med 2006;3:298. PMID:16231970 https://doi.org/10.1371/journal.pmed.0020298
66. Tobian AA, Serwadda D, Quinn TC, et al.男性包皮环切术预防HSV-2和HPV感染及梅毒。N Engl J Med 2009;360:1298-309. PMID:19321868 https://doi.org/10.1056/ NEJMoa0802556
67. Auvert B, Sobngwi-Tambekou J, Cutler E, et al.男性包皮环切术对年轻男性高危人乳头瘤病毒流行率的影响：在南非Orange Farm开展的随机对照试验结果。J Infect Dis 2009;199:14-9. PMID:19086814 https:// doi.org/10.1086/595566
68. Sobngwi-Tambekou J, Taljaard D, Lissouba P, et al.HSV-2血清状态对年轻男性获得HIV的影响：南非Orange Farm纵向研究结果。J Infect Dis 2009;199:958-64. PMID:19220143 https://doi.org/10.1086/597208
69. Gray R, Kigozi G, Kong X, et al.男性包皮环切术预防HIV的有效性及对试验后随访研究中危险行为的影响。AIDS 2012;26:609-15. PMID:22210632 https://doi.org/10.1097/QAD.0b013e3283504a3f
70. Mehta SD, Moses S, Parker CB, Agot K, Maclean I, Bailey RC.包皮环切状态与2型单纯疱疹病毒感染、生殖器溃疡病及HIV感染的发生。AIDS 2012;26:1141-9. PMID:22382150 https://doi.org/10.1097/ QAD.0b013e328352d116
71. 世界卫生组织/UNAIDS.男性包皮环切术与HIV预防的新数据：政策与规划意义[Internet].瑞士日内瓦：WHO/UNAIDS男性包皮环切术与HIV预防技术磋商会：研究对政策与规划的意义；2007. https://www.who.int/hiv/ pub/ male circumcision/research_implications/en/
72. 美国泌尿外科学会.包皮环切术政策声明[Internet].马里兰州林西克姆：美国泌尿外科学会；2017. https://www.auanet.org/guidelines/guidelines/Circumcision
73. Yuan T, Fitzpatrick T, Ko NY, et al.包皮环切术预防男男性行为人群HIV及其他性传播感染：全球数据的系统评价与荟萃分析。Lancet Glob Health 2019;7:e436-47. PMID:30879508 https://doi.org/10.1016/ S2214-109X(18) 30567-9
74. Grohskopf LA, Chillag KL, Gvetadze R, et al.美国HIV未感染男男性行为人群中每日口服富马酸替诺福韦二吡呋酯临床安全性的随机试验。J Acquir Immune Defic Syndr 2013;64:79-86. PMID:23466649 https:// doi.org/10.1097/QAI.0b013e31828ece33
75. Grant RM, Lama JR, Anderson PL, et al.; iPrEx研究团队.男男性行为人群中暴露前化学预防用于HIV预防。N Engl J Med 2010;363:2587-99. PMID:21091279 https://doi.org/10.1056/NEJMoa1011205
76. Baeten JM, Donnell D, Ndase P, et al.; Partners PrEP研究团队.异性恋男女中抗逆转录病毒预防用于HIV预防。N Engl J Med 2012;367:399-410. PMID:22784037 https:// doi.org/10.1056/NEJMoa1108524
77. Thigpen MC, Kebaabetswe PM, Paxton LA, et al.; TDF2研究组.博茨瓦纳异性恋HIV传播的抗逆转录病毒暴露前预防。N Engl J Med 2012;367:423-34. PMID:22784038 https:// doi.org/10.1056/NEJMoa1110711

78. Choopanya K, Martin M, Suntharasamai P, et al.; Bangkok Tenofovir Study Group. Antiretroviral prophylaxis for HIV infection in injecting drug users in Bangkok, Thailand (the Bangkok Tenofovir Study): a randomised, double-blind, placebo-controlled phase 3 trial. Lancet 2013;381:2083–90. PMID:23769234 https://doi.org/10.1016/S0140-6736(13)61127-7
79. Molina JM, Charreau I, Spire B, et al.; ANRS IPERGAY Study Group. Efficacy, safety, and effect on sexual behaviour of on-demand pre-exposure prophylaxis for HIV in men who have sex with men: an observational cohort study. Lancet HIV 2017;4:e402–10. PMID:28747274 https://doi.org/10.1016/S2352-3018(17)30089-9
80. CDC. Preexposure prophylaxis for the prevention of HIV infection in the United States—2017 update: a clinical practice guideline. Atlanta, GA: US Department of Health and Human Services, CDC; 2018. https://www.cdc.gov/hiv/pdf/risk/prep/cdc-hiv-prep-guidelines-2017.pdf
81. Jones J, Weiss K, Mermin J, et al. Proportion of incident human immunodeficiency virus cases among men who have sex with men attributable to gonorrhea and chlamydia: a modeling analysis. Sex Transm Dis 2019;46:357–63. PMID:31095100 https://doi.org/10.1097/OLQ.0000000000000980
82. Pathela P, Braunstein SL, Blank S, Schillinger JA. HIV incidence among men with and those without sexually transmitted rectal infections: estimates from matching against an HIV case registry. Clin Infect Dis 2013;57:1203–9. PMID:23800942 https://doi.org/10.1093/cid/cit437
83. Pathela P, Braunstein SL, Blank S, Shepard C, Schillinger JA. The high risk of an HIV diagnosis following a diagnosis of syphilis: a population-level analysis of New York City men. Clin Infect Dis 2015;61:281–7. PMID:25870333 https://doi.org/10.1093/cid/civ289
84. Chou R, Evans C, Hoverman A, et al. Preexposure prophylaxis for the prevention of HIV infection: evidence report and systematic review for the US Preventive Services Task Force. JAMA 2019;321:2214–30. PMID:31184746 https://doi.org/10.1001/jama.2019.2591
85. Liu AY, Cohen SE, Vittinghoff E, et al. Preexposure prophylaxis for HIV infection integrated with municipal- and community-based sexual health services. JAMA Intern Med 2016;176:75–84. PMID:26571482 https://doi.org/10.1001/jamainternmed.2015.4683
86. McCormack S, Dunn DT, Desai M, et al. Pre-exposure prophylaxis to prevent the acquisition of HIV-1 infection (PROUD): effectiveness results from the pilot phase of a pragmatic open-label randomised trial. Lancet 2016;387:53–60. PMID:26364263 https://doi.org/10.1016/S0140-6736(15)00056-2
87. Volk JE, Marcus JL, Phengrasamy T, et al. No new HIV infections with increasing use of HIV preexposure prophylaxis in a clinical practice setting. Clin Infect Dis 2015;61:1601–3. PMID:26334052 https://doi.org/10.1093/cid/civ778
88. Celum C, Wald A, Lingappa JR, et al.; Partners in Prevention HSV/HIV Transmission Study Team. Acyclovir and transmission of HIV-1 from persons infected with HIV-1 and HSV-2. N Engl J Med 2010;362:427–39. PMID:20089951 https://doi.org/10.1056/NEJMoa0904849
89. Celum C, Wald A, Hughes J, et al.; HPTN 039 Protocol Team. Effect of aciclovir on HIV-1 acquisition in herpes simplex virus 2 seropositive women and men who have sex with men: a randomised, double-blind, placebo-controlled trial. Lancet 2008;371:2109–19. PMID:18572080 https://doi.org/10.1016/S0140-6736(08)60920-4
90. Bolan RK, Beymer MR, Weiss RE, Flynn RP, Leibowitz AA, Klausner JD. Doxycycline prophylaxis to reduce incident syphilis among HIV-infected men who have sex with men who continue to engage in high-risk sex: a randomized, controlled pilot study. Sex Transm Dis 2015;42:98–103. PMID:25585069 https://doi.org/10.1097/OLQ.0000000000000216
91. Grant JS, Stafylis C, Celum C, et al. Doxycycline prophylaxis for bacterial sexually transmitted infections. Clin Infect Dis 2020;70:1247–53. PMID:31504345 https://doi.org/10.1093/cid/ciz866
92. Myer L, Kuhn L, Stein ZA, Wright TC Jr, Denny L. Intravaginal practices, bacterial vaginosis, and women's susceptibility to HIV infection: epidemiological evidence and biological mechanisms. Lancet Infect Dis 2005;5:786–94. PMID:16310150 https://doi.org/10.1016/S1473-3099(05)70298-X
93. Molina JM, Charreau I, Chidiac C, et al.; ANRS IPERGAY Study Group. Post-exposure prophylaxis with doxycycline to prevent sexually transmitted infections in men who have sex with men: an open-label randomised substudy of the ANRS IPERGAY trial. Lancet Infect Dis 2018;18:308–17. PMID:29229440 https://doi.org/10.1016/S1473-3099(17)30725-9
94. Cohen MS, Chen YQ, McCauley M, et al.; HPTN 052 Study Team. Prevention of HIV-1 infection with early antiretroviral therapy. N Engl J Med 2011;365:493–505. PMID:21767103 https://doi.org/10.1056/NEJMoa1105243
95. Rodger AJ, Cambiano V, Bruun T, et al.; PARTNER Study Group. Sexual activity without condoms and risk of HIV transmission in serodifferent couples when the HIV-positive partner is using suppressive antiretroviral therapy. JAMA 2016;316:171–81. PMID:27404185 https://doi.org/10.1001/jama.2016.5148
96. Bavinton BR, Pinto AN, Phanuphak N, et al.; Opposites Attract Study Group. Viral suppression and HIV transmission in serodiscordant male couples: an international, prospective, observational, cohort study. Lancet HIV 2018;5:e438–47. PMID:30025681 https://doi.org/10.1016/S2352-3018(18)30132-2
97. Rodger AJ, Cambiano V, Bruun T, et al.; PARTNER Study Group. Risk of HIV transmission through condomless sex in serodifferent gay couples with the HIV-positive partner taking suppressive antiretroviral therapy (PARTNER): final results of a multicentre, prospective, observational study. Lancet 2019;393:2428–38. PMID:31056293 https://doi.org/10.1016/S0140-6736(19)30418-0
98. Panel on Antiretroviral Guidelines for Adults and Adolescents. Guidelines for the use of antiretroviral agents in adults and adolescents with HIV. Bethesda, MD: US Department of Health and Human Services, National Institutes of Health, AIDSinfo. https://clinicalinfo.hiv.gov/sites/default/files/inline-files/AdultandAdolescentGL.pdf
99. Golden MR, Kerani RP, Stenger M, et al. Effect of expedited partner therapy (EPT) on chlamydial prevalence: the Washington State Community-Level Trial. Presented at the STD Prevention Conference, Minneapolis, MN; March 12–15, 2012.
100. Philip SS, Yu X, Donnell D, Vittinghoff E, Buchbinder S. Serosorting is associated with a decreased risk of HIV seroconversion in the EXPLORE Study Cohort. PLoS One 2010;5:e12662. PMID:20844744 https://doi.org/10.1371/journal.pone.0012662
101. Vallabhaneni S, Li X, Vittinghoff E, Donnell D, Pilcher CD, Buchbinder SP. Seroadaptive practices: association with HIV acquisition among HIV-negative men who have sex with men. PLoS One 2012;7:e45718. PMID:23056215 https://doi.org/10.1371/journal.pone.0045718
102. Jin F, Prestage GP, Templeton DJ, et al. The impact of HIV seroadaptive behaviors on sexually transmissible infections in HIV-negative homosexual men in Sydney, Australia. Sex Transm Dis 2012;39:191–4. PMID:22337105 https://doi.org/10.1097/OLQ.0b013e3182401a2f
103. Hotton AL, Gratzer B, Mehta SD. Association between serosorting and bacterial sexually transmitted infection among HIV-negative men who have sex with men at an urban lesbian, gay, bisexual, and transgender health center. Sex Transm Dis 2012;39:959–64. PMID:23191950 https://doi.org/10.1097/OLQ.0b013e31826e870d
104. Anderson C, Gallo MF, Hylton-Kong T, et al. Randomized controlled trial on the effectiveness of counseling messages for avoiding unprotected sexual intercourse during sexually transmitted infection and reproductive tract infection treatment among female sexually transmitted infection clinic patients. Sex Transm Dis 2013;40:105–10. PMID:23321990 https://doi.org/10.1097/OLQ.0b013e31827938a1

78. Choopanya K, Martin M, Suntharasamai P, et al.； 曼谷替诺福韦研究组.泰国曼谷注射吸毒者中抗逆转录病毒预防用于HIV感染(曼谷替诺福韦研究)：一项随机、双盲、安慰剂对照3期试验。Lancet 2013;381:2083-90. PMID:23769234 https://doi.org/10.1016/ S0140-6736(13) 61127-7
79. Molina JM, Charreau I, Spire B, et al.; ANRS IPERGAY研究组.男男性行为人群中按需暴露前预防用于HIV的有效性、安全性及对性行为的影响：一项观察性队列研究。Lancet HIV 2017;4:e402-10. PMID:28747274 https://doi.org/10.1016/S2352-3018(17) 30089-9
80. CDC.美国HIV感染暴露前预防-2017更新：临床实践指南。佐治亚州亚特兰大：美国卫生与公众服务部，CDC;2018. https:// www.cdc.gov/hiv/pdf/risk/prep/cdc-hiv-prep-guidelines-2017.pdf
81. Jones J, Weiss K, Mermin J, et al.男男性行为人群中归因于淋病和衣原体的HIV新发感染病例比例：一项建模分析。Sex Transm Dis 2019;46:357-63. PMID:31095100 https://doi.org/10.1097/ OLQ.0000000000000980
82. Pathela P, Braunstein SL, Blank S, Schillinger JA.有和无性传播直肠感染的男性中HIV发病率：基于HIV病例登记匹配的估计。Clin Infect Dis 2013;57:1203-9. PMID:23800942 https://doi.org/10.1093/cid/cit437
83. Pathela P, Braunstein SL, Blank S, Shepard C, Schillinger JA.梅毒诊断后HIV诊断的高风险：纽约市男性的人群水平分析。Clin Infect Dis 2015;61:281-7. PMID:25870333 https://doi.org/10.1093/cid/civ289
84. Chou R, Evans C, Hoverman A, et al.暴露前预防用于HIV感染预防：美国预防服务工作组证据报告与系统评价。JAMA 2019;321:2214-30. PMID:31184746 https://doi.org/10.1001/jama.2019.2591
85. Liu AY, Cohen SE, Vittinghoff E, et al.与市政和社区性健康服务整合的HIV感染暴露前预防。JAMA Intern Med 2016;176:75-84. PMID:26571482 https://doi.org/10.1001/JAMA Intern Med.2015.4683
86. McCormack S, Dunn DT, Desai M, et al.暴露前预防预防HIV-1感染获得(PROUD)：一项实用性开放标签随机试验试点阶段的有效性结果。Lancet 2016;387:53-60. PMID:26364263 https://doi.org/10.1016/ S0140-6736(15) 00056-2
87. Volk JE, Marcus JL, Phengrasamy T, et al.临床实践环境中HIV暴露前预防使用增加而未见新发HIV感染。Clin Infect Dis 2015;61:1601-3. PMID:26334052 https://doi.org/10.1093/cid/civ778
88. Celum C, Wald A, Lingappa JR, et al.； 预防伙伴HSV/HIV传播研究团队.阿昔洛韦与HIV-1和HSV-2合并感染者HIV-1的传播。N Engl J Med 2010;362:427-39. PMID:20089951 https://doi.org/10.1056/ NEJMoa0904849
89. Celum C, Wald A, Hughes J, et al.; HPTN 039方案团队.阿昔洛韦对2型单纯疱疹病毒血清阳性女性和男男性行为人群HIV-1获得的影响：一项随机、双盲、安慰剂对照试验。Lancet 2008;371:2109-19. PMID:18572080 https://doi.org/10.1016/S0140-6736(08) 60920-4
90. Bolan RK, Beymer MR, Weiss RE, Flynn RP, Leibowitz AA, Klausner JD.多西环素预防减少继续从事高危性行为的HIV感染男男性行为人群中梅毒发生：一项随机对照试点研究。Sex Transm Dis 2015;42:98-103. PMID:25585069 https://doi.org/10.1097/OLQ.0000000000000216
91. Grant JS, Stafylis C, Celum C, et al.多西环素预防细菌性性传播感染。Clin Infect Dis 2020;70:1247-53. PMID:31504345 https://doi.org/10.1093/cid/ciz866
92. Myer L, Kuhn L, Stein ZA, Wright TC Jr, Denny L.阴道内操作、细菌性阴道病与女性对HIV感染的易感性：流行病学证据与生物学机制。Lancet Infect Dis 2005;5:786-94. PMID:16310150 https://doi.org/10.1016/ S1473-3099(05) 70298-X
93. Molina JM, Charreau I, Chidiac C, et al.; ANRS IPERGAY研究组.多西环素暴露后预防用于预防男男性行为者中的性传播感染：ANRS IPERGAY试验的一项开放标签随机子研究.Lancet Infect Dis 2018;18:308-17. PMID:29229440 https://doi.org/10.1016/ S1473-3099(17) 30725-9
94. Cohen MS, Chen YQ, McCauley M, et al.; HPTN 052 研究团队。早期抗逆转录病毒治疗预防 HIV-1 感染。N Engl J Med 2011;365:493-505. PMID:21767103 https://doi.org/10.1056/ NEJMoa1105243
95. Rodger AJ, Cambiano V, Bruun T, et al.; PARTNER研究组.血清学不同的伴侣中，当HIV阳性一方使用抑制性抗逆转录病毒治疗时，无安全套性行为与HIV传播风险.JAMA 2016;316:171-81. PMID:27404185 https://doi.org/10.1001/jama.2016.5148
96. Bavinton BR, Pinto AN, Phanuphak N, et al.; Opposites Attract Study Group.血清不一致男性伴侣中的病毒抑制与HIV传播：一项国际性、前瞻性、观察性队列研究。Lancet HIV 2018;5:e438-47. PMID:30025681 https://doi.org/10.1016/ S2352-3018(18) 30132-2
97. Rodger AJ, Cambiano V, Bruun T ， 等； PARTNER研究组。在HIV阳性伴侣接受抑制性抗逆转录病毒治疗的情况下，血清不一致男同性恋伴侣通过无套性行为传播HIV的风险(PARTNER)：多中心、前瞻性、观察性研究的最终结果。Lancet 2019; 393:2428-38. PMID:31056293 https://doi.org/10.1016/S0140-6736(19) 30418-0
98. 成人和青少年抗逆转录病毒指南专家组。成人和青少年HIV感染者抗逆转录病毒药物使用指南。马里兰州贝塞斯达：美国卫生与公众服务部，国立卫生研究院，AIDSinfo。https://clinicalinfo.hiv.gov/sites/default/ files/inline-files/AdultandAdolescentGL.pdf
99. Golden MR, Kerani RP, Stenger M, et al.加速伴侣治疗(EPT)对衣原体感染率的影响：华盛顿州社区水平试验。发表于STD预防会议，明尼苏达州明尼阿波利斯；2012年3月12-15日。
100. Philip SS, Yu X, Donnell D, Vittinghoff E, Buchbinder S.在EXPLORE研究队列中，血清分类与HIV血清转换风险降低相关。PLoS One 2010;5:e12662. PMID:20844744 https://doi.org/10.1371/journal.pone.0012662
101. Vallabhaneni S, Li X, Vittinghoff E, Donnell D, Pilcher CD, Buchbinder SP.血清适应行为：与HIV阴性男男性行为者中HIV感染的相关性。PLoS One 2012;7:e45718. PMID:23056215 https://doi.org/10.1371/journal.pone.0045718
102. Jin F, Prestage GP, Templeton DJ, et al.HIV血清适应行为对澳大利亚悉尼HIV阴性男同性恋者性传播感染的影响。Sex Transm Dis 2012;39:191-4. PMID:22337105 https://doi.org/10.1097/OLQ.0b013e3182401a2f
103. Hotton AL, Gratzer B, Mehta SD.城市女同性恋、男同性恋、双性恋和跨性别健康中心中HIV阴性男男性行为者血清分类与细菌性性传播感染之间的关联。Sex Transm Dis 2012;39:959-64. PMID:23191950 https://doi.org/10.1097/OLQ.0b013e31826e870d
104. Anderson C, Gallo MF, Hylton-Kong T, et al.关于在性传播感染门诊女性患者中，避免性传播感染和生殖道感染治疗期间无保护性交的咨询信息有效性的随机对照试验。Sex Transm Dis 2013;40:105-10. PMID:23321990 https://doi.org/10.1097/OLQ.0b013e31827938a1

105. Golden MR, Hogben M, Handsfield HH, St Lawrence JS, Potterat JJ, Holmes KK. Partner notification for HIV and STD in the United States: low coverage for gonorrhea, chlamydial infection, and HIV. Sex Transm Dis 2003;30:490–6. PMID:12782949 https://doi.org/10.1097/00007435-200306000-00004
106. Katz DA, Dombrowski JC, Kerani RP, et al. Integrating HIV testing as an outcome of STD partner services for men who have sex with men. AIDS Patient Care STDS 2016;30:208–14. PMID:27158848 https://doi.org/10.1089/apc.2016.0027
107. Katz DA, Dombrowski JC, Barry M, Spellman D, Bell TR, Golden MR. STD partner services to monitor and promote HIV pre-exposure prophylaxis use among men who have sex with men. J Acquir Immune Defic Syndr 2019;80:533–41. PMID:30649032 https://doi.org/10.1097/QAI.0000000000001952
108. Bocour A, Renaud TC, Udeagu CC, Shepard CW. HIV partner services are associated with timely linkage to HIV medical care. AIDS 2013;27:2961–3. PMID:24189585 https://doi.org/10.1097/QAD.0000000000000031
109. Tesoriero JM, Johnson BL, Hart-Malloy R, et al. Improving retention in HIV care through New York's expanded partner services Data-to-Care pilot. J Public Health Manag Pract 2017;23:255–63. PMID:27902561 https://doi.org/10.1097/PHH.0000000000000483
110. Trelle S, Shang A, Nartey L, Cassell JA, Low N. Improved effectiveness of partner notification for patients with sexually transmitted infections: systematic review. BMJ 2007;334:354. PMID:17237298 https://doi.org/10.1136/bmj.39079.460741.7C
111. CDC. Recommendations for partner services programs for HIV infection, syphilis, gonorrhea, and chlamydial infection. MMWR Recomm Rep 2008;57(No. RR-9). PMID:18987617
112. Thurman AR, Shain RN, Holden AE, Champion JD, Perdue ST, Piper JM. Partner notification of sexually transmitted infections: a large cohort of Mexican American and African American women. Sex Transm Dis 2008;35:136–40. PMID:17898679 https://doi.org/10.1097/OLQ.0b013e318151498f
113. Kissinger PJ, Niccolai LM, Magnus M, et al. Partner notification for HIV and syphilis: effects on sexual behaviors and relationship stability. Sex Transm Dis 2003;30:75–82. PMID:12514447 https://doi.org/10.1097/00007435-200301000-00015
114. Smith SG, Zhang X, Basile KC, et al. The National Intimate Partner and Sexual Violence Survey: 2015 data brief—updated release. Atlanta GA: US Department of Health and Human Services, CDC, National Center for Injury Prevention and Control; 2018. https://www.cdc.gov/violenceprevention/pdf/2015data-brief508.pdf
115. Wilson TE, Hogben M, Malka ES, et al. A randomized controlled trial for reducing risks for sexually transmitted infections through enhanced patient-based partner notification. Am J Public Health 2009;99(Suppl 1):S104–10. PMID:18556619 https://doi.org/10.2105/AJPH.2007.112128
116. Yu YY, Frasure-Williams JA, Dunne EF, Bolan G, Markowitz L, Bauer HM. Chlamydia partner services for females in California family planning clinics. Sex Transm Dis 2011;38:913–8. PMID:21934563 https://doi.org/10.1097/OLQ.0b013e3182240366
117. Mickiewicz T, Al-Tayyib A, Thrun M, Rietmeijer C. Implementation and effectiveness of an expedited partner therapy program in an urban clinic. Sex Transm Dis 2012;39:923–9. PMID:23169171 https://doi.org/10.1097/OLQ.0b013e3182756f20
118. Kachur R, Strona FV, Kinsey J, Collins D. Introducing technology into partner services: a toolkit for programs. Atlanta, GA: US Department of Health and Human Services, CDC; 2015. https://www.cdc.gov/std/program/ips/ips-toolkit-12-28-2015.pdf
119. Kachur R, Hall W, Coor A, Kinsey J, Collins D, Strona FV. The use of technology for sexually transmitted disease partner services in the United States: a structured review. Sex Transm Dis 2018;45:707–12. PMID:29771868 https://doi.org/10.1097/OLQ.0000000000000864
120. Pellowski J, Mathews C, Kalichman MO, Dewing S, Lurie MN, Kalichman SC. Advancing partner notification through electronic communication technology: a review of acceptability and utilization research. J Health Commun 2016;21:629–37. PMID:27144318 https://doi.org/10.1080/10810730.2015.1128020
121. Borchardt LN, Pickett ML, Tan KT, Visotcky AM, Drendel AL. Expedited partner therapy: pharmacist refusal of legal prescriptions. Sex Transm Dis 2018;45:350–3. PMID:29465689 https://doi.org/10.1097/OLQ.0000000000000751
122. Qin JZ, Diniz CP, Coleman JS. Pharmacy-level barriers to implementing expedited partner therapy in Baltimore, Maryland. Am J Obstet Gynecol 2018;218:504.e1–6. PMID:29410060 https://doi.org/10.1016/j.ajog.2018.01.036
123. Schillinger J, Slutsker J, Tsang L, et al. Do prescriptions for expedited partner therapy get filled? Findings from a multi-jurisdictional evaluation, US, 2017–2018. Sex Transm Infect 2019;95(Suppl 1):A107.
124. Slutsker JS, Tsang LB, Schillinger JA. Do prescriptions for expedited partner therapy for chlamydia get filled? Findings from a multi-jurisdictional evaluation, United States, 2017–2019. Sex Transm Dis 2020;47:376–82. PMID:32149956 https://doi.org/10.1097/OLQ.0000000000001163
125. Golden MR, Whittington WL, Handsfield HH, et al. Effect of expedited treatment of sex partners on recurrent or persistent gonorrhea or chlamydial infection. N Engl J Med 2005;352:676–85. PMID:15716561 https://doi.org/10.1056/NEJMoa041681
126. Schillinger JA, Kissinger P, Calvet H, et al. Patient-delivered partner treatment with azithromycin to prevent repeated *Chlamydia trachomatis* infection among women: a randomized, controlled trial. Sex Transm Dis 2003;30:49–56. PMID:12514443 https://doi.org/10.1097/00007435-200301000-00011
127. Kissinger P, Mohammed H, Richardson-Alston G, et al. Patient-delivered partner treatment for male urethritis: a randomized, controlled trial. Clin Infect Dis 2005;41:623–9. PMID:16080084 https://doi.org/10.1086/432476
128. Cameron ST, Glasier A, Scott G, et al. Novel interventions to reduce re-infection in women with chlamydia: a randomized controlled trial. Hum Reprod 2009;24:888–95. PMID:19136481 https://doi.org/10.1093/humrep/den475
129. Kissinger P, Schmidt N, Mohammed H, et al. Patient-delivered partner treatment for *Trichomonas vaginalis* infection: a randomized controlled trial. Sex Transm Dis 2006;33:445–50. PMID:16531939 https://doi.org/10.1097/01.olq.0000204511.84485.4c
130. Schwebke JR, Desmond RA. A randomized controlled trial of partner notification methods for prevention of trichomoniasis in women. Sex Transm Dis 2010;37:392–6. PMID:20453720 https://doi.org/10.1097/OLQ.0b013e3181dd1691
131. Stephens SC, Bernstein KT, Katz MH, Philip SS, Klausner JD. The effectiveness of patient-delivered partner therapy and chlamydial and gonococcal reinfection in San Francisco. Sex Transm Dis 2010;37:525–9. PMID:20502392 https://doi.org/10.1097/OLQ.0b013e3181d8920f
132. Kerani RP, Fleming M, DeYoung B, Golden MR. A randomized, controlled trial of inSPOT and patient-delivered partner therapy for gonorrhea and chlamydial infection among men who have sex with men. Sex Transm Dis 2011;38:941–6. PMID:21934569 https://doi.org/10.1097/OLQ.0b013e318223fcbc
133. Stekler J, Bachmann L, Brotman RM, et al. Concurrent sexually transmitted infections (STIs) in sex partners of patients with selected STIs: implications for patient-delivered partner therapy. Clin Infect Dis 2005;40:787–93. PMID:15736009 https://doi.org/10.1086/428043
134. McNulty A, Teh MF, Freedman E. Patient delivered partner therapy for chlamydial infection—what would be missed? Sex Transm Dis 2008;35:834–6. PMID:18580822 https://doi.org/10.1097/OLQ.0b013e3181761993

105. Golden MR, Hogben M, Handsfield HH, St Lawrence JS, Potterat JJ, Holmes KK.美国HIV和性传播疾病的伴侣通知：淋病、衣原体感染和HIV的覆盖率低。Sex Transm Dis 2003;30:490-6. PMID:12782949 https://doi.org/10.1097/00007435-200306000-00004
106. Katz DA, Dombrowski JC, Kerani RP, et al.将HIV检测整合为男男性行为者性病伴侣服务的一项结局。AIDS Patient Care STDS 2016;30:208-14. PMID:27158848 https://doi.org/10.1089/apc.2016.0027
107. Katz DA, Dombrowski JC, Barry M, Spellman D, Bell TR, Golden MR.STD伴侣服务用于监测和促进男男性行为者中HIV暴露前预防的使用。J Acquir Immune Defic Syndr 2019;80:533-41. PMID:30649032 https://doi.org/10.1097/QAI.0000000000001952
108. Bocour A, Renaud TC, Udeagu CC, Shepard CW.HIV伴侣服务与及时衔接HIV医疗服务相关。AIDS 2013;27:2961-3. PMID:24189585 https://doi.org/10.1097/ QAD.0000000000000031
109. Tesoriero JM, Johnson BL, Hart-Malloy R, et al.通过纽约扩展的伴侣服务数据到护理试点项目提高HIV护理的保留率。J Public Health Manag Pract 2017;23:255-63. PMID:27902561 https://doi.org/10.1097/ PHH.0000000000000483
110. Trelle S, Shang A, Nartey L, Cassell JA, Low N.改善性传播感染患者伴侣通知的有效性：系统评价。BMJ 2007;334:354. PMID:17237298 https://doi.org/10.1136/bmj.39079.460741.7C
111. CDC。《HIV感染、梅毒、淋病和衣原体感染的伴侣服务项目建议》。MMWR Recomm Rep 2008;57(No.RR-9)。PMID:18987617
112. Thurman AR, Shain RN, Holden AE, Champion JD, Perdue ST, Piper JM. 性传播感染的伴侣通知：一个大型墨西哥裔美国女性和非洲裔美国女性队列。Sex Transm Dis 2008;35:136-40. PMID:17898679 https://doi.org/10.1097/ OLQ.0b013e318151498f
113. Kissinger PJ, Niccolai LM, Magnus M, et al.HIV和梅毒的患者通知：对性行为和关系稳定性的影响。Sex Transm Dis 2003;30:75-82. PMID:12514447 https://doi.org/10.1097/00007435-200301000-00015
114. Smith SG, Zhang X, Basile KC, et al.国家亲密伴侣与性暴力调查：2015年数据简报-更新版。亚特兰大佐治亚州：美国卫生与公众服务部，CDC，国家伤害预防与控制中心；2018年。https://www.cdc.gov/ violenceprevention/pdf/2015data-brief508.pdf
115. Wilson TE, Hogben M, Malka ES, et al.通过增强的基于患者伴侣通知降低性传播感染风险的随机对照试验。Am J Public Health 2009;99(Suppl 1): S104-10. PMID:18556619 https://doi.org/10.2105/ AJPH.2007.112128
116. Yu YY, Frasure-Williams JA, Dunne EF, Bolan G, Markowitz L, Bauer HM.加利福尼亚州计划生育诊所女性衣原体伴侣服务。Sex Transm Dis 2011;38:913-8. PMID:21934563 https://doi.org/10.1097/OLQ.0b013e3182240366
117. Mickiewicz T, Al-Tayyib A, Thrun M, Rietmeijer C.城市诊所中加速伴侣治疗项目的实施与效果。Sex Transm Dis 2012;39:923-9. PMID:23169171 https://doi.org/10.1097/OLQ.0b013e3182756f20
118. Kachur R, Strona FV, Kinsey J, Collins D.将技术引入伴侣服务：项目工具包。Atlanta, GA: US Department of Health and Human Services, CDC; 2015. https://www.cdc.gov/std/program/ips/ips-toolkit-12-28-2015.pdf
119. Kachur R, Hall W, Coor A, Kinsey J, Collins D, Strona FV.美国性传播疾病伴侣服务中技术的使用：一项结构化综述。Sex Transm Dis 2018;45:707-12. PMID:29771868 https://doi.org/10.1097/OLQ.0000000000000864
120. Pellowski J, Mathews C, Kalichman MO, Dewing S, Lurie MN, Kalichman SC.通过电子通信技术推进伴侣通知：可接受性与利用研究综述.J Health Commun 2016;21:629-37. PMID:27144318 https://doi.org/10.1080/10810730.2015.1128020
121. Borchardt LN, Pickett ML, Tan KT, Visotcky AM, Drendel AL.加速伴侣治疗：药师拒绝合法处方。Sex Transm Dis 2018;45:350-3. PMID:29465689 https://doi.org/10.1097/OLQ.0000000000000751
122. Qin JZ, Diniz CP, Coleman JS.马里兰州巴尔的摩市实施加速伴侣治疗的药房层面障碍。Am J Obstet Gynecol 2018;218:504.e1-6. PMID:29410060 https://doi.org/10.1016/j.ajog.2018.01.036
123. Schillinger J, Slutsker J, Tsang L, et al.快速伴侣治疗的处方会被配药吗?多辖区评估结果，美国，2017-2018。Sex Transm Infect 2019;95(Suppl 1): A107。
124. Slutsker JS, Tsang LB, Schillinger JA.针对衣原体的快速伴侣治疗处方会被配药吗?多辖区评估结果，美国，2017-2019。Sex Transm Dis 2020;47:376-82. PMID:32149956 https://doi.org/10.1097/ OLQ.0000000000001163
125. Golden MR, Whittington WL, Handsfield HH, et al.快速治疗性伴对复发性或持续性淋病或衣原体感染的影响。N Engl J Med 2005;352:676-85. PMID:15716561 https://doi.org/10.1056/NEJMoa041681
126. Schillinger JA, Kissinger P, Calvet H, et al.患者递送性伴阿奇霉素治疗以预防女性反复沙眼衣原体感染：一项随机对照试验。Sex Transm Dis 2003;30:49-56. PMID:12514443 https://doi.org/10.1097/00007435-200301000-00011
127. Kissinger P, Mohammed H, Richardson-Alston G, et al.男性尿道炎的患者递送性伴治疗：一项随机对照试验。Clin Infect Dis 2005;41:623-9. PMID:16080084 https://doi.org/10.1086/432476
128. Cameron ST, Glasier A, Scott G, et al.减少衣原体感染女性再感染的新干预措施：一项随机对照试验。Hum Reprod 2009;24:888-95. PMID:19136481 https://doi.org/10.1093/humrep/den475
129. Kissinger P, Schmidt N, Mohammed H, et al.阴道毛滴虫感染的患者递送性伴治疗：一项随机对照试验。Sex Transm Dis 2006;33:445-50. PMID:16531939 https://doi.org/10.1097/01.olq.0000204511.84485.4c
130. Schwebke JR, Desmond RA.预防女性滴虫感染的性伴通知方法随机对照试验。Sex Transm Dis 2010;37:392-6. PMID:20453720 https://doi.org/10.1097/ OLQ.0b013e3181dd1691
131. Stephens SC, Bernstein KT, Katz MH, Philip SS, Klausner JD.旧金山患者递送性伴治疗及衣原体和淋球菌再感染的有效性。Sex Transm Dis 2010;37:525-9. PMID:20502392 https://doi.org/10.1097/ OLQ.0b013e3181d8920f
132. Kerani RP, Fleming M, DeYoung B, Golden MR.男男性行为人群中针对淋病和衣原体感染的inSPOT与患者递送性伴治疗的随机对照试验。Sex Transm Dis 2011;38:941-6. PMID:21934569 https://doi.org/10.1097/OLQ.0b013e318223fcbc
133. Stekler J, Bachmann L, Brotman RM, et al.特定STI患者性伴中合并性传播感染(STI)：对患者递送性伴治疗的意义。Clin Infect Dis 2005;40:787-93. PMID:15736009 https://doi.org/10.1086/428043
134. McNulty A, Teh MF, Freedman E.衣原体感染的患者递送性伴治疗--会遗漏什么?Sex Transm Dis 2008;35:834-6. PMID:18580822 https://doi.org/10.1097/ OLQ.0b013e3181761993

135. Schillinger J, Jamison K, Slutsker J, et al. STI and HIV infections among MSM reporting exposure to gonorrhea or chlamydia: implications for expedited partner therapy. Sex Transm Infect 2019;95(Suppl 1):A107. http://dx.doi.org/10.1136/sextrans-2019-sti.272
136. Turner AN, Feldblum PJ, Hoke TH. Baseline infection with a sexually transmitted disease is highly predictive of reinfection during follow-up in Malagasy sex workers. Sex Transm Dis 2010;37:559–62. PMID:20716996 https://doi.org/10.1097/OLQ.0b013e3181d70a03
137. Peterman TA, Tian LH, Metcalf CA, et al.; RESPECT-2 Study Group. High incidence of new sexually transmitted infections in the year following a sexually transmitted infection: a case for rescreening. Ann Intern Med 2006;145:564–72. PMID:17043338 https://doi.org/10.7326/0003-4819-145-8-200610170-00005
138. Owens DK, Davidson KW, Krist AH, et al.; US Preventive Services Task Force. Screening for HIV infection: US Preventive Services Task Force recommendation statement. JAMA 2019;321:2326–36. PMID:31184701 https://doi.org/10.1001/jama.2019.6587
139. Health and Human Services Panel on Treatment of HIV-Infected Pregnant Women and Prevention of Perinatal Transmission. Recommendations for use of antiretroviral drugs in pregnant HIV-1-infected women for maternal health and interventions to reduce perinatal HIV transmission in the United States. Bethesda, MD: US Department of Health and Human Services, National Institutes of Health, AIDSinfo; 2014. https://npin.cdc.gov/publication/recommendations-use-antiretroviral-drugs-pregnant-hiv-1-infected-women-maternal-health
140. Committee on Obstetric Practice HIV Expert Work Group. ACOG Committee opinion no. 752: prenatal and perinatal human immunodeficiency virus testing. Obstet Gynecol 2018;132:e138–42. PMID:30134428 https://doi.org/10.1097/AOG.0000000000002825
141. CDC. Sexually transmitted disease surveillance 2019 [Internet]. Atlanta GA: US Department of Health and Human Services, CDC; 2021. https://www.cdc.gov/std/statistics/2019/default.htm
142. Warren HP, Cramer R, Kidd S, Leichliter JS. State requirements for prenatal syphilis screening in the United States, 2016. Matern Child Health J 2018;22:1227–32. PMID:30019155 https://doi.org/10.1007/s10995-018-2592-0
143. Lin JS, Eder M, Bean S. Screening for syphilis infection in pregnant women: a reaffirmation evidence update for the U.S. Preventive Services Task Force. Evidence Synthesis No. 167. AHRQ Publication No. 18-05238-EF-1. Rockville, MD: Agency for Healthcare Research and Quality; 2018.
144. Neblett Fanfair R, Tao G, Owusu-Edusei K, Gift TL, Bernstein KT. Suboptimal prenatal syphilis testing among commercially insured women in the United States, 2013. Sex Transm Dis 2017;44:219–21. PMID:28282647 https://doi.org/10.1097/OLQ.0000000000000569
145. Patel CG, Huppert JS, Tao G. Provider adherence to syphilis testing recommendations for women delivering a stillbirth. Sex Transm Dis 2017;44:685–90. PMID:28876321 https://doi.org/10.1097/OLQ.0000000000000656
146. Matthias JM, Rahman MM, Newman DR, Peterman TA. Effectiveness of prenatal screening and treatment to prevent congenital syphilis, Louisiana and Florida, 2013–2014. Sex Transm Dis 2017;44:498–502. PMID:28703731 https://doi.org/10.1097/OLQ.0000000000000638
147. Albright CM, Emerson JB, Werner EF, Hughes BL. Third-trimester prenatal syphilis screening: a cost-effectiveness analysis. Obstet Gynecol 2015;126:479–85. PMID:26244531 https://doi.org/10.1097/AOG.0000000000000997
148. Owens DK, Davidson KW, Krist AH, et al.; US Preventive Services Task Force. Screening for hepatitis B virus infection in pregnant women: US Preventive Services Task Force reaffirmation recommendation statement. JAMA 2019;322:349–54. PMID:31334800 https://doi.org/10.1001/jama.2019.9365
149. LeFevre ML; US Preventive Services Task Force. Screening for chlamydia and gonorrhea: U.S. Preventive Services Task Force recommendation statement. Ann Intern Med 2014;161:902–10. PMID:25243785 https://doi.org/10.7326/M14-1981
150. Watts T, Stockman L, Martin J, Guilfoyle S, Vergeront JM. Increased risk for mother-to-infant transmission of hepatitis C virus among Medicaid recipients—Wisconsin, 2011–2015. MMWR Morb Mortal Wkly Rep 2017;66:1136–9. PMID:29072864 https://doi.org/10.15585/mmwr.mm6642a3
151. Patrick SW, Bauer AM, Warren MD, Jones TF, Wester C. Hepatitis C virus infection among women giving birth—Tennessee and United States, 2009–2014. MMWR Morb Mortal Wkly Rep 2017;66:470–3. PMID:28493860 https://doi.org/10.15585/mmwr.mm6618a3
152. Chappell CA, Hillier SL, Crowe D, Meyn LA, Bogen DL, Krans EE. Hepatitis C virus screening among children exposed during pregnancy. Pediatrics 2018;141:e20173273. PMID:29720535 https://doi.org/10.1542/peds.2017-3273
153. Gowda C, Kennedy S, Glover C, Prasad MR, Wang L, Honegger JR. Enhanced identification of maternal hepatitis C virus infection using existing public health surveillance systems. Paediatr Perinat Epidemiol 2018;32:401–10. PMID:29972246 https://doi.org/10.1111/ppe.12481
154. Waruingi W, Mhanna MJ, Kumar D, Abughali N. Hepatitis C virus universal screening versus risk based selective screening during pregnancy. J Neonatal Perinatal Med 2015;8:371–8. PMID:26836823 https://doi.org/10.3233/NPM-15915024
155. Boudova S, Mark K, El-Kamary SS. Risk-based hepatitis C screening in pregnancy is less reliable than universal screening: a retrospective chart review. Open Forum Infect Dis 2018;5:ofy043. PMID:29564364 https://doi.org/10.1093/ofid/ofy043
156. Schillie S, Wester C, Osborne M, Wesolowski L, Ryerson AB. CDC recommendations for hepatitis C screening among adults—United States, 2020. MMWR Recomm Rep 2020;69(No. RR-2). PMID:32271723 https://doi.org/10.15585/mmwr.rr6902a1
157. Moyer VA; US Preventive Services Task Force. Screening for hepatitis C virus infection in adults: U.S. Preventive Services Task Force recommendation statement. Ann Intern Med 2013;159:349–57. PMID:23798026 https://doi.org/10.7326/0003-4819-159-5-201309030-00672
158. Perkins RB, Guido RS, Castle PE, et al.; 2019 ASCCP Risk-Based Management Consensus Guidelines Committee. 2019 ASCCP risk-based management consensus guidelines for abnormal cervical cancer screening tests and cancer precursors. J Low Genit Tract Dis 2020;24:102–31. PMID:32243307 https://doi.org/10.1097/LGT.0000000000000525
159. Owens DK, Davidson KW, Krist AH, et al.; US Preventive Services Task Force. Screening for bacterial vaginosis in pregnant persons to prevent preterm delivery: US Preventive Services Task Force recommendation statement. JAMA 2020;323:1286–92. PMID:32259236 https://doi.org/10.1001/jama.2020.2684
160. American Academy of Pediatrics Committee on Fetus and Newborn; American College of Obstetrics and Gynecology Committee on Obstetric Practice. Guidelines for perinatal care. Kilpatrick SJ, Papile LA, eds. 8th ed. Itasca, IL: American Academy of Pediatrics and Washington, DC: American College of Obstetrics and Gynecology; 2017.
161. Curry SJ, Krist AH, Owens DK, et al.; US Preventive Services Task Force. Screening for syphilis infection in pregnant women: US Preventive Services Task Force reaffirmation recommendation statement. JAMA 2018;320:911–7. PMID:30193283 https://doi.org/10.1001/jama.2018.11785
162. Bibbins-Domingo K, Grossman DC, Curry SJ, et al.; US Preventive Services Task Force. Serologic screening for genital herpes infection: US Preventive Services Task Force recommendation statement. JAMA 2016;316:2525–30. PMID:27997659 https://doi.org/10.1001/jama.2016.16776

135. Schillinger J, Jamison K, Slutsker J, et al.报告暴露于淋病或衣原体的MSM中的STI和HIV感染：对快速伴侣治疗的意义。Sex Transm Infect 2019;95(Suppl 1): A107. http://dx.doi.org/10.1136/ sextrans-2019-sti.272
136. Turner AN, Feldblum PJ, Hoke TH.基线性传播疾病感染高度预测马达加斯加性工作者随访期间的再感染。Sex Transm Dis 2010;37:559-62. PMID:20716996 https://doi.org/10.1097/OLQ.0b013e3181d70a03
137. Peterman TA, Tian LH, Metcalf CA, et al.; RESPECT-2 Study Group.性传播感染后一年内新发性传播感染的高发病率：重新筛查的理由。Ann Intern Med 2006;145:564-72. PMID:17043338 https://doi.org/10.7326/0003-4819-145-8-200610170-00005
138. Owens DK, Davidson KW, Krist AH, et al.； 美国预防服务工作组. 筛查HIV感染：美国预防服务工作组推荐声明. JAMA 2019;321:2326-36. PMID:31184701 https://doi.org/10.1001/jama.2019.6587
139. Health and Human Services Panel on Treatment of HIV-Infected Pregnant Women and Prevention of Perinatal Transmission.美国HIV-1感染孕妇抗逆转录病毒药物用于母体健康及减少围产期HIV传播干预措施的使用建议。Bethesda, MD: US Department of Health and Human Services, National Institutes of Health, AIDSinfo; 2014. https://npin.cdc.gov/publication/Recommendations-use-antiretroviral-drugs-pregnant-hiv-1-infected-women-maternal-health
140. Committee on Obstetric Practice HIV Expert Work Group.ACOG Committee opinion no.752： 产前和围产期人类免疫缺陷病毒检测。Obstet Gynecol 2018;132:e138-42. PMID:30134428 https://doi.org/10.1097/AOG.0000000000002825
141. CDC.2019年性传播疾病监测[Internet]。Atlanta GA: US Department of Health and Human Services, CDC; 2021. https://www.cdc.gov/std/statistics/2019/default.htm
142. Warren HP, Cramer R, Kidd S, Leichliter JS.美国产前梅毒筛查的州要求，2016年。Matern Child Health J 2018;22:1227-32. PMID:30019155 https://doi.org/10.1007/ s10995-018-2592-0
143. Lin JS, Eder M, Bean S.孕妇梅毒感染筛查：为U.S.Preventive Services Task Force更新的重申证据。Evidence Synthesis No.167. AHRQ Publication No.18-05238-EF-1. Rockville, MD: Agency for Healthcare Research and Quality; 2018.
144. Neblett Fanfair R, Tao G, Owusu-Edusei K, Gift TL, Bernstein KT.美国商业保险女性产前梅毒检测不足，2013年。Sex Transm Dis 2017;44:219-21. PMID:28282647 https://doi.org/10.1097/OLQ.0000000000000569
145. Patel CG, Huppert JS, Tao G.提供者对死产分娩女性梅毒检测建议的依从性。Sex Transm Dis 2017;44:685-90. PMID:28876321 https://doi.org/10.1097/ OLQ.0000000000000656
146. Matthias JM, Rahman MM, Newman DR, Peterman TA.产前筛查和治疗预防先天性梅毒的有效性，路易斯安那州和佛罗里达州，2013-2014年。Sex Transm Dis 2017;44:498-502. PMID:28703731 https://doi.org/10.1097/ OLQ.0000000000000638
147. Albright CM, Emerson JB, Werner EF, Hughes BL.妊娠晚期产前梅毒筛查：成本效益分析。Obstet Gynecol 2015;126:479-85. PMID:26244531 https://doi.org/10.1097/ AOG.0000000000000997
148. Owens DK, Davidson KW, Krist AH, et al.; US Preventive Services Task Force.孕妇乙型肝炎病毒感染筛查：US Preventive Services Task Force重申推荐声明。JAMA 2019;322:349-54. PMID:31334800 https://doi.org/10.1001/jama.2019.9365
149. LeFevre ML; US Preventive Services Task Force.衣原体和淋病筛查：U.S.Preventive Services Task Force推荐声明。Ann Intern Med 2014;161:902-10. PMID:25243785 https://doi.org/10.7326/M14-1981
150. Watts T, Stockman L, Martin J, Guilfoyle S, Vergeront JM.Medicaid受益者中丙型肝炎病毒母婴传播风险增加--威斯康星州，2011-2015年。MMWR Morb Mortal Wkly Rep 2017;66:1136-9. PMID:29072864 https://doi.org/10.15585/mmwr.mm6642a3
151. Patrick SW, Bauer AM, Warren MD, Jones TF, Wester C.分娩女性中丙型肝炎病毒感染--田纳西州和美国，2009-2014年。MMWR Morb Mortal Wkly Rep 2017;66:470-3. PMID:28493860 https://doi.org/10.15585/mmwr.mm6618a3
152. Chappell CA, Hillier SL, Crowe D, Meyn LA, Bogen DL, Krans EE.孕期暴露儿童的丙型肝炎病毒筛查。Pediatrics 2018;141:e20173273. PMID:29720535 https://doi.org/10.1542/peds.2017-3273
153. Gowda C, Kennedy S, Glover C, Prasad MR, Wang L, Honegger JR.利用现有公共卫生监测系统加强孕产妇丙型肝炎病毒感染的识别。Paediatr Perinat Epidemiol 2018;32:401-10. PMID:29972246 https://doi.org/10.1111/ ppe.12481
154. Waruingi W, Mhanna MJ, Kumar D, Abughali N.妊娠期间丙型肝炎病毒普遍筛查与基于风险的选择性筛查的比较。J Neonatal Perinatal Med 2015;8:371-8. PMID:26836823 https://doi.org/10.3233/NPM-15915024
155. Boudova S, Mark K, El-Kamary SS.妊娠期基于风险的丙型肝炎筛查不如普遍筛查可靠：一项回顾性病历审查。Open Forum Infect Dis 2018;5:ofy043. PMID:29564364 https://doi.org/10.1093/ofid/ofy043
156. Schillie S, Wester C, Osborne M, Wesolowski L, Ryerson AB.CDC关于成人丙型肝炎筛查的建议--美国，2020年。MMWR Recomm Rep 2020;69(No.RR-2).PMID:32271723 https://doi.org/10.15585/mmwr.rr6902a1
157. Moyer VA; US Preventive Services Task Force.成人丙型肝炎病毒感染的筛查：美国预防服务工作组推荐声明。Ann Intern Med 2013;159:349-57. PMID:23798026 https://doi.org/10.7326/0003-4819-159-5-201309030-00672
158. Perkins RB, Guido RS, Castle PE, et al.; 2019 ASCCP Risk-Based Management Consensus Guidelines Committee.2019 ASCCP基于风险管理的宫颈癌筛查异常结果及癌前病变共识指南。J Low Genit Tract Dis 2020;24:102-31. PMID:32243307 https://doi.org/10.1097/LGT.0000000000000525
159. Owens DK, Davidson KW, Krist AH, et al.; US Preventive Services Task Force.孕妇细菌性阴道病筛查以预防早产：美国预防服务工作组推荐声明。JAMA 2020;323:1286-92. PMID:32259236 https://doi.org/10.1001/jama.2020.2684
160. 美国儿科学会胎儿与新生儿委员会；美国妇产科医师学会产科实践委员会。围产期护理指南。Kilpatrick SJ, Papile LA， 编。第8版。伊利诺伊州伊塔斯卡：美国儿科学会；华盛顿特区：美国妇产科医师学会；2017年。
161. Curry SJ, Krist AH, Owens DK, et al.; US Preventive Services Task Force.孕妇梅毒感染筛查：美国预防服务工作组再次确认推荐声明。JAMA 2018;320:911-7. PMID:30193283 https://doi.org/10.1001/jama.2018.11785
162. Bibbins-Domingo K, Grossman DC, Curry SJ, et al.; US Preventive Services Task Force.生殖器疱疹感染的血清学筛查：美国预防服务工作组推荐声明。JAMA 2016;316:2525-30. PMID:27997659 https://doi.org/10.1001/ jama.2016.16776

163. Selph SS, Bougatsos C, Dana T, Grusing S, Chou R. Screening for HIV infection in pregnant women: updated evidence report and systematic review for the US Preventive Services Task Force. JAMA 2019;321:2349–60. PMID:31184704 https://doi.org/10.1001/jama.2019.2593
164. Henderson JT, Webber EM, Bean SI. Screening for Hepatitis B infection in pregnant women: updated evidence report and systematic review for the US Preventive Services Task Force. JAMA 2019;322:360–2. PMID:31334780 https://doi.org/10.1001/jama.2019.1655
165. Leichliter JS, Dittus PJ, Copen CE, Aral SO. Trends in factors indicating increased risk for STI among key subpopulations in the United States, 2002–2015. Sex Transm Infect 2020;96:121–3. PMID:31350378 https://doi.org/10.1136/sextrans-2019-054045
166. Committee on Adolescence; Council on Clinical and Information Technology; Blythe MJ, Del Beccaro MA. Standards for health information technology to ensure adolescent privacy. Pediatrics 2012;130:987–90. PMID:23109684 https://doi.org/10.1542/peds.2012-2580
167. ACOG Committee Opinion no. 599: Committee on Adolescent Health Care: adolescent confidentiality and electronic health records. Obstet Gynecol 2014;123:1148–50. PMID:24785881 https://doi.org/10.1097/01.AOG.0000446825.08715.98
168. Thompson LA, Martinko T, Budd P, Mercado R, Schentrup AM. Meaningful use of a confidential adolescent patient portal. J Adolesc Health 2016;58:134–40. PMID:26802988 https://doi.org/10.1016/j.jadohealth.2015.10.015
169. Society for Adolescent Health and Medicine; American Academy of Pediatrics. Confidentiality protections for adolescents and young adults in the health care billing and insurance claims process. J Adolesc Health 2016;58:374–7. PMID:26903437 https://doi.org/10.1016/j.jadohealth.2015.12.009
170. Bamberger DM, Graham G, Dennis L, Gerkovich MM. Extragenital gonorrhea and chlamydia among men and women according to type of sexual exposure. Sex Transm Dis 2019;46:329–34. PMID:30676485 https://doi.org/10.1097/OLQ.0000000000000967
171. Chan PA, Robinette A, Montgomery M, et al. Extragenital infections caused by *Chlamydia trachomatis* and *Neisseria gonorrhoeae*: a review of the literature. Infect Dis Obstet Gynecol 2016;2016:5758387. PMID:27366021 https://doi.org/10.1155/2016/5758387
172. Owusu-Edusei K Jr, Hoover KW, Gift TL. Cost-effectiveness of opt-out chlamydia testing for high-risk young women in the U.S. Am J Prev Med 2016;51:216–24. PMID:26952078 https://doi.org/10.1016/j.amepre.2016.01.007
173. DiClemente RJ, Sales JM, Danner F, Crosby RA. Association between sexually transmitted diseases and young adults' self-reported abstinence. Pediatrics 2011;127:208–13. PMID:21199852 https://doi.org/10.1542/peds.2009-0892
174. Curry SJ, Krist AH, Owens DK, et al.; US Preventive Services Task Force. Screening for cervical cancer: US Preventive Services Task Force recommendation statement. JAMA 2018;320:674–86. PMID:30140884 https://doi.org/10.1001/jama.2018.10897
175. Committee on Practice Bulletins—Gynecology. Practice bulletin no. 157: cervical cancer screening and prevention. Obstet Gynecol 2016;127:e1–20. PMID:26695583 https://doi.org/10.1097/AOG.0000000000001263
176. Benard VB, Watson M, Castle PE, Saraiya M. Cervical carcinoma rates among young females in the United States. Obstet Gynecol 2012;120:1117–23. PMID:23090530 https://doi.org/10.1097/AOG.0b013e31826e4609
177. Fontham ETH, Wolf AMD, Church TR, et al. Cervical cancer screening for individuals at average risk: 2020 guideline update from the American Cancer Society. CA Cancer J Clin 2020;70:321–46. PMID:32729638 https://doi.org/10.3322/caac.21628
178. Owens DK, Davidson KW, Krist AH, et al.; US Preventive Services Task Force. Preexposure prophylaxis for the prevention of HIV infection: US Preventive Services Task Force recommendation statement. JAMA 2019;321:2203–13. PMID:31184747 https://doi.org/10.1001/jama.2019.6390
179. Mayer KH, Bekker LG, Stall R, Grulich AE, Colfax G, Lama JR. Comprehensive clinical care for men who have sex with men: an integrated approach. Lancet 2012;380:378–87. PMID:22819653 https://doi.org/10.1016/S0140-6736(12)60835-6
180. Buchbinder SP, Vittinghoff E, Heagerty PJ, et al. Sexual risk, nitrite inhalant use, and lack of circumcision associated with HIV seroconversion in men who have sex with men in the United States. J Acquir Immune Defic Syndr 2005;39:82–9. PMID:15851918 https://doi.org/10.1097/01.qai.0000134740.41585.f4
181. Paz-Bailey G, Mendoza MC, Finlayson T, et al.; NHBS Study Group. Trends in condom use among MSM in the United States: the role of antiretroviral therapy and seroadaptive strategies. AIDS 2016;30:1985–90. PMID:27149088 https://doi.org/10.1097/QAD.0000000000001139
182. Spicknall IH, Gift TL, Bernstein KT, Aral SO. Sexual networks and infection transmission networks among men who have sex with men as causes of disparity and targets of prevention. Sex Transm Infect 2017;93:307–8. PMID:28389442 https://doi.org/10.1136/sextrans-2016-052676
183. Glick SN, Morris M, Foxman B, et al. A comparison of sexual behavior patterns among men who have sex with men and heterosexual men and women. J Acquir Immune Defic Syndr 2012;60:83–90. PMID:22522237 https://doi.org/10.1097/QAI.0b013e318247925e
184. Goodreau SM, Golden MR. Biological and demographic causes of high HIV and sexually transmitted disease prevalence in men who have sex with men. Sex Transm Infect 2007;83:458–62. PMID:17855487 https://doi.org/10.1136/sti.2007.025627
185. Chew Ng RA, Samuel MC, Lo T, et al. Sex, drugs (methamphetamines), and the Internet: increasing syphilis among men who have sex with men in California, 2004–2008. Am J Public Health 2013;103:1450–6. PMID:23153138 https://doi.org/10.2105/AJPH.2012.300808
186. Bernstein KT, Stephens SC, Strona FV, Kohn RP, Philip SS. Epidemiologic characteristics of an ongoing syphilis epidemic among men who have sex with men, San Francisco. Sex Transm Dis 2013;40:11–7. PMID:23254114 https://doi.org/10.1097/OLQ.0b013e31827763ea
187. Cohen SE, Chew Ng RA, Katz KA, et al. Repeat syphilis among men who have sex with men in California, 2002–2006: implications for syphilis elimination efforts. Am J Public Health 2012;102:e1–8. PMID:22095364 https://doi.org/10.2105/AJPH.2011.300383
188. Kirkcaldy RD, Harvey A, Papp JR, et al. *Neisseria gonorrhoeae* antimicrobial susceptibility surveillance—The Gonococcal Isolate Surveillance Project, 27 sites, United States, 2014. MMWR Surveill Summ 2016;65(No. SS-7). PMID:27414503 https://doi.org/10.15585/mmwr.ss6507a1
189. Kirkcaldy RD, Zaidi A, Hook EW 3rd, et al. *Neisseria gonorrhoeae* antimicrobial resistance among men who have sex with men and men who have sex exclusively with women: the Gonococcal Isolate Surveillance Project, 2005–2010. Ann Intern Med 2013;158:321–8. PMID:23460055 https://doi.org/10.7326/0003-4819-158-5-201303050-00004
190. Newman LM, Dowell D, Bernstein K, et al. A tale of two gonorrhea epidemics: results from the STD Surveillance Network. Public Health Rep 2012;127:282–92. PMID:22547859 https://doi.org/10.1177/003335491212700308
191. Hess KL, Hu X, Lansky A, Mermin J, Hall HI. Lifetime risk of a diagnosis of HIV infection in the United States. Ann Epidemiol 2017;27:238–43. PMID:28325538 https://doi.org/10.1016/j.annepidem.2017.02.003

163. Selph SS, Bougatsos C, Dana T, Grusing S, Chou R.孕妇HIV感染筛查：美国预防服务工作组更新证据报告和系统评价。JAMA 2019;321:2349-60. PMID:31184704 https://doi.org/10.1001/jama.2019.2593
164. Henderson JT, Webber EM, Bean SI.孕妇乙型肝炎感染筛查：美国预防服务工作组更新证据报告和系统评价。JAMA 2019;322:360-2. PMID:31334780 https://doi.org/10.1001/jama.2019.1655
165. Leichliter JS, Dittus PJ, Copen CE, Aral SO.美国关键亚人群中STI风险增加指标因素的趋势，2002-2015年。Sex Transm Infect 2020;96:121-3. PMID:31350378 https://doi.org/10.1136/sextrans-2019-054045
166. Committee on Adolescence; Council on Clinical and Information Technology; Blythe MJ, Del Beccaro MA.确保青少年隐私的健康信息技术标准。Pediatrics 2012;130:987-90. PMID:23109684 https://doi.org/10.1542/ peds.2012-2580
167. ACOG Committee Opinion no.599: Committee on Adolescent Health Care： 青少年保密性与电子健康记录。Obstet Gynecol 2014;123:1148-50. PMID:24785881 https://doi.org/10.1097/01.AOG.0000446825.08715.98
168. Thompson LA, Martinko T, Budd P, Mercado R, Schentrup AM.保密性青少年患者门户的有意义使用。J Adolesc Health 2016;58:134-40. PMID:26802988 https://doi.org/10.1016/j.jadohealth.2015.10.015
169. Society for Adolescent Health and Medicine; American Academy of Pediatrics.医疗保健计费和保险理赔过程中对青少年和年轻成人的保密保护。J Adolesc Health 2016;58:374-7. PMID:26903437 https://doi.org/10.1016/j.jadohealth.2015.12.009
170. Bamberger DM, Graham G, Dennis L, Gerkovich MM.根据性暴露类型分类的男性和女性生殖器外淋病和衣原体感染。Sex Transm Dis 2019;46:329-34. PMID:30676485 https://doi.org/10.1097/OLQ.0000000000000967
171. Chan PA, Robinette A, Montgomery M, et al.由沙眼衣原体和淋病奈瑟菌引起的生殖器外感染：文献综述。Infect Dis Obstet Gynecol 2016;2016:5758387. PMID:27366021 https://doi.org/10.1155/2016/5758387
172. Owusu-Edusei K Jr, Hoover KW, Gift TL.美国高风险年轻女性选择退出衣原体检测的成本效益。Am J Prev Med 2016;51:216-24. PMID:26952078 https://doi.org/10.1016/j.amepre.2016.01.007
173. DiClemente RJ, Sales JM, Danner F, Crosby RA.性传播疾病与年轻成人自我报告的禁欲之间的关联。Pediatrics 2011;127:208-13. PMID:21199852 https://doi.org/10.1542/peds.2009-0892
174. Curry SJ, Krist AH, Owens DK, et al.; US Preventive Services Task Force. 宫颈癌筛查：美国预防服务工作组推荐声明。JAMA 2018;320:674-86. PMID:30140884 https://doi.org/10.1001/jama.2018.10897
175. Committee on Practice Bulletins-Gynecology.实践简报第157号：宫颈癌筛查与预防。Obstet Gynecol 2016;127:e1-20. PMID:26695583 https://doi.org/10.1097/ AOG.0000000000001263
176. Benard VB, Watson M, Castle PE, Saraiya M.美国年轻女性宫颈癌发病率。Obstet Gynecol 2012;120:1117-23. PMID:23090530 https://doi.org/10.1097/ AOG.0b013e31826e4609
177. Fontham ETH, Wolf AMD, Church TR, et al.平均风险人群的宫颈癌筛查：美国癌症协会2020年指南更新。CA Cancer J Clin 2020;70:321-46. PMID:32729638 https://doi.org/10.3322/caac.21628
178. Owens DK, Davidson KW, Krist AH, et al.; US Preventive Services Task Force.暴露前预防用于预防HIV感染：美国预防服务工作组推荐声明。JAMA 2019;321:2203-13. PMID:31184747 https://doi.org/10.1001/jama.2019.6390
179. Mayer KH, Bekker LG, Stall R, Grulich AE, Colfax G, Lama JR.男男性行为人群的综合临床护理：整合方法。Lancet 2012;380:378-87. PMID:22819653 https://doi.org/10.1016/S0140-6736(12) 60835-6
180. Buchbinder SP, Vittinghoff E, Heagerty PJ, et al.美国男男性行为人群中与HIV血清阳转相关的性风险、亚硝酸盐吸入剂使用和未行包皮环切术。J Acquir Immune Defic Syndr 2005;39:82-9. PMID:15851918 https://doi.org/10.1097/01.qai.0000134740.41585.f4
181. Paz-Bailey G, Mendoza MC, Finlayson T, et al.; NHBS Study Group.美国MSM安全套使用趋势：抗逆转录病毒治疗和血清适应策略的作用。AIDS 2016;30:1985-90. PMID:27149088 https://doi.org/10.1097/ QAD.0000000000001139
182. Spicknall IH, Gift TL, Bernstein KT, Aral SO.男男性行为人群中的性网络和感染传播网络作为差异原因和预防目标。Sex Transm Infect 2017;93:307-8. PMID:28389442 https://doi.org/10.1136/sextrans-2016-052676
183. Glick SN, Morris M, Foxman B, et al.男男性行为人群与异性恋男性和女性性行为模式的比较。J Acquir Immune Defic Syndr 2012;60:83-90. PMID:22522237 https://doi.org/10.1097/QAI.0b013e318247925e
184. Goodreau SM, Golden MR.男男性行为人群中HIV和性传播疾病高流行率的生物学和人口学原因。Sex Transm Infect 2007;83:458-62. PMID:17855487 https://doi.org/10.1136/sti.2007.025627
185. Chew Ng RA, Samuel MC, Lo T, et al.性、药物(甲基苯丙胺)与互联网：2004-2008年加利福尼亚州男男性行为人群中梅毒增加。Am J Public Health 2013;103:1450-6. PMID:23153138 https://doi.org/10.2105/AJPH.2012.300808
186. Bernstein KT, Stephens SC, Strona FV, Kohn RP, Philip SS.旧金山男男性行为人群中持续梅毒流行的流行病学特征。Sex Transm Dis 2013;40:11-7. PMID:23254114 https://doi.org/10.1097/OLQ.0b013e31827763ea
187. Cohen SE, Chew Ng RA, Katz KA, et al.2002-2006年加利福尼亚州男男性行为人群中的重复梅毒感染：对梅毒消除工作的启示。Am J Public Health 2012;102:e1-8. PMID:22095364 https://doi.org/10.2105/AJPH.2011.300383
188. Kirkcaldy RD, Harvey A, Papp JR, et al.淋病奈瑟菌抗菌药物敏感性监测--淋球菌分离株监测项目，27个站点，美国，2014年。MMWR Surveill Summ 2016;65(No.SS-7).PMID:27414503 https://doi.org/10.15585/ mmwr.ss6507a1
189. Kirkcaldy RD, Zaidi A, Hook EW 3rd, et al.男男性行为人群和仅与女性发生性行为的男性中淋病奈瑟菌抗菌药物耐药：淋球菌分离株监测项目，2005-2010年。Ann Intern Med 2013;158:321-8. PMID:23460055 https://doi.org/10.7326/0003-4819-158-5-201303050-00004
190. Newman LM, Dowell D, Bernstein K, et al.两种淋病流行情况：来自STD监测网络的结果。Public Health Rep 2012;127:282-92. PMID:22547859 https://doi.org/10.1177/003335491212700308
191. Hess KL, Hu X, Lansky A, Mermin J, Hall HI.美国HIV感染诊断的终生风险。Ann Epidemiol 2017;27:238-43. PMID:28325538 https://doi.org/10.1016/j.annepidem.2017.02.003

192. Patel P, Borkowf CB, Brooks JT, Lasry A, Lansky A, Mermin J. Estimating per-act HIV transmission risk: a systematic review. AIDS 2014;28:1509–19. PMID:24809629 https://doi.org/10.1097/QAD.0000000000000298
193. Koblin BA, Husnik MJ, Colfax G, et al. Risk factors for HIV infection among men who have sex with men. AIDS 2006;20:731–9. PMID:16514304 https://doi.org/10.1097/01.aids.0000216374.61442.55
194. Ackers ML, Greenberg AE, Lin CY, et al. High and persistent HIV seroincidence in men who have sex with men across 47 U.S. cities. PLoS One 2012;7:e34972. PMID:22529964 https://doi.org/10.1371/journal.pone.0034972
195. Zetola NM, Bernstein KT, Wong E, Louie B, Klausner JD. Exploring the relationship between sexually transmitted diseases and HIV acquisition by using different study designs. J Acquir Immune Defic Syndr 2009;50:546–51. PMID:19367993 https://doi.org/10.1097/QAI.0b013e318195bd2b
196. Solomon MM, Mayer KH, Glidden DV, et al.; iPrEx Study Team. Syphilis predicts HIV incidence among men and transgender women who have sex with men in a preexposure prophylaxis trial. Clin Infect Dis 2014;59:1020–6. PMID:24928295 https://doi.org/10.1093/cid/ciu450
197. Fleming DT, Wasserheit JN. From epidemiological synergy to public health policy and practice: the contribution of other sexually transmitted diseases to sexual transmission of HIV infection. Sex Transm Infect 1999;75:3–17. PMID:10448335 https://doi.org/10.1136/sti.75.1.3
198. Freeman EE, Weiss HA, Glynn JR, Cross PL, Whitworth JA, Hayes RJ. Herpes simplex virus 2 infection increases HIV acquisition in men and women: systematic review and meta-analysis of longitudinal studies. AIDS 2006;20:73–83. PMID:16327322 https://doi.org/10.1097/01.aids.0000198081.09337.a7
199. Reynolds SJ, Risbud AR, Shepherd ME, et al. High rates of syphilis among STI patients are contributing to the spread of HIV-1 in India. Sex Transm Infect 2006;82:121–6. PMID:16581736 https://doi.org/10.1136/sti.2005.015040
200. Hoots BE, Wejnert C, Martin A, et al.; NHBS Study Group. Undisclosed HIV infection among MSM in a behavioral surveillance study. AIDS 2019;33:913–8. PMID:30649053 https://doi.org/10.1097/QAD.0000000000002147
201. Dolling DI, Desai M, McOwan A, et al.; PROUD Study Group. An analysis of baseline data from the PROUD study: an open-label randomised trial of pre-exposure prophylaxis. Trials 2016;17:163. PMID:27013513 https://doi.org/10.1186/s13063-016-1286-4
202. Oldenburg CE, Nunn AS, Montgomery M, et al. Behavioral changes following uptake of HIV pre-exposure prophylaxis among men who have sex with men in a clinical setting. AIDS Behav 2018;22:1075–9. PMID:28150120 https://doi.org/10.1007/s10461-017-1701-1
203. Montaño MA, Dombrowski JC, Dasgupta S, et al. Changes in sexual behavior and STI diagnoses among MSM initiating PrEP in a clinic setting. AIDS Behav 2019;23:548–55. PMID:30117076 https://doi.org/10.1007/s10461-018-2252-9
204. Traeger MW, Schroeder SE, Wright EJ, et al. Effects of pre-exposure prophylaxis for the prevention of human immunodeficiency virus infection on sexual risk behavior in men who have sex with men: a systematic review and meta-analysis. Clin Infect Dis 2018;67:676–86. PMID:29509889 https://doi.org/10.1093/cid/ciy182
205. Jenness SM, Weiss KM, Goodreau SM, et al. Incidence of gonorrhea and chlamydia following human immunodeficiency virus preexposure prophylaxis among men who have sex with men: a modeling study. Clin Infect Dis 2017;65:712–8. PMID:28505240 https://doi.org/10.1093/cid/cix439
206. Tang EC, Vittinghoff E, Philip SS, et al. Quarterly screening optimizes detection of sexually transmitted infections when prescribing HIV preexposure prophylaxis. AIDS 2020;34:1181–6. PMID:32205724 https://doi.org/10.1097/QAD.0000000000002522
207. Barbee LA, Khosropour CM, Dombrowksi JC, Golden MR. New human immunodeficiency virus diagnosis independently associated with rectal gonorrhea and chlamydia in men who have sex with men. Sex Transm Dis 2017;44:385–9. PMID:28608786 https://doi.org/10.1097/OLQ.0000000000000614
208. Bernstein KT, Marcus JL, Nieri G, Philip SS, Klausner JD. Rectal gonorrhea and chlamydia reinfection is associated with increased risk of HIV seroconversion. J Acquir Immune Defic Syndr 2010;53:537–43. PMID:19935075 https://doi.org/10.1097/QAI.0b013e3181c3ef29
209. Barbee LA, Khosropour CM, Dombrowski JC, Manhart LE, Golden MR. An estimate of the proportion of symptomatic gonococcal, chlamydial and non-gonococcal non-chlamydial urethritis attributable to oral sex among men who have sex with men: a case-control study. Sex Transm Infect 2016;92:155–60. PMID:26297719 https://doi.org/10.1136/sextrans-2015-052214
210. Lafferty WE, Hughes JP, Handsfield HH. Sexually transmitted diseases in men who have sex with men. Acquisition of gonorrhea and nongonococcal urethritis by fellatio and implications for STD/HIV prevention. Sex Transm Dis 1997;24:272–8. PMID:9153736 https://doi.org/10.1097/00007435-199705000-00007
211. Bernstein KT, Stephens SC, Barry PM, et al. *Chlamydia trachomatis* and *Neisseria gonorrhoeae* transmission from the oropharynx to the urethra among men who have sex with men. Clin Infect Dis 2009;49:1793–7. PMID:19911970 https://doi.org/10.1086/648427
212. Patton ME, Kidd S, Llata E, et al. Extragenital gonorrhea and chlamydia testing and infection among men who have sex with men—STD Surveillance Network, United States, 2010–2012. Clin Infect Dis 2014;58:1564–70. PMID:24647015 https://doi.org/10.1093/cid/ciu184
213. Kent CK, Chaw JK, Wong W, et al. Prevalence of rectal, urethral, and pharyngeal chlamydia and gonorrhea detected in 2 clinical settings among men who have sex with men: San Francisco, California, 2003. Clin Infect Dis 2005;41:67–74. PMID:15937765 https://doi.org/10.1086/430704
214. Koedijk FD, van Bergen JE, Dukers-Muijrers NH, van Leeuwen AP, Hoebe CJ, van der Sande MA; Dutch STI centres. The value of testing multiple anatomic sites for gonorrhoea and chlamydia in sexually transmitted infection centres in the Netherlands, 2006–2010. Int J STD AIDS 2012;23:626–31. PMID:23033514 https://doi.org/10.1258/ijsa.2012.011378
215. Barbee LA, Dombrowski JC, Kerani R, Golden MR. Effect of nucleic acid amplification testing on detection of extragenital gonorrhea and chlamydial infections in men who have sex with men sexually transmitted disease clinic patients. Sex Transm Dis 2014;41:168–72. PMID:24521722 https://doi.org/10.1097/OLQ.0000000000000093
216. Danby CS, Cosentino LA, Rabe LK, et al. Patterns of extragenital chlamydia and gonorrhea in women and men who have sex with men reporting a history of receptive anal intercourse. Sex Transm Dis 2016;43:105–9. PMID:26766527 https://doi.org/10.1097/OLQ.0000000000000384
217. van der Helm JJ, Hoebe CJ, van Rooijen MS, et al. High performance and acceptability of self-collected rectal swabs for diagnosis of *Chlamydia trachomatis* and *Neisseria gonorrhoeae* in men who have sex with men and women. Sex Transm Dis 2009;36:493–7. PMID:19617869 https://doi.org/10.1097/OLQ.0b013e3181a44b8c
218. Alexander S, Ison C, Parry J, et al.; Brighton Home Sampling Kits Steering Group. Self-taken pharyngeal and rectal swabs are appropriate for the detection of *Chlamydia trachomatis* and *Neisseria gonorrhoeae* in asymptomatic men who have sex with men. Sex Transm Infect 2008;84:488–92. PMID:19028953 https://doi.org/10.1136/sti.2008.031443

192. Patel P, Borkowf CB, Brooks JT, Lasry A, Lansky A, Mermin J.估计每次性行为HIV传播风险：系统综述。AIDS 2014;28:1509-19. PMID:24809629 https://doi.org/10.1097/ QAD.0000000000000298
193. Koblin BA, Husnik MJ, Colfax G, et al.男男性行为人群中HIV感染的危险因素。AIDS 2006;20:731-9. PMID:16514304 https://doi.org/10.1097/01.aids.0000216374.61442.55
194. Ackers ML, Greenberg AE, Lin CY, et al.美国47个城市男男性行为人群中高且持续的HIV血清学发病率。PLoS One 2012;7:e34972. PMID:22529964 https://doi.org/10.1371/ journal.pone.0034972
195. Zetola NM, Bernstein KT, Wong E, Louie B, Klausner JD.使用不同研究设计探讨性传播疾病与HIV感染之间的关系。J Acquir Immune Defic Syndr 2009;50:546-51. PMID:19367993 https://doi.org/10.1097/QAI.0b013e318195bd2b
196. Solomon MM, Mayer KH, Glidden DV, et al.; iPrEx Study Team.在暴露前预防试验中，梅毒可预测男男性行为人群和跨性别女性中的HIV发病率。Clin Infect Dis 2014;59:1020-6. PMID:24928295 https://doi.org/10.1093/cid/ ciu450
197. Fleming DT, Wasserheit JN.从流行病学协同作用到公共卫生政策和实践：其他性传播疾病对HIV感染性传播的贡献。Sex Transm Infect 1999;75:3-17. PMID:10448335 https://doi.org/10.1136/sti.75.1.3
198. Freeman EE, Weiss HA, Glynn JR, Cross PL, Whitworth JA, Hayes RJ.单纯疱疹病毒2型感染增加男性和女性的HIV感染风险：纵向研究的系统评价和荟萃分析。AIDS 2006;20:73-83. PMID:16327322 https://doi.org/10.1097/01. aids.0000198081.09337.a7
199. Reynolds SJ, Risbud AR, Shepherd ME, et al.印度STI患者中梅毒高感染率促进HIV-1传播。Sex Transm Infect 2006;82:121-6. PMID:16581736 https://doi.org/10.1136/sti.2005.015040
200. Hoots BE, Wejnert C, Martin A, et al.; NHBS Study Group.行为监测研究中MSM未披露的HIV感染。AIDS 2019;33:913-8. PMID:30649053 https://doi.org/10.1097/QAD.0000000000002147
201. Dolling DI, Desai M, McOwan A, et al.; PROUD Study Group.PROUD研究基线数据分析：暴露前预防的开放标签随机试验。Trials 2016;17:163. PMID:27013513 https://doi.org/10.1186/s13063-016-1286-4
202. Oldenburg CE, Nunn AS, Montgomery M, et al.临床环境中男男性行为人群接受HIV暴露前预防后的行为变化。AIDS Behav 2018;22:1075-9. PMID:28150120 https://doi.org/10.1007/s10461-017-1701-1
203. Montaño MA, Dombrowski JC, Dasgupta S, et al.诊所环境中启动PrEP的MSM性行为变化和STI诊断。AIDS Behav 2019;23:548-55. PMID:30117076 https://doi.org/10.1007/s10461-018-2252-9
204. Traeger MW, Schroeder SE, Wright EJ, et al.暴露前预防用于预防人类免疫缺陷病毒感染对男男性行为人群性风险行为的影响：系统评价和荟萃分析。Clin Infect Dis 2018;67:676-86. PMID:29509889 https://doi.org/10.1093/cid/ciy182
205. Jenness SM, Weiss KM, Goodreau SM, et al.男男性行为人群接受人类免疫缺陷病毒暴露前预防后淋病和衣原体发病率：建模研究。Clin Infect Dis 2017;65:712-8. PMID:28505240 https://doi.org/10.1093/cid/cix439
206. Tang EC, Vittinghoff E, Philip SS, et al.开具HIV暴露前预防时季度筛查优化性传播感染检测。AIDS 2020;34:1181-6. PMID:32205724 https://doi.org/10.1097/QAD.0000000000002522
207. Barbee LA, Khosropour CM, Dombrowksi JC, Golden MR.新诊断人类免疫缺陷病毒与男男性行为人群直肠淋病和衣原体独立相关。Sex Transm Dis 2017;44:385-9. PMID:28608786 https://doi.org/10.1097/OLQ.0000000000000614
208. Bernstein KT, Marcus JL, Nieri G, Philip SS, Klausner JD.直肠淋病和衣原体再感染与HIV血清转换风险增加相关。J Acquir Immune Defic Syndr 2010;53:537-43. PMID:19935075 https://doi.org/10.1097/QAI.0b013e3181c3ef29
209. Barbee LA, Khosropour CM, Dombrowski JC, Manhart LE, Golden MR.男男性行为人群中有症状淋球菌性、衣原体性和非淋球菌非衣原体性尿道炎归因于口交的比例估计：病例对照研究。Sex Transm Infect 2016;92:155-60. PMID:26297719 https://doi.org/10.1136/sextrans-2015-052214
210. Lafferty WE, Hughes JP, Handsfield HH.男男性行为人群中的性传播疾病。口交获得淋病和非淋球菌性尿道炎及其对STD/HIV预防的意义。Sex Transm Dis 1997;24:272-8. PMID:9153736 https://doi.org/10.1097/00007435-199705000-00007
211. Bernstein KT, Stephens SC, Barry PM, et al.沙眼衣原体和淋病奈瑟菌在男男性行为人群中从口咽传播至尿道。Clin Infect Dis 2009;49:1793-7. PMID:19911970 https://doi.org/10.1086/648427
212. Patton ME, Kidd S, Llata E, et al.男男性行为人群生殖器外淋病和衣原体检测与感染--STD监测网络，美国，2010-2012。Clin Infect Dis 2014;58:1564-70. PMID:24647015 https://doi.org/10.1093/cid/ciu184
213. Kent CK, Chaw JK, Wong W, et al.男男性行为人群在两个临床环境中检测到的直肠、尿道和咽部衣原体和淋病患病率：加利福尼亚州旧金山，2003年。Clin Infect Dis 2005;41:67-74. PMID:15937765 https://doi.org/10.1086/430704
214. Koedijk FD, van Bergen JE, Dukers-Muijrers NH, van Leeuwen AP, Hoebe CJ, van der Sande MA; Dutch STI centres.2006-2010年荷兰性传播感染中心多个解剖部位检测淋病和衣原体的价值。Int J STD AIDS 2012;23:626-31. PMID:23033514 https://doi.org/10.1258/ijsa.2012.011378
215. Barbee LA, Dombrowski JC, Kerani R, Golden MR.核酸扩增检测对男男性行为人群性传播疾病诊所患者生殖器外淋病和衣原体感染检测的影响。Sex Transm Dis 2014;41:168-72. PMID:24521722 https://doi.org/10.1097/OLQ.0000000000000093
216. Danby CS, Cosentino LA, Rabe LK, et al.报告有接受性肛交史的男男性行为人群和女性生殖器外衣原体和淋病的模式。Sex Transm Dis 2016;43:105-9. PMID:26766527 https://doi.org/10.1097/OLQ.0000000000000384
217. van der Helm JJ, Hoebe CJ, van Rooijen MS, et al.自采直肠拭子用于诊断男男性行为人群和女性沙眼衣原体和淋病奈瑟菌的高性能和可接受性。Sex Transm Dis 2009;36:493-7. PMID:19617869 https://doi.org/10.1097/OLQ.0b013e3181a44b8c
218. Alexander S, Ison C, Parry J, et al.; Brighton Home Sampling Kits Steering Group.自取咽部和直肠拭子适用于检测无症状男男性行为人群中的沙眼衣原体和淋病奈瑟菌。Sex Transm Infect 2008;84:488-92. PMID:19028953 https://doi.org/10.1136/sti.2008.031443

219. Freeman AH, Bernstein KT, Kohn RP, Philip S, Rauch LM, Klausner JD. Evaluation of self-collected versus clinician-collected swabs for the detection of *Chlamydia trachomatis* and *Neisseria gonorrhoeae* pharyngeal infection among men who have sex with men. Sex Transm Dis 2011;38:1036–9. PMID:21992980 https://doi.org/10.1097/OLQ.0b013e318227713e
220. Chesson HW, Bernstein KT, Gift TL, Marcus JL, Pipkin S, Kent CK. The cost-effectiveness of screening men who have sex with men for rectal chlamydial and gonococcal infection to prevent HIV Infection. Sex Transm Dis 2013;40:366–71. PMID:23588125 https://doi.org/10.1097/OLQ.0b013e318284e544
221. Jenness SM, Weiss KM, Prasad P, Zlotorzynska M, Sanchez T. Bacterial sexually transmitted infection screening rates by symptomatic status among men who have sex with men in the United States: a hierarchical Bayesian analysis. Sex Transm Dis 2019;46:25–30. PMID:30044334 https://doi.org/10.1097/OLQ.0000000000000896
222. Hoover KW, Butler M, Workowski K, et al.; Evaluation Group for Adherence to STD and Hepatitis Screening. STD screening of HIV-infected MSM in HIV clinics. Sex Transm Dis 2010;37:771–6. PMID:20585275 https://doi.org/10.1097/OLQ.0b013e3181e50058
223. de Voux A, Bernstein KT, Bradley H, Kirkcaldy RD, Tie Y, Shouse RL; Medical Monitoring Project. Syphilis testing among sexually active men who have sex with men and who are receiving medical care for human immunodeficiency virus in the United States: Medical Monitoring Project, 2013–2014. Clin Infect Dis 2019;68:934–9. PMID:29985985 https://doi.org/10.1093/cid/ciy571
224. Gray RT, Hoare A, Prestage GP, Donovan B, Kaldor JM, Wilson DP. Frequent testing of highly sexually active gay men is required to control syphilis. Sex Transm Dis 2010;37:298–305. PMID:20393383 https://doi.org/10.1097/OLQ.0b013e3181ca3c0a
225. Tuite AR, Fisman DN, Mishra S. Screen more or screen more often? Using mathematical models to inform syphilis control strategies. BMC Public Health 2013;13:606. PMID:23800206 https://doi.org/10.1186/1471-2458-13-606
226. Tuite A, Fisman D. Go big or go home: impact of screening coverage on syphilis infection dynamics. Sex Transm Infect 2016;92:49–54. PMID:25954016 https://doi.org/10.1136/sextrans-2014-052001
227. Tuite AR, Shaw S, Reimer JN, Ross CP, Fisman DN, Mishra S. Can enhanced screening of men with a history of prior syphilis infection stem the epidemic in men who have sex with men? A mathematical modelling study. Sex Transm Infect 2018;94:105–10. PMID:28705938 https://doi.org/10.1136/sextrans-2017-053201
228. Raifman JR, Gebo KA, Mathews WC, et al.; HIV Research Network. Gonorrhea and chlamydia case detection increased when testing increased in a multisite US HIV cohort, 2004–2014. J Acquir Immune Defic Syndr 2017;76:409–16. PMID:28777262 https://doi.org/10.1097/QAI.0000000000001514
229. Barbee LA, Dhanireddy S, Tat SA, Marrazzo JM. Barriers to bacterial sexually transmitted infection testing of HIV-infected men who have sex with men engaged in HIV primary care. Sex Transm Dis 2015;42:590–4. PMID:26372931 https://doi.org/10.1097/OLQ.0000000000000320
230. McMillan A, Young H, Moyes A. Rectal gonorrhoea in homosexual men: source of infection. Int J STD AIDS 2000;11:284–7. PMID:10824935 https://doi.org/10.1177/095646240001100502
231. Chow EP, Cornelisse VJ, Read TR, Chen MY, Bradshaw CS, Fairley CK. Saliva use in sex: associations with use of smartphone dating applications in men who have sex with men. Int J STD AIDS 2018;29:362–6. PMID:28835197 https://doi.org/10.1177/0956462417727669
232. Cornelisse VJ, Priest D, Fairley CK, et al. The frequency of kissing as part of sexual activity differs depending on how men meet their male casual sexual partners. Int J STD AIDS 2018;29:598–602. PMID:29256822 https://doi.org/10.1177/0956462417748717
233. Krist AH, Davidson KW, Mangione CM, et al.; US Preventive Services Task Force. Screening for hepatitis B virus infection in adolescents and adults: US Preventive Services Task Force recommendation statement. JAMA 2020;324:2415–22. PMID:33320230 https://doi.org/10.1001/jama.2020.22980
234. Tohme RA, Holmberg SD. Is sexual contact a major mode of hepatitis C virus transmission? Hepatology 2010;52:1497–505. PMID:20635398 https://doi.org/10.1002/hep.23808
235. Wandeler G, Gsponer T, Bregenzer A, et al.; Swiss HIV Cohort Study. Hepatitis C virus infections in the Swiss HIV Cohort Study: a rapidly evolving epidemic. Clin Infect Dis 2012;55:1408–16. PMID:22893583 https://doi.org/10.1093/cid/cis694
236. Garg S, Taylor LE, Grasso C, Mayer KH. Prevalent and incident hepatitis C virus infection among HIV-infected men who have sex with men engaged in primary care in a Boston community health center. Clin Infect Dis 2013;56:1480–7. PMID:23386630 https://doi.org/10.1093/cid/cit054
237. Urbanus AT, van de Laar TJ, Stolte IG, et al. Hepatitis C virus infections among HIV-infected men who have sex with men: an expanding epidemic. AIDS 2009;23:F1–7. PMID:19542864 https://doi.org/10.1097/QAD.0b013e32832e5631
238. Linas BP, Wong AY, Schackman BR, Kim AY, Freedberg KA. Cost-effective screening for acute hepatitis C virus infection in HIV-infected men who have sex with men. Clin Infect Dis 2012;55:279–90. PMID:22491339 https://doi.org/10.1093/cid/cis382
239. Taylor LE, DeLong AK, Maynard MA, et al. Acute hepatitis C virus in an HIV clinic: a screening strategy, risk factors, and perception of risk. AIDS Patient Care STDS 2011;25:571–7. PMID:21859307 https://doi.org/10.1089/apc.2011.0106
240. Kaul R, Kimani J, Nagelkerke NJ, et al.; Kibera HIV Study Group. Monthly antibiotic chemoprophylaxis and incidence of sexually transmitted infections and HIV-1 infection in Kenyan sex workers: a randomized controlled trial. JAMA 2004;291:2555–62. PMID:15173146 https://doi.org/10.1001/jama.291.21.2555
241. Ong JJ, Baggaley RC, Wi TE, et al. Global epidemiologic characteristics of sexually transmitted infections among individuals using preexposure prophylaxis for the prevention of HIV infection: a systematic review and meta-analysis. JAMA Netw Open 2019;2:e1917134. PMID:31825501 https://doi.org/10.1001/jamanetworkopen.2019.17134
242. Paz-Bailey G, Hoots BE, Xia M, Finlayson T, Prejean J, Purcell DW; NHBS Study Group. Trends in Internet use among men who have sex with men in the United States. J Acquir Immune Defic Syndr 2017;75(Suppl 3):S288–95. PMID:28604430 https://doi.org/10.1097/QAI.0000000000001404
243. Badal HJ, Stryker JE, DeLuca N, Purcell DW. Swipe right: dating website and app use among men who have sex with men. AIDS Behav 2018;22:1265–72. PMID:28884248 https://doi.org/10.1007/s10461-017-1882-7
244. Chan PA, Crowley C, Rose JS, et al. A network analysis of sexually transmitted diseases and online hookup sites among men who have sex with men. Sex Transm Dis 2018;45:462–8. PMID:29465663 https://doi.org/10.1097/OLQ.0000000000000784
245. Beymer MR, Weiss RE, Bolan RK, et al. Sex on demand: geosocial networking phone apps and risk of sexually transmitted infections among a cross-sectional sample of men who have sex with men in Los Angeles County. Sex Transm Infect 2014;90:567–72. PMID:24926041 https://doi.org/10.1136/sextrans-2013-051494
246. Medina MM, Crowley C, Montgomery MC, et al. Disclosure of HIV serostatus and pre-exposure prophylaxis use on internet hookup sites among men who have sex with men. AIDS Behav 2019;23:1681–8. PMID:30267365 https://doi.org/10.1007/s10461-018-2286-z
247. Chan PA, Towey C, Poceta J, et al. Online hookup sites for meeting sexual partners among men who have sex with men in Rhode Island, 2013: a call for public health action. Public Health Rep 2016;131:264–71. PMID:26957661 https://doi.org/10.1177/003335491613100210

219. Freeman AH, Bernstein KT, Kohn RP, Philip S, Rauch LM, Klausner JD.Evaluation of self-collected versus clinician-collected swabs for the detection of 沙眼衣原体 and 淋病奈瑟菌 pharyngeal infection among 男男性行为人群.Sex Transm Dis 2011;38:1036-9. PMID:21992980 https://doi.org/10.1097/ OLQ.0b013e318227713e
220. Chesson HW, Bernstein KT, Gift TL, Marcus JL, Pipkin S, Kent CK.男男性行为人群直肠衣原体和淋球菌感染筛查以预防HIV感染的成本效益。Sex Transm Dis 2013;40:366-71. PMID:23588125 https://doi.org/10.1097/OLQ.0b013e318284e544
221. Jenness SM, Weiss KM, Prasad P, Zlotorzynska M, Sanchez T.美国男男性行为人群按症状状态划分的细菌性性传播感染筛查率：分层贝叶斯分析。Sex Transm Dis 2019;46:25-30. PMID:30044334 https://doi.org/10.1097/OLQ.0000000000000896
222. Hoover KW, Butler M, Workowski K ， 等；STD和肝炎筛查依从性评估组。HIV诊所中HIV感染MSM的STD筛查。Sex Transm Dis 2010;37:771-6. PMID:20585275 https://doi.org/10.1097/OLQ.0b013e3181e50058
223. de Voux A, Bernstein KT, Bradley H, Kirkcaldy RD, Tie Y, Shouse RL; Medical Monitoring Project.美国正在接受人类免疫缺陷病毒医疗照护的性活跃男男性行为人群的梅毒检测：Medical Monitoring Project,2013-2014。Clin Infect Dis 2019;68:934-9. PMID:29985985 https://doi.org/10.1093/cid/ciy571
224. Gray RT, Hoare A, Prestage GP, Donovan B, Kaldor JM, Wilson DP 控制梅毒需要对高度性活跃的男同性恋者进行频繁检测。Sex Transm Dis 2010;37:298-305. PMID:20393383 https:// doi.org/10.1097/ OLQ.0b013e3181ca3c0a
225. Tuite AR, Fisman DN, Mishra S.扩大筛查还是增加筛查频率?利用数学模型为梅毒控制策略提供依据。BMC Public Health 2013;13:606. PMID:23800206 https://doi.org/10.1186/1471-2458-13-606
226. Tuite A, Fisman D.要么做大要么回家：筛查覆盖率对梅毒感染动态的影响。Sex Transm Infect 2016;92:49-54. PMID:25954016 https://doi.org/10.1136/sextrans-2014-052001
227. Tuite AR, Shaw S, Reimer JN, Ross CP, Fisman DN, Mishra S.对有既往梅毒感染史的男性加强筛查能否遏制男男性行为人群中的流行?一项数学建模研究。Sex Transm Infect 2018;94:105-10. PMID:28705938 https://doi.org/10.1136/sextrans-2017-053201
228. Raifman JR, Gebo KA, Mathews WC, et al.; HIV Research Network.2004-2014年美国多中心HIV队列中检测增加时淋病和衣原体病例检出增加。J Acquir Immune Defic Syndr 2017;76:409-16. PMID:28777262 https://doi.org/10.1097/QAI.0000000000001514
229. Barbee LA, Dhanireddy S, Tat SA, Marrazzo JM.接受HIV初级照护的HIV感染男男性行为人群进行细菌性性传播感染检测的障碍。Sex Transm Dis 2015;42:590-4. PMID:26372931 https://doi.org/10.1097/OLQ.0000000000000320
230. McMillan A, Young H, Moyes A.男同性恋者直肠淋病：感染来源。Int J STD AIDS 2000;11:284-7. PMID:10824935 https://doi.org/10.1177/095646240001100502
231. Chow EP, Cornelisse VJ, Read TR, Chen MY, Bradshaw CS, Fairley CK.性行为中唾液的使用：与男男性行为人群使用智能手机约会应用的关联。Int J STD AIDS 2018;29:362-6. PMID:28835197 https://doi.org/10.1177/0956462417727669
232. Cornelisse VJ, Priest D, Fairley CK, et al.作为性活动一部分的接吻频率因男性如何结识其男性临时性伴而异。Int J STD AIDS 2018;29:598-602. PMID:29256822 https://doi.org/10.1177/0956462417748717
233. Krist AH, Davidson KW, Mangione CM, et al.; US Preventive Services Task Force.青少年和成人乙型肝炎病毒感染的筛查：US Preventive Services Task Force推荐声明。JAMA 2020;324:2415-22. PMID:33320230 https://doi.org/10.1001/ jama.2020.22980
234. Tohme RA, Holmberg SD.性接触是丙型肝炎病毒传播的主要方式吗?Hepatology 2010;52:1497-505. PMID:20635398 https://doi.org/10.1002/hep.23808
235. Wandeler G, Gsponer T, Bregenzer A, et al.; Swiss HIV Cohort Study.Swiss HIV Cohort Study中的丙型肝炎病毒感染：一场快速演变的流行病。Clin Infect Dis 2012;55:1408-16. PMID:22893583 https://doi.org/10.1093/cid/cis694
236. Garg S, Taylor LE, Grasso C, Mayer KH.波士顿社区健康中心接受初级照护的HIV感染男男性行为人群中丙型肝炎病毒的现患和incident感染。Clin Infect Dis 2013;56:1480-7. PMID:23386630 https://doi.org/10.1093/cid/cit054
237. Urbanus AT, van de Laar TJ, Stolte IG, et al.HIV感染男男性行为人群中的丙型肝炎病毒感染：一场不断扩大的流行病。AIDS 2009;23:F1-7. PMID:19542864 https://doi.org/10.1097/QAD.0b013e32832e5631
238. Linas BP, Wong AY, Schackman BR, Kim AY, Freedberg KA.HIV感染男男性行为人群中急性丙型肝炎病毒感染的成本效益筛查。Clin Infect Dis 2012;55:279-90. PMID:22491339 https://doi.org/10.1093/cid/cis382
239. Taylor LE, DeLong AK, Maynard MA, et al.HIV诊所中的急性丙型肝炎病毒：筛查策略、危险因素和风险认知。AIDS Patient Care STDS 2011;25:571-7. PMID:21859307 https://doi.org/10.1089/apc.2011.0106
240. Kaul R, Kimani J, Nagelkerke NJ, et al.; Kibera HIV Study Group.肯尼亚性工作者每月抗生素化学预防与性传播感染及HIV-1感染发病率：一项随机对照试验。JAMA 2004;291:2555-62. PMID:15173146 https://doi.org/10.1001/jama.291.21.2555
241. Ong JJ, Baggaley RC, Wi TE, et al.使用暴露前预防预防HIV感染的个体中性传播感染的全球流行病学特征：系统综述和meta分析。JAMA Netw Open 2019;2:e1917134. PMID:31825501 https://doi.org/10.1001/jamanetworkopen.2019.17134
242. Paz-Bailey G, Hoots BE, Xia M, Finlayson T, Prejean J, Purcell DW; NHBS Study Group.美国男男性行为人群互联网使用趋势。J Acquir Immune Defic Syndr 2017;75(Suppl 3): S288-95. PMID:28604430 https://doi.org/10.1097/ QAI.0000000000001404
243. Badal HJ, Stryker JE, DeLuca N, Purcell DW.向右滑：男男性行为人群约会网站和应用的使用。AIDS Behav 2018;22:1265-72. PMID:28884248 https://doi.org/10.1007/ s10461-017-1882-7
244. Chan PA, Crowley C, Rose JS, et al.男男性行为人群性传播疾病与在线约炮网站的网络分析。Sex Transm Dis 2018;45:462-8. PMID:29465663 https:// doi.org/10.1097/OLQ.0000000000000784
245. Beymer MR, Weiss RE, Bolan RK, et al.按需性行为：地理社交网络手机应用与洛杉矶县男男性行为人群横断面样本中性传播感染风险。Sex Transm Infect 2014;90:567-72. PMID:24926041 https://doi.org/10.1136/sextrans-2013-051494
246. Medina MM, Crowley C, Montgomery MC, et al.男男性行为人群在互联网约炮网站上披露HIV血清状态和暴露前预防使用情况。AIDS Behav 2019;23:1681-8. PMID:30267365 https://doi.org/10.1007/s10461-018-2286-z
247. Chan PA, Towey C, Poceta J, et al.2013年罗德岛男男性行为人群用于结识性伴的在线约炮网站：呼吁公共卫生行动。Public Health Rep 2016;131:264-71. PMID:26957661 https://doi.org/10.1177/003335491613100210

248. Lampkin D, Crawley A, Lopez TP, Mejia CM, Yuen W, Levy V. Reaching suburban men who have sex with men for STD and HIV services through online social networking outreach: a public health approach. J Acquir Immune Defic Syndr 2016;72:73–8. PMID:27097365 https://doi.org/10.1097/QAI.0000000000000930
249. Sun CJ, Stowers J, Miller C, Bachmann LH, Rhodes SD. Acceptability and feasibility of using established geosocial and sexual networking mobile applications to promote HIV and STD testing among men who have sex with men. AIDS Behav 2015;19:543–52. PMID:25381563 https://doi.org/10.1007/s10461-014-0942-5
250. Dritz SK, Back AF. Letter: *Shigella* enteritis venereally transmitted. N Engl J Med 1974;291:1194. PMID:4608062 https://doi.org/10.1056/NEJM197411282912223
251. Aragón TJ, Vugia DJ, Shallow S, et al. Case-control study of shigellosis in San Francisco: the role of sexual transmission and HIV infection. Clin Infect Dis 2007;44:327–34. PMID:17205436 https://doi.org/10.1086/510593
252. Simms I, Field N, Jenkins C, et al. Intensified shigellosis epidemic associated with sexual transmission in men who have sex with men—*Shigella flexneri* and *S. sonnei* in England, 2004 to end of February 2015. Euro Surveill 2015;20:21097. PMID:25953129 https://doi.org/10.2807/1560-7917.ES2015.20.15.21097
253. Gilbart VL, Simms I, Jenkins C, et al. Sex, drugs and smart phone applications: findings from semistructured interviews with men who have sex with men diagnosed with *Shigella flexneri* 3a in England and Wales. Sex Transm Infect 2015;91:598–602. PMID:25921020 https://doi.org/10.1136/sextrans-2015-052014
254. Narayan S, Galanis E; BC STEI Group. Are enteric infections sexually transmitted in British Columbia? Can Commun Dis Rep 2016;42:24–9. PMID:29770000 https://doi.org/10.14745/ccdr.v42i02a01
255. Mohan K, Hibbert M, Rooney G, et al. What is the overlap between HIV and shigellosis epidemics in England: further evidence of MSM transmission? Sex Transm Infect 2018;94:67–71. PMID:28490580 https://doi.org/10.1136/sextrans-2016-052962
256. Hughes G, Silalang P, Were J, et al. Prevalence and characteristics of gastrointestinal infections in men who have sex with men diagnosed with rectal chlamydia infection in the UK: an 'unlinked anonymous' cross-sectional study. Sex Transm Infect 2018;94:518–21. PMID:28360379 https://doi.org/10.1136/sextrans-2016-053057
257. O'Sullivan B, Delpech V, Pontivivo G, et al. Shigellosis linked to sex venues, Australia. Emerg Infect Dis 2002;8:862–4. PMID:12141976 https://doi.org/10.3201/eid0808.010534
258. Marcus U, Zucs P, Bremer V, et al. Shigellosis—a re-emerging sexually transmitted infection: outbreak in men having sex with men in Berlin. Int J STD AIDS 2004;15:533–7. PMID:15307964 https://doi.org/10.1258/0956462041558221
259. Danila RN, Eikmeier DL, Robinson TJ, La Pointe A, DeVries AS. Two concurrent enteric disease outbreaks among men who have sex with men, Minneapolis-St Paul area. Clin Infect Dis 2014;59:987–9. PMID:24944234 https://doi.org/10.1093/cid/ciu478
260. Okame M, Adachi E, Sato H, et al. *Shigella sonnei* outbreak among men who have sex with men in Tokyo. Jpn J Infect Dis 2012;65:277–8. PMID:22627317 https://doi.org/10.7883/yoken.65.277
261. Wilmer A, Romney MG, Gustafson R, et al. *Shigella flexneri* serotype 1 infections in men who have sex with men in Vancouver, Canada. HIV Med 2015;16:168–75. PMID:25656740 https://doi.org/10.1111/hiv.12191
262. CDC. *Shigella sonnei* outbreak among men who have sex with men—San Francisco, California, 2000–2001. MMWR Morb Mortal Wkly Rep 2001;50:922–6. PMID:11699845
263. Baer JT, Vugia DJ, Reingold AL, Aragon T, Angulo FJ, Bradford WZ. HIV infection as a risk factor for shigellosis. Emerg Infect Dis 1999;5:820–3. PMID:10603219 https://doi.org/10.3201/eid0506.990614
264. Simms I, Gilbart VL, Byrne L, et al. Identification of verocytotoxin-producing *Escherichia coli* O117:H7 in men who have sex with men, England, November 2013 to August 2014. Euro Surveill 2014;19:20946. PMID:25375900 https://doi.org/10.2807/1560-7917.ES2014.19.43.20946
265. Quinn TC, Goodell SE, Fennell C, et al. Infections with *Campylobacter jejuni* and *Campylobacter*-like organisms in homosexual men. Ann Intern Med 1984;101:187–92. PMID:6547580 https://doi.org/10.7326/0003-4819-101-2-187
266. Gaudreau C, Pilon PA, Sylvestre J-L, Boucher F, Bekal S. Multidrug-resistant *Campylobacter coli* in men who have sex with men, Quebec, Canada, 2015. Emerg Infect Dis 2016;22:1661–3. PMID:27533504 https://doi.org/10.3201/eid2209.151695
267. Chen GJ, Lin KY, Hung CC, Chang SC. Hepatitis A outbreak among men who have sex with men in a country of low endemicity of hepatitis A infection. J Infect Dis 2017;215:1339–40. PMID:28329351 https://doi.org/10.1093/infdis/jix123
268. Lo YC, Ji DD, Hung CC. Prevalent and incident HIV diagnoses among *Entamoeba histolytica*-infected adult males: a changing epidemiology associated with sexual transmission—Taiwan, 2006–2013. PLoS Negl Trop Dis 2014;8:e3222. PMID:25299178 https://doi.org/10.1371/journal.pntd.0003222
269. Stark D, van Hal SJ, Matthews G, Harkness J, Marriott D. Invasive amebiasis in men who have sex with men, Australia. Emerg Infect Dis 2008;14:1141–3. PMID:18598643 https://doi.org/10.3201/eid1407.080017
270. Mitchell H, Hughes G. Recent epidemiology of sexually transmissible enteric infections in men who have sex with men. Curr Opin Infect Dis 2018;31:50–6. PMID:29251673 https://doi.org/10.1097/QCO.0000000000000423
271. Weatherburn P, Hickson F, Reid D, Torres-Rueda S, Bourne A. Motivations and values associated with combining sex and illicit drugs ('chemsex') among gay men in South London: findings from a qualitative study. Sex Transm Infect 2017;93:203–6. PMID:27519259 https://doi.org/10.1136/sextrans-2016-052695
272. Baker KS, Dallman TJ, Ashton PM, et al. Intercontinental dissemination of azithromycin-resistant shigellosis through sexual transmission: a cross-sectional study. Lancet Infect Dis 2015;15:913–21. PMID:25936611 https://doi.org/10.1016/S1473-3099(15)00002-X
273. Bowen A, Grass J, Bicknese A, Campbell D, Hurd J, Kirkcaldy RD. Elevated risk for antimicrobial drug-resistant *Shigella* infection among men who have sex with men, United States, 2011–2015. Emerg Infect Dis 2016;22:1613–6. PMID:27533624 https://doi.org/10.3201/eid2209.160624
274. Gaudreau C, Rodrigues-Coutlée S, Pilon PA, Coutlée F, Bekal S. Long-lasting outbreak of erythromycin- and ciprofloxacin-resistant *Campylobacter jejuni* subspecies *jejuni* from 2003 to 2013 in men who have sex with men, Quebec, Canada. Clin Infect Dis 2015;61:1549–52. PMID:26187024 https://doi.org/10.1093/cid/civ570
275. Muzny CA, Sunesara IR, Martin DH, Mena LA. Sexually transmitted infections and risk behaviors among African American women who have sex with women: does sex with men make a difference? Sex Transm Dis 2011;38:1118–25. PMID:22082722 https://doi.org/10.1097/OLQ.0b013e31822e6179
276. Eisenberg M. Differences in sexual risk behaviors between college students with same-sex and opposite-sex experience: results from a national survey. Arch Sex Behav 2001;30:575–89. PMID:11725456 https://doi.org/10.1023/A:1011958816438
277. Koh AS, Gómez CA, Shade S, Rowley E. Sexual risk factors among self-identified lesbians, bisexual women, and heterosexual women accessing primary care settings. Sex Transm Dis 2005;32:563–9. PMID:16118605 https://doi.org/10.1097/01.olq.0000175417.17078.21

248. Lampkin D, Crawley A, Lopez TP, Mejia CM, Yuen W, Levy V.通过在线社交网络外展覆盖郊区男男性行为人群以提供STD和HIV服务：一种公共卫生方法。J Acquir Immune Defic Syndr 2016;72:73-8. PMID:27097365 https://doi.org/10.1097/QAI.0000000000000930
249. Sun CJ, Stowers J, Miller C, Bachmann LH, Rhodes SD.利用现有地理社交和性网络移动应用程序促进男男性行为人群HIV和STD检测的可接受性和可行性。AIDS Behav 2015;19:543-52. PMID:25381563 https://doi.org/10.1007/s10461-014-0942-5
250. Dritz SK, Back AF.来信：志贺菌肠炎经性传播。N Engl J Med 1974;291:1194. PMID:4608062 https://doi.org/10.1056/NEJM197411282912223
251. Aragón TJ, Vugia DJ, Shallow S, et al.旧金山志贺菌病的病例对照研究：性传播和HIV感染的作用。Clin Infect Dis 2007;44:327-34. PMID:17205436 https://doi.org/10.1086/510593
252. Simms I, Field N, Jenkins C, et al.与男男性行为人群性传播相关的志贺菌病疫情加剧--福氏志贺菌和宋内志贺菌在英格兰，2004年至2015年2月底。Euro Surveill 2015;20:21097. PMID:25953129 https://doi.org/10.2807/1560-7917.ES2015.20.15.21097
253. Gilbart VL, Simms I, Jenkins C, et al.性、药物和智能手机应用程序：对英格兰和威尔士确诊感染福氏志贺菌3a的男男性行为人群进行半结构化访谈的发现。Sex Transm Infect 2015;91:598-602. PMID:25921020 https://doi.org/10.1136/sextrans-2015-052014
254. Narayan S, Galanis E; BC STEI Group.不列颠哥伦比亚省的肠道感染是否经性传播?Can Commun Dis Rep 2016;42:24-9. PMID:29770000 https://doi.org/10.14745/ccdr.v42i02a01
255. Mohan K, Hibbert M, Rooney G, et al.英格兰HIV与志贺菌病疫情的重叠情况如何：MSM传播的进一步证据?Sex Transm Infect 2018;94:67-71. PMID:28490580 https://doi.org/10.1136/sextrans-2016-052962
256. Hughes G, Silalang P, Were J, et al.英国确诊直肠衣原体感染的男男性行为人群中胃肠道感染的患病率和特征：一项"非关联匿名"横断面研究。Sex Transm Infect 2018;94:518-21. PMID:28360379 https://doi.org/10.1136/sextrans-2016-053057
257. O'Sullivan B, Delpech V, Pontivivo G, et al.澳大利亚与性场所相关的志贺菌病。Emerg Infect Dis 2002;8:862-4. PMID:12141976 https://doi.org/10.3201/eid0808.010534
258. Marcus U, Zucs P, Bremer V, et al.志贺菌病--一种重新出现的性传播感染：柏林男男性行为人群中的疫情。Int J STD AIDS 2004;15:533-7. PMID:15307964 https://doi.org/10.1258/0956462041558221
259. Danila RN, Eikmeier DL, Robinson TJ, La Pointe A, DeVries AS.明尼阿波利斯-圣保罗地区男男性行为人群中同时发生的两起肠道疾病疫情。Clin Infect Dis 2014;59:987-9. PMID:24944234 https://doi.org/10.1093/cid/ciu478
260. ame M, Adachi E, Sato H, et al.东京男男性行为人群中的宋内志贺菌疫情。Jpn J Infect Dis 2012;65:277-8. PMID:22627317 https://doi.org/10.7883/yoken.65.277
261. Wilmer A, Romney MG, Gustafson R, et al.加拿大温哥华男男性行为人群中的福氏志贺菌1型血清感染。HIV Med 2015;16:168-75. PMID:25656740 https://doi.org/10.1111/ hiv.12191
262. CDC.男男性行为人群中的宋内志贺菌疫情--加利福尼亚州旧金山，2000-2001年。MMWR Morb Mortal Wkly Rep 2001;50:922-6. PMID:11699845
263. Baer JT, Vugia DJ, Reingold AL, Aragon T, Angulo FJ, Bradford WZ.HIV感染作为志贺菌病的危险因素。Emerg Infect Dis 1999;5:820-3. PMID:10603219 https://doi.org/10.3201/ eid0506.990614
264. Simms I, Gilbart VL, Byrne L, et al.在英格兰男男性行为人群中鉴定产维罗细胞毒素的大肠埃希菌O117:H7,2013年11月至2014年8月。Euro Surveill 2014;19:20946. PMID:25375900 https://doi.org/10.2807/1560-7917. ES2014.19.43.20946
265. Quinn TC, Goodell SE, Fennell C, et al.同性恋男性中空肠弯曲菌和类弯曲菌微生物的感染。Ann Intern Med 1984;101:187-92. PMID:6547580 https://doi.org/10.7326/0003-4819-101-2-187
266. Gaudreau C, Pilon PA, Sylvestre J-L, Boucher F, Bekal S.加拿大魁北克男男性行为人群中的多重耐药大肠弯曲菌,2015年。Emerg Infect Dis 2016;22:1661-3. PMID:27533504 https://doi.org/10.3201/eid2209.151695
267. Chen GJ, Lin KY, Hung CC, Chang SC.甲型肝炎低流行国家男男性行为人群中的甲型肝炎疫情。J Infect Dis 2017;215:1339-40. PMID:28329351 https:// doi.org/10.1093/infdis/jix123
268. Lo YC, Ji DD, Hung CC.感染溶组织内阿米巴的成年男性中HIV诊断的患病率和发病率：与性传播相关的流行病学变化--台湾，2006-2013年。PLoS Negl Trop Dis 2014;8:e3222. PMID:25299178 https://doi.org/10.1371/ journal.pntd.0003222
269. Stark D, van Hal SJ, Matthews G, Harkness J, Marriott D.澳大利亚男男性行为人群中的侵袭性阿米巴病。Emerg Infect Dis 2008;14:1141-3. PMID:18598643 https://doi.org/10.3201/ eid1407.080017
270. Mitchell H, Hughes G.男男性行为人群中性传播肠道感染的近期流行病学。Curr Opin Infect Dis 2018;31:50-6. PMID:29251673 https://doi.org/10.1097/ QCO.0000000000000423
271. Weatherburn P, Hickson F, Reid D, Torres-Rueda S, Bourne A.伦敦南部男同性恋者中与性行为和非法药物结合使用("chemsex")相关的动机和价值观：一项定性研究的发现。Sex Transm Infect 2017;93:203-6. PMID:27519259 https://doi.org/10.1136/sextrans-2016-052695
272. Baker KS, Dallman TJ, Ashton PM, et al.耐阿奇霉素志贺菌病通过性传播的洲际传播：一项横断面研究。Lancet Infect Dis 2015;15:913-21. PMID:25936611 https://doi.org/10.1016/S1473-3099(15) 00002-X
273. Bowen A, Grass J, Bicknese A, Campbell D, Hurd J, Kirkcaldy RD. 美国男男性行为人群中抗微生物药物耐药志贺菌感染风险升高，2011-2015年。Emerg Infect Dis 2016;22:1613-6. PMID:27533624 https://doi.org/10.3201/ eid2209.160624
274. Gaudreau C, Rodrigues-Coutlée S, Pilon PA, Coutlée F, Bekal S.加拿大魁北克男男性行为人群中2003年至2013年耐红霉素和环丙沙星的空肠弯曲菌空肠亚种长期持续疫情。Clin Infect Dis 2015;61:1549-52. PMID:26187024 https://doi.org/10.1093/cid/civ570
275. Muzny CA, Sunesara IR, Martin DH, Mena LA.与女性发生性行为的非裔美国女性中的性传播感染和危险行为：与男性发生性行为是否有影响?Sex Transm Dis 2011;38:1118-25. PMID:22082722 https://doi.org/10.1097/ OLQ.0b013e31822e6179
276. Eisenberg M.有同性性经历和异性性经历的大学生之间性危险行为的差异：一项全国调查的结果。Arch Sex Behav 2001;30:575-89. PMID:11725456 https://doi.org/10.1023/A:1011958816438
277. Koh AS, Gómez CA, Shade S, Rowley E.就诊于初级保健机构的自我认同女同性恋者、双性恋女性和异性恋女性中的性危险因素。Sex Transm Dis 2005;32:563-9. PMID:16118605 https://doi.org/10.1097/01.olq.0000175417.17078.21

278. Goodenow C, Szalacha LA, Robin LE, Westheimer K. Dimensions of sexual orientation and HIV-related risk among adolescent females: evidence from a statewide survey. Am J Public Health 2008;98:1051–8. PMID:18445809 https://doi.org/10.2105/AJPH.2005.080531
279. Muzny CA, Austin EL, Harbison HS, Hook EW 3rd. Sexual partnership characteristics of African American women who have sex with women; impact on sexually transmitted infection risk. Sex Transm Dis 2014;41:611–7. PMID:25211257 https://doi.org/10.1097/OLQ.0000000000000194
280. Riskind RG, Tornello SL, Younger BC, Patterson CJ. Sexual identity, partner gender, and sexual health among adolescent girls in the United States. Am J Public Health 2014;104:1957–63. PMID:25121821 https://doi.org/10.2105/AJPH.2014.302037
281. Schick V, Rosenberger JG, Herbenick D, Reece M. Sexual behaviour and risk reduction strategies among a multinational sample of women who have sex with women. Sex Transm Infect 2012;88:407–12. PMID:22563015 https://doi.org/10.1136/sextrans-2011-050404
282. Richters J, Prestage G, Schneider K, Clayton S. Do women use dental dams? Safer sex practices of lesbians and other women who have sex with women. Sex Health 2010;7:165–9. PMID:20465981 https://doi.org/10.1071/SH09072
283. Rowen TS, Breyer BN, Lin TC, Li CS, Robertson PA, Shindel AW. Use of barrier protection for sexual activity among women who have sex with women. Int J Gynaecol Obstet 2013;120:42–5. PMID:23106842 https://doi.org/10.1016/j.ijgo.2012.08.011
284. Lindley LL, Friedman DB, Struble C. Becoming visible: assessing the availability of online sexual health information for lesbians. Health Promot Pract 2012;13:472–80. PMID:21677116 https://doi.org/10.1177/1524839910390314
285. Chetcuti N, Beltzer N, Methy N, Laborde C, Velter A, Bajos N; CSF Group. Preventive care's forgotten women: life course, sexuality, and sexual health among homosexually and bisexually active women in France. J Sex Res 2013;50:587–97. PMID:22497621 https://doi.org/10.1080/00224499.2012.657264
286. Logie CH, Navia D, Loutfy MR. Correlates of a lifetime history of sexually transmitted infections among women who have sex with women in Toronto, Canada: results from a cross-sectional internet-based survey. Sex Transm Infect 2015;91:278–83. PMID:25477474 https://doi.org/10.1136/sextrans-2014-051745
287. Muzny CA, Kapil R, Austin EL, Hook EW, Geisler WM. Lower sexually transmissible infection prevalence among lifetime exclusive women who have sex with women compared with women who have sex with women and men. Sex Health 2014;11:592–3. PMID:25435197 https://doi.org/10.1071/SH14181
288. Muzny CA, Harbison HS, Pembleton ES, Austin EL. Sexual behaviors, perception of sexually transmitted infection risk, and practice of safe sex among southern African American women who have sex with women. Sex Transm Dis 2013;40:395–400. PMID:23588129 https://doi.org/10.1097/OLQ.0b013e31828caf34
289. Przedworski JM, McAlpine DD, Karaca-Mandic P, VanKim NA. Health and health risks among sexual minority women: an examination of 3 subgroups. Am J Public Health 2014;104:1045–7. PMID:24825204 https://doi.org/10.2105/AJPH.2013.301733
290. Brenick A, Romano K, Kegler C, Eaton LA. Understanding the influence of stigma and medical mistrust on engagement in routine healthcare among Black women who have sex with women. LGBT Health 2017;4:4–10. PMID:28113005 https://doi.org/10.1089/lgbt.2016.0083
291. Fethers K, Marks C, Mindel A, Estcourt CS. Sexually transmitted infections and risk behaviours in women who have sex with women. Sex Transm Infect 2000;76:345–9. PMID:11141849 https://doi.org/10.1136/sti.76.5.345
292. Marrazzo JM, Koutsky LA, Eschenbach DA, Agnew K, Stine K, Hillier SL. Characterization of vaginal flora and bacterial vaginosis in women who have sex with women. J Infect Dis 2002;185:1307–13. PMID:12001048 https://doi.org/10.1086/339884
293. Kellock D, O'Mahony CP. Sexually acquired metronidazole-resistant trichomoniasis in a lesbian couple. Genitourin Med 1996;72:60–1. PMID:8655171 https://doi.org/10.1136/sti.72.1.60
294. Muzny CA, Rivers CA, Mena LA, Schwebke JR. Genotypic characterization of *Trichomonas vaginalis* isolates among women who have sex with women in sexual partnerships. Sex Transm Dis 2012;39:556–8. PMID:22706219 https://doi.org/10.1097/OLQ.0b013e31824f1c49
295. Chan SK, Thornton LR, Chronister KJ, et al.; CDC. Likely female-to-female sexual transmission of HIV—Texas, 2012. MMWR Morb Mortal Wkly Rep 2014;63:209–12. PMID:24622284
296. Kwakwa HA, Ghobrial MW. Female-to-female transmission of human immunodeficiency virus. Clin Infect Dis 2003;36:e40–1. PMID:12539088 https://doi.org/10.1086/345462
297. Marrazzo JM, Handsfield HH, Whittington WL. Predicting chlamydial and gonococcal cervical infection: implications for management of cervicitis. Obstet Gynecol 2002;100:579–84. PMID:12220782 https://doi.org/10.1097/00006250-200209000-00029
298. Diamant AL, Schuster MA, McGuigan K, Lever J. Lesbians' sexual history with men: implications for taking a sexual history. Arch Intern Med 1999;159:2730–6. PMID:10597764 https://doi.org/10.1001/archinte.159.22.2730
299. Xu F, Sternberg MR, Markowitz LE. Women who have sex with women in the United States: prevalence, sexual behavior and prevalence of herpes simplex virus type 2 infection—results from national health and nutrition examination survey 2001–2006. Sex Transm Dis 2010;37:407–13. PMID:20531032 https://doi.org/10.1097/OLQ.0b013e3181db2e18
300. Everett BG, Higgins JA, Haider S, Carpenter E. Do sexual minorities receive appropriate sexual and reproductive health care and counseling? J Womens Health (Larchmt) 2019;28:53–62. PMID:30372369 https://doi.org/10.1089/jwh.2017.6866
301. Marrazzo JM, Koutsky LA, Stine KL, et al. Genital human papillomavirus infection in women who have sex with women. J Infect Dis 1998;178:1604–9. PMID:9815211 https://doi.org/10.1086/314494
302. Marrazzo JM, Koutsky LA, Kiviat NB, Kuypers JM, Stine K. Papanicolaou test screening and prevalence of genital human papillomavirus among women who have sex with women. Am J Public Health 2001;91:947–52. PMID:11392939 https://doi.org/10.2105/AJPH.91.6.947
303. Bailey JV, Kavanagh J, Owen C, McLean KA, Skinner CJ. Lesbians and cervical screening. Br J Gen Pract 2000;50:481–2. PMID:10962789
304. Anderson TA, Schick V, Herbenick D, Dodge B, Fortenberry JD. A study of human papillomavirus on vaginally inserted sex toys, before and after cleaning, among women who have sex with women and men. Sex Transm Infect 2014;90:529–31. PMID:24739872 https://doi.org/10.1136/sextrans-2014-051558
305. Marrazzo JM, Stine K, Wald A. Prevalence and risk factors for infection with herpes simplex virus type-1 and -2 among lesbians. Sex Transm Dis 2003;30:890–5. PMID:14646636 https://doi.org/10.1097/01.OLQ.0000091151.52656.E5
306. Muzny CA, Schwebke JR. The clinical spectrum of *Trichomonas vaginalis* infection and challenges to management. Sex Transm Infect 2013;89:423–5. PMID:23543252 https://doi.org/10.1136/sextrans-2012-050893
307. Muzny CA, Blackburn RJ, Sinsky RJ, Austin EL, Schwebke JR. Added benefit of nucleic acid amplification testing for the diagnosis of *Trichomonas vaginalis* among men and women attending a sexually transmitted diseases clinic. Clin Infect Dis 2014;59:834–41. PMID:24928292 https://doi.org/10.1093/cid/ciu446

278. Goodenow C, Szalacha LA, Robin LE, Westheimer K.青少年女性性取向维度与HIV相关风险：来自全州调查的证据。Am J Public Health 2008;98:1051-8. PMID:18445809 https://doi.org/10.2105/AJPH.2005.080531
279. Muzny CA, Austin EL, Harbison HS, Hook EW 3rd.与女性发生性行为的非裔美国女性的性伴特征；对性传播感染风险的影响。Sex Transm Dis 2014;41:611-7. PMID:25211257 https://doi.org/10.1097/OLQ.0000000000000194
280. Riskind RG, Tornello SL, Younger BC, Patterson CJ.美国青春期女孩的性身份、伴侣性别与性健康。Am J Public Health 2014;104:1957-63. PMID:25121821 https://doi.org/10.2105/AJPH.2014.302037
281. Schick V, Rosenberger JG, Herbenick D, Reece M.跨国与女性发生性行为的女性样本中的性行为及风险降低策略。Sex Transm Infect 2012;88:407-12. PMID:22563015 https://doi.org/10.1136/sextrans-2011-050404
282. Richters J, Prestage G, Schneider K, Clayton S.女性会使用口交膜吗?女同性恋者及其他与女性发生性行为的女性的安全性行为实践。Sex Health 2010;7:165-9. PMID:20465981 https://doi.org/10.1071/SH09072
283. Rowen TS, Breyer BN, Lin TC, Li CS, Robertson PA, Shindel AW.与女性发生性行为的女性在性活动中使用屏障保护的情况。Int J Gynaecol Obstet 2013;120:42-5. PMID:23106842 https://doi.org/10.1016/j.ijgo.2012.08.011
284. Lindley LL, Friedman DB, Struble C.变得可见：评估女同性恋者在线性健康信息的可及性。Health Promot Pract 2012;13:472-80. PMID:21677116 https://doi.org/10.1177/1524839910390314
285. Chetcuti N, Beltzer N, Methy N, Laborde C, Velter A, Bajos N; CSF Group.预防保健中被遗忘的女性：法国同性恋及双性恋活跃女性的生命历程、性行为与性健康。J Sex Res 2013;50:587-97. PMID:22497621 https://doi.org /10.1080/00224499.2012.657264
286. Logie CH, Navia D, Loutfy MR.加拿大大多伦多地区与女性发生性行为的女性终生性传播感染史的相关因素：基于互联网的横断面调查结果。Sex Transm Infect 2015;91:278-83. PMID:25477474 https://doi.org/10.1136/sextrans-2014-051745
287. Muzny CA, Kapil R, Austin EL, Hook EW, Geisler WM.终生仅与女性发生性行为的女性相比与女性和男性均发生性行为的女性，性传播感染患病率更低。Sex Health 2014;11:592-3. PMID:25435197 https://doi.org/10.1071/SH14181
288. Muzny CA, Harbison HS, Pembleton ES, Austin EL.美国南部与女性发生性行为的非裔美国女性的性行为、对性传播感染风险的认知及安全性行为实践。Sex Transm Dis 2013;40:395-400. PMID:23588129 https://doi.org/10.1097/OLQ.0b013e31828caf34
289. Przedworski JM, McAlpine DD, Karaca-Mandic P, VanKim NA.性少数女性的健康与健康风险：对3个亚组的考察。Am J Public Health 2014;104:1045-7. PMID:24825204 https://doi.org/10.2105/AJPH.2013.301733
290. Brenick A, Romano K, Kegler C, Eaton LA.理解污名与医疗不信任对与女性发生性行为的黑人女性参与常规医疗保健的影响。LGBT Health 2017;4:4-10. PMID:28113005 https://doi.org/10.1089/ lgbt.2016.0083
291. Fethers K, Marks C, Mindel A, Estcourt CS.与女性发生性行为的女性中的性传播感染及风险行为。Sex Transm Infect 2000;76:345-9. PMID:11141849 https://doi.org/10.1136/sti.76.5.345
292. Marrazzo JM, Koutsky LA, Eschenbach DA, Agnew K, Stine K, Hillier SL.与女性发生性行为的女性阴道菌群及细菌性阴道病的特征。J Infect Dis 2002;185:1307-13. PMID:12001048 https://doi.org/10.1086/339884
293. Kellock D, O'Mahony CP.一对女同性恋伴侣中经性获得的甲硝唑耐药滴虫感染。Genitourin Med 1996;72:60-1. PMID:8655171 https://doi.org/10.1136/sti.72.1.60
294. Muzny CA, Rivers CA, Mena LA, Schwebke JR.性伴关系中与女性发生性行为的女性分离的阴道毛滴虫分离株的基因型特征。Sex Transm Dis 2012;39:556-8. PMID:22706219 https://doi.org/10.1097/OLQ.0b013e31824f1c49
295. Chan SK, Thornton LR, Chronister KJ, et al.; CDC.可能的女性至女性性传播HIV-德克萨斯州，2012年。MMWR Morb Mortal Wkly Rep 2014;63:209-12. PMID:24622284
296. Kwakwa HA, Ghobrial MW.女性至女性传播人类免疫缺陷病毒。Clin Infect Dis 2003;36:e40-1. PMID:12539088 https://doi.org/10.1086/345462
297. Marrazzo JM, Handsfield HH, Whittington WL.预测衣原体及淋球菌宫颈感染：对宫颈炎管理的意义。Obstet Gynecol 2002;100:579-84. PMID:12220782 https:// doi.org/10.1097/00006250-200209000-00029
298. Diamant AL, Schuster MA, McGuigan K, Lever J.女同性恋者与男性的性史：对采集性史的启示。Arch Intern Med 1999;159:2730-6. PMID:10597764 https://doi.org/10.1001/ archinte.159.22.2730
299. Xu F, Sternberg MR, Markowitz LE.美国与女性发生性行为的女性：患病率、性行为及2型单纯疱疹病毒感染患病率-2001-2006年全国健康与营养调查结果。Sex Transm Dis 2010;37:407-13. PMID:20531032 https://doi.org/10.1097/ OLQ.0b013e3181db2e18
300. Everett BG, Higgins JA, Haider S, Carpenter E.性少数群体是否获得适当的性与生殖健康保健及咨询?J Womens Health(Larchmt) 2019;28:53-62. PMID:30372369 https:// doi.org/10.1089/jwh.2017.6866
301. Marrazzo JM, Koutsky LA, Stine KL, et al.与女性发生性行为的女性生殖道人乳头瘤病毒感染。J Infect Dis 1998;178:1604-9. PMID:9815211 https://doi.org/10.1086/314494
302. Marrazzo JM, Koutsky LA, Kiviat NB, Kuypers JM, Stine K.与女性发生性行为的女性巴氏涂片筛查及生殖道人乳头瘤病毒患病率。Am J Public Health 2001;91:947-52. PMID:11392939 https:// doi.org/10.2105/ AJPH.91.6.947
303. Bailey JV, Kavanagh J, Owen C, McLean KA, Skinner CJ.女同性恋者与宫颈筛查。Br J Gen Pract 2000;50:481-2. PMID:10962789
304. Anderson TA, Schick V, Herbenick D, Dodge B, Fortenberry JD.与女性和男性发生性行为的女性中阴道插入性玩具清洁前后人乳头瘤病毒的研究。Sex Transm Infect 2014;90:529-31. PMID:24739872 https://doi.org/10.1136/sextrans-2014-051558
305. Marrazzo JM, Stine K, Wald A.女同性恋者中1型和2型单纯疱疹病毒感染的患病率及危险因素。Sex Transm Dis 2003;30:890-5. PMID:14646636 https://doi.org/10.1097/01. OLQ.0000091151.52656.E5
306. Muzny CA, Schwebke JR.阴道毛滴虫感染的临床谱及管理挑战。Sex Transm Infect 2013;89:423-5. PMID:23543252 https:// doi.org/10.1136/ sextrans-2012-050893
307. Muzny CA, Blackburn RJ, Sinsky RJ, Austin EL, Schwebke JR.核酸扩增检测对性病门诊就诊男性和女性阴道毛滴虫诊断的附加益处。Clin Infect Dis 2014;59:834-41. PMID:24928292 https:// doi.org/10.1093/cid/ciu446

308. Singh D, Fine DN, Marrazzo JM. *Chlamydia trachomatis* infection among women reporting sexual activity with women screened in family planning clinics in the Pacific Northwest, 1997 to 2005. Am J Public Health 2011;101:1284–90. PMID:20724697 https://doi.org/10.2105/AJPH.2009.169631
309. Muzny CA, Kapil R, Austin EL, Brown L, Hook EW 3rd, Geisler WM. *Chlamydia trachomatis* infection in African American women who exclusively have sex with women. Int J STD AIDS 2016;27:978–83. PMID:26384942 https://doi.org/10.1177/0956462415604092
310. Koumans EH, Sternberg M, Bruce C, et al. The prevalence of bacterial vaginosis in the United States, 2001–2004; associations with symptoms, sexual behaviors, and reproductive health. Sex Transm Dis 2007;34:864–9. PMID:17621244 https://doi.org/10.1097/OLQ.0b013e318074e565
311. Evans AL, Scally AJ, Wellard SJ, Wilson JD. Prevalence of bacterial vaginosis in lesbians and heterosexual women in a community setting. Sex Transm Infect 2007;83:470–5. PMID:17611235 https://doi.org/10.1136/sti.2006.022277
312. Olson KM, Boohaker LJ, Schwebke JR, Aslibekyan S, Muzny CA. Comparisons of vaginal flora patterns among sexual behaviour groups of women: implications for the pathogenesis of bacterial vaginosis. Sex Health 2018;15:61–7. PMID:29212588 https://doi.org/10.1071/SH17087
313. Muzny CA, Lensing SY, Aaron KJ, Schwebke JR. Incubation period and risk factors support sexual transmission of bacterial vaginosis in women who have sex with women. Sex Transm Infect 2019;95:511–5. PMID:30872415 https://doi.org/10.1136/sextrans-2018-053824
314. Bradshaw CS, Walker SM, Vodstrcil LA, et al. The influence of behaviors and relationships on the vaginal microbiota of women and their female partners: the WOW Health Study. J Infect Dis 2014;209:1562–72. PMID:24285846 https://doi.org/10.1093/infdis/jit664
315. Marrazzo JM, Antonio M, Agnew K, Hillier SL. Distribution of genital *Lactobacillus* strains shared by female sex partners. J Infect Dis 2009;199:680–3. PMID:19199538 https://doi.org/10.1086/596632
316. Marrazzo JM, Fiedler TL, Srinivasan S, et al. Extravaginal reservoirs of vaginal bacteria as risk factors for incident bacterial vaginosis. J Infect Dis 2012;205:1580–8. PMID:22448002 https://doi.org/10.1093/infdis/jis242
317. Mitchell C, Manhart LE, Thomas K, Fiedler T, Fredricks DN, Marrazzo J. Behavioral predictors of colonization with *Lactobacillus crispatus* or *Lactobacillus jensenii* after treatment for bacterial vaginosis: a cohort study. Infect Dis Obstet Gynecol 2012;2012:706540. Epub May 30, 2012. PMID:22693410 https://doi.org/10.1155/2012/706540
318. Mitchell C, Manhart LE, Thomas KK, Agnew K, Marrazzo JM. Effect of sexual activity on vaginal colonization with hydrogen peroxide-producing *Lactobacilli* and *Gardnerella vaginalis*. Sex Transm Dis 2011;38:1137–44. PMID:22082725 https://doi.org/10.1097/OLQ.0b013e31822e6121
319. Fethers K, Twin J, Fairley CK, et al. Bacterial vaginosis (BV) candidate bacteria: associations with BV and behavioural practices in sexually-experienced and inexperienced women. PLoS One 2012;7:e30633. PMID:22363457 https://doi.org/10.1371/journal.pone.0030633
320. Bradshaw CS, Vodstrcil LA, Hocking JS, et al. Recurrence of bacterial vaginosis is significantly associated with posttreatment sexual activities and hormonal contraceptive use. Clin Infect Dis 2013;56:777–86. PMID:23243173 https://doi.org/10.1093/cid/cis1030
321. Marrazzo JM, Thomas KK, Fiedler TL, Ringwood K, Fredricks DN. Risks for acquisition of bacterial vaginosis among women who report sex with women: a cohort study. PLoS One 2010;5:e11139. PMID:20559445 https://doi.org/10.1371/journal.pone.0011139
322. Vodstrcil LA, Walker SM, Hocking JS, et al. Incident bacterial vaginosis (BV) in women who have sex with women is associated with behaviors that suggest sexual transmission of BV. Clin Infect Dis 2015;60:1042–53. PMID:25516188 https://doi.org/10.1093/cid/ciu1130
323. Muzny CA, Blanchard E, Taylor CM, et al. Identification of key bacteria involved in the induction of incident bacterial vaginosis: a prospective study. J Infect Dis 2018;218:966–78. PMID:29718358 https://doi.org/10.1093/infdis/jiy243
324. Marrazzo JM, Thomas KK, Ringwood K. A behavioural intervention to reduce persistence of bacterial vaginosis among women who report sex with women: results of a randomised trial. Sex Transm Infect 2011;87:399–405. PMID:21653935 https://doi.org/10.1136/sti.2011.049213
325. Bradshaw CS, Walker J, Fairley CK, et al. Prevalent and incident bacterial vaginosis are associated with sexual and contraceptive behaviours in young Australian women. PLoS One 2013;8:e57688. PMID:23472099 https://doi.org/10.1371/journal.pone.0057688
326. Poteat T, Reisner SL, Radix A. HIV epidemics among transgender women. Curr Opin HIV AIDS 2014;9:168–73. PMID:24322537 https://doi.org/10.1097/COH.0000000000000030
327. White Hughto JM, Reisner SL, Pachankis JE. Transgender stigma and health: a critical review of stigma determinants, mechanisms, and interventions. Soc Sci Med 2015;147:222–31. PMID:26599625 https://doi.org/10.1016/j.socscimed.2015.11.010
328. Radix AE, Lelutiu-Weinberger C, Gamarel KE. Satisfaction and healthcare utilization of transgender and gender non-conforming individuals in NYC: a community-based participatory study. LGBT Health 2014;1:302–8. PMID:26789858 https://doi.org/10.1089/lgbt.2013.0042
329. Rapues J, Wilson EC, Packer T, Colfax GN, Raymond HF. Correlates of HIV infection among transfemales, San Francisco, 2010: results from a respondent-driven sampling study. Am J Public Health 2013;103:1485–92. PMID:23763398 https://doi.org/10.2105/AJPH.2012.301109
330. Sevelius JM, Patouhas E, Keatley JG, Johnson MO. Barriers and facilitators to engagement and retention in care among transgender women living with human immunodeficiency virus. Ann Behav Med 2014;47:5–16. PMID:24317955 https://doi.org/10.1007/s12160-013-9565-8
331. Sevelius JM. Gender affirmation: a framework for conceptualizing risk behavior among transgender women of color. Sex Roles 2013;68:675–89. PMID:23729971 https://doi.org/10.1007/s11199-012-0216-5
332. Reisner SL, White Hughto JM, Pardee D, Sevelius J. Syndemics and gender affirmation: HIV sexual risk in female-to-male trans masculine adults reporting sexual contact with cisgender males. Int J STD AIDS 2016;27:955–66. PMID:26384946 https://doi.org/10.1177/0956462415602418
333. Coleman E, Bockting W, Botzer M, et al. Standards of care for the health of transsexual, transgender, and gender-nonconforming people, version 7. Int J Transgenderism 2012;13:165–232. https://doi.org/10.1080/15532739.2011.700873
334. Winter S, Diamond M, Green J, et al. Transgender people: health at the margins of society. Lancet 2016;388:390–400. PMID:27323925 https://doi.org/10.1016/S0140-6736(16)00683-8
335. Cahill S, Singal R, Grasso C, et al. Do ask, do tell: high levels of acceptability by patients of routine collection of sexual orientation and gender identity data in four diverse American community health centers. PLoS One 2014;9:e107104. PMID:25198577 https://doi.org/10.1371/journal.pone.0107104
336. Cahill SR, Baker K, Deutsch MB, Keatley J, Makadon HJ. Inclusion of sexual orientation and gender identity in Stage 3 Meaningful Use Guidelines: a huge step forward for LGBT health. LGBT Health 2016;3:100–2. PMID:26698386 https://doi.org/10.1089/lgbt.2015.0136
337. Tordoff DM, Morgan J, Dombrowski JC, Golden MR, Barbee LA. Increased ascertainment of transgender and non-binary patients using a 2-step versus 1-step gender identity intake question in an STD clinic setting. Sex Transm Dis 2019;46:254–9. PMID:30516726 https://doi.org/10.1097/OLQ.0000000000000952

308. Singh D, Fine DN, Marrazzo JM.1997至2005年太平洋西北地区计划生育诊所筛查中报告与女性有性行为的女性沙眼衣原体感染。Am J Public Health 2011;101:1284-90. PMID:20724697 https://doi.org/10.2105/AJPH.2009.169631
309. Muzny CA, Kapil R, Austin EL, Brown L, Hook EW 3rd, Geisler WM.沙眼衣原体感染在仅与女性发生性行为的非裔美国女性中。Int J STD AIDS 2016;27:978-83. PMID:26384942 https://doi.org/10.1177/0956462415604092
310. Koumans EH, Sternberg M, Bruce C, et al.2001-2004年美国细菌性阴道病的患病率；与症状、性行为和生殖健康的关联。Sex Transm Dis 2007;34:864-9. PMID:17621244 https://doi.org/10.1097/OLQ.0b013e318074e565
311. Evans AL, Scally AJ, Wellard SJ, Wilson JD.社区环境中女同性恋者和异性恋女性细菌性阴道病的患病率。Sex Transm Infect 2007;83:470-5. PMID:17611235 https://doi.org/10.1136/sti.2006.022277
312. Olson KM, Boohaker LJ, Schwebke JR, Aslibekyan S, Muzny CA.不同性行为组女性阴道菌群模式的比较：对细菌性阴道病发病机制的意义。Sex Health 2018;15:61-7. PMID:29212588 https://doi.org/10.1071/ SH17087
313. Muzny CA, Lensing SY, Aaron KJ, Schwebke JR.潜伏期和危险因素支持与女性发生性行为的女性中细菌性阴道病的性传播。Sex Transm Infect 2019;95:511-5. PMID:30872415 https://doi.org/10.1136/sextrans-2018-053824
314. Bradshaw CS, Walker SM, Vodstrcil LA, et al.行为和关系对女性及其女性伴侣阴道微生物群的影响：WOW健康研究。J Infect Dis 2014;209:1562-72. PMID:24285846 https://doi.org/10.1093/infdis/jit664
315. Marrazzo JM, Antonio M, Agnew K, Hillier SL.女性性伴共享的生殖道乳杆菌菌株的分布。J Infect Dis 2009;199:680-3. PMID:19199538 https://doi.org/10.1086/596632
316. Marrazzo JM, Fiedler TL, Srinivasan S, et al.阴道细菌的阴道外储库作为新发细菌性阴道病的危险因素。J Infect Dis 2012;205:1580-8. PMID:22448002 https://doi.org/10.1093/ infdis/jis242
317. 米切尔 C， 曼哈特 LE， 托马斯 K， 菲德勒 T， 弗雷德里克斯 DN， 马拉佐 J.细菌性阴道病治疗后卷曲乳杆菌或詹氏乳杆菌定植的行为预测因素：一项队列研究。Infect Dis Obstet Gynecol 2012;2012:706540. Epub May 30, 2012. PMID:22693410 https://doi.org/10.1155/2012/706540
318. Mitchell C, Manhart LE, Thomas KK, Agnew K, Marrazzo JM.性活动对产过氧化氢乳杆菌和阴道加德纳菌阴道定植的影响。Sex Transm Dis 2011;38:1137-44. PMID:22082725 https://doi.org/10.1097/OLQ.0b013e31822e6121
319. Fethers K, Twin J, Fairley CK, et al.细菌性阴道病(BV)候选细菌：与BV及有性经验和无性经验女性行为实践的关联。PLoS One 2012;7:e30633. PMID:22363457 https://doi.org/10.1371/journal.pone.0030633
320. Bradshaw CS, Vodstrcil LA, Hocking JS, et al.细菌性阴道病复发与治疗后性活动及激素避孕药使用显著相关。Clin Infect Dis 2013;56:777-86. PMID:23243173 https://doi.org/10.1093/cid/cis1030
321. Marrazzo JM, Thomas KK, Fiedler TL, Ringwood K, Fredricks DN.报告与女性发生性行为的女性中获得细菌性阴道病的风险：一项队列研究。PLoS One 2010;5:e11139. PMID:20559445 https://doi.org/10.1371/journal.pone.0011139
322. Vodstrcil LA, Walker SM, Hocking JS, et al.与女性发生性行为的女性中新发细菌性阴道病(BV)与提示BV性传播的行为相关。Clin Infect Dis 2015;60:1042-53. PMID:25516188 https://doi.org/10.1093/cid/ciu1130
323. Muzny CA, Blanchard E, Taylor CM, et al.鉴定参与诱导新发细菌性阴道病的关键细菌：一项前瞻性研究。J Infect Dis 2018;218:966-78. PMID:29718358 https://doi.org/10.1093/infdis/jiy243
324. Marrazzo JM, Thomas KK, Ringwood K.减少报告与女性发生性行为的女性中细菌性阴道病持续存在的行为干预：一项随机试验的结果。Sex Transm Infect 2011;87:399-405. PMID:21653935 https://doi.org/10.1136/ sti.2011.049213
325. Bradshaw CS, Walker J, Fairley CK, et al.澳大利亚年轻女性中现患和新发细菌性阴道病与性行为和避孕行为相关。PLoS One 2013;8:e57688. PMID:23472099 https://doi.org/10.1371/journal.pone.0057688
326. Poteat T, Reisner SL, Radix A.跨性别女性中的HIV流行。Curr Opin HIV AIDS 2014;9:168-73. PMID:24322537 https://doi.org/10.1097/COH.0000000000000030
327. White Hughto JM, Reisner SL, Pachankis JE.跨性别污名与健康：对污名决定因素、机制和干预措施的关键综述。Soc Sci Med 2015;147:222-31. PMID:26599625 https://doi.org/10.1016/j.socscimed.2015.11.010
328. Radix AE, Lelutiu-Weinberger C, Gamarel KE.纽约市跨性别和性别不 conformity个体的满意度与医疗保健利用：一项基于社区的参与性研究。LGBT Health 2014;1:302-8. PMID:26789858 https://doi.org/10.1089/ lgbt.2013.0042
329. Rapues J, Wilson EC, Packer T, Colfax GN, Raymond HF.2010年旧金山跨性别女性中HIV感染的相关因素：来自受访者驱动抽样研究的结果。Am J Public Health 2013;103:1485-92. PMID:23763398 https://doi.org/10.2105/ AJPH.2012.301109
330. Sevelius JM, Patouhas E, Keatley JG, Johnson MO.感染人类免疫缺陷病毒的跨性别女性参与和保留在护理中的障碍和促进因素。Ann Behav Med 2014;47:5-16. PMID:24317955 https://doi.org/10.1007/s12160-013-9565-8
331. Sevelius JM.性别肯定：概念化有色人种跨性别女性风险行为的框架。Sex Roles 2013;68:675-89. PMID:23729971 https://doi.org/10.1007/s11199-012-0216-5
332. Reisner SL, White Hughto JM, Pardee D, Sevelius J.Syndemics与性别肯定：报告与顺性别男性有性接触的女性至男性跨性别男性成人的HIV性风险。Int J STD AIDS 2016;27:955-66. PMID:26384946 https://doi.org/10.1177/0956462415602418
333. Coleman E, Bockting W, Botzer M, et al.变性人、跨性别者和性别不conformity者健康护理标准，第7版。Int J Transgenderism 2012;13:165-232. https://doi.org/10. 1080/15532739.2011.700873
334. Winter S, Diamond M, Green J, et al.跨性别者：社会边缘的健康。Lancet 2016;388:390-400. PMID:27323925 https://doi.org/10.1016/S0140-6736(16) 00683-8
335. Cahill S, Singal R, Grasso C, et al.要问，要说：在四个多样化的美国社区健康中心，患者对常规收集性取向和性别认同数据的高度接受性。PLoS One 2014;9:e107104. PMID:25198577 https://doi.org/10.1371/journal.pone.0107104
336. Cahill SR, Baker K, Deutsch MB, Keatley J, Makadon HJ.将性取向和性别认同纳入第3阶段有意义使用指南：LGBT健康的巨大进步。LGBT Health 2016;3:100-2. PMID:26698386 https://doi.org/10.1089/ lgbt.2015.0136
337. Tordoff DM, Morgan J, Dombrowski JC, Golden MR, Barbee LA.在STD诊所环境中使用2步法与1步法性别认同入院问题增加跨性别和非二元患者的确定性。Sex Transm Dis 2019;46:254-9. PMID:30516726 https://doi.org/10.1097/OLQ.0000000000000952

338. Grant JM, Mottet LA, Tanis J. National transgender discrimination survey report on health and health care. Washington, DC: National Center for Transgender Equality and the National Gay and Lesbian Task Force; 2010. https://cancer-network.org/wp-content/uploads/2017/02/National_Transgender_Discrimination_Survey_Report_on_health_and_health_care.pdf
339. Jaffee KD, Shires DA, Stroumsa D. Discrimination and delayed health care among transgender women and men: implications for improving medical education and health care delivery. Med Care 2016;54:1010–6. PMID:27314263 https://doi.org/10.1097/MLR.0000000000000583
340. Glick JL, Theall KP, Andrinopoulos KM, Kendall C. The role of discrimination in care postponement among trans-feminine individuals in the U.S. National Transgender Discrimination Survey. LGBT Health 2018;5:171–9. PMID:29589995 https://doi.org/10.1089/lgbt.2017.0093
341. Callander D, Cook T, Cornelisse V, et al. Trans and gender diverse people's experiences of sexual health care are associated with sexual health screening uptake. Sex Transm Infect 2019;95(Suppl 1):A64. https://sti.bmj.com/content/sextrans/95/Suppl_1.toc.pdf
342. Casey LS, Reisner SL, Findling MG, et al. Discrimination in the United States: experiences of lesbian, gay, bisexual, transgender, and queer Americans. Health Serv Res 2019;54(Suppl 2):1454–66. PMID:31659745 https://doi.org/10.1111/1475-6773.13229
343. Potter J, Peitzmeier SM, Bernstein I, et al. Cervical cancer screening for patients on the female-to-male spectrum: a narrative review and guide for clinicians. J Gen Intern Med 2015;30:1857–64. PMID:26160483 https://doi.org/10.1007/s11606-015-3462-8
344. Becasen JS, Denard CL, Mullins MM, Higa DH, Sipe TA. Estimating the prevalence of HIV and sexual behaviors among the US transgender population: a systematic review and meta-analysis, 2006–2017. Am J Public Health 2019;109:e1–8. PMID:30496000 https://doi.org/10.2105/AJPH.2018.304727
345. Baral SD, Poteat T, Strömdahl S, Wirtz AL, Guadamuz TE, Beyrer C. Worldwide burden of HIV in transgender women: a systematic review and meta-analysis. Lancet Infect Dis 2013;13:214–22. PMID:23260128 https://doi.org/10.1016/S1473-3099(12)70315-8
346. Allan-Blitz LT, Konda KA, Calvo GM, et al. High incidence of extra-genital gonorrheal and chlamydial infections among high-risk men who have sex with men and transgender women in Peru. Int J STD AIDS 2018;29:568–76. PMID:29183269 https://doi.org/10.1177/0956462417744098
347. Hiransuthikul A, Janamnuaysook R, Sungsing T, et al. High burden of chlamydia and gonorrhoea in pharyngeal, rectal and urethral sites among Thai transgender women: implications for anatomical site selection for the screening of STI. Sex Transm Infect 2019;95:534–9. PMID:30982000 https://doi.org/10.1136/sextrans-2018-053835
348. Kojima N, Park H, Konda KA, et al. The PICASSO Cohort: baseline characteristics of a cohort of men who have sex with men and male-to-female transgender women at high risk for syphilis infection in Lima, Peru. BMC Infect Dis 2017;17:255. PMID:28399798 https://doi.org/10.1186/s12879-017-2332-x
349. Pitasi MA, Kerani RP, Kohn R, et al. Chlamydia, gonorrhea, and human immunodeficiency virus infection among transgender women and transgender men attending clinics that provide sexually transmitted disease services in six US cities: results from the Sexually Transmitted Disease Surveillance Network. Sex Transm Dis 2019;46:112–7. PMID:30278030 https://doi.org/10.1097/OLQ.0000000000000917
350. James S, Herman JL, Rankin S, Keisling M, Mottet L, Anafi M. The report of the 2015 US transgender survey. Washington, DC: National Center for Transgender Equality; 2016. https://transequality.org/sites/default/files/docs/usts/USTS-Full-Report-Dec17.pdf
351. Hadj-Moussa M, Ohl DA, Kuzon WM Jr. Feminizing genital gender-confirmation surgery. Sex Med Rev 2018;6:457–468.e2. PMID:29454634 https://doi.org/10.1016/j.sxmr.2017.11.005
352. Salgado CJ, Nugent A, Kuhn J, Janette M, Bahna H. Primary sigmoid vaginoplasty in transwomen: technique and outcomes. BioMed Res Int 2018;2018:4907208. PMID:29862275 https://doi.org/10.1155/2018/4907208
353. Radix AE, Harris AB, Belkind U, Ting J, Goldstein ZG. *Chlamydia trachomatis* infection of the neovagina in transgender women. Open Forum Infect Dis 2019;6:ofz470. PMID:32395566 https://doi.org/10.1093/ofid/ofz470
354. Elfering L, van der Sluis WB, Mermans JF, Buncamper ME. *Herpes neolabialis*: herpes simplex virus type 1 infection of the neolabia in a transgender woman. Int J STD AIDS 2017;28:841–3. PMID:28632111 https://doi.org/10.1177/0956462416685658
355. van der Sluis WB, Buncamper ME, Bouman MB, et al. Prevalence of neovaginal high-risk human papillomavirus among transgender women in the Netherlands. Sex Transm Dis 2016;43:503–5. PMID:27414682 https://doi.org/10.1097/OLQ.0000000000000476
356. Yang C, Liu S, Xu K, Xiang Q, Yang S, Zhang X. *Condylomata gigantea* in a male transsexual. Int J STD AIDS 2009;20:211–2. PMID:19255276 https://doi.org/10.1258/ijsa.2008.008213
357. Matsuki S, Kusatake K, Hein KZ, Anraku K, Morita E. *Condylomata acuminata* in the neovagina after male-to-female reassignment treated with CO_2 laser and imiquimod. Int J STD AIDS 2015;26:509–11. PMID:24970474 https://doi.org/10.1177/0956462414542476
358. Bodsworth NJ, Price R, Davies SC. Gonococcal infection of the neovagina in a male-to-female transsexual. Sex Transm Dis 1994;21:211–2. PMID:7974071 https://doi.org/10.1097/00007435-199407000-00005
359. Haustein UF. Pruritus of the artificial vagina of a transsexual patient caused by gonococcal infection [German]. Hautarzt 1995;46:858–9. PMID:8567271 https://doi.org/10.1007/s001050050354
360. Yamada K, Shida D, Kato T, Yoshida H, Yoshinaga S, Kanemitsu Y. Adenocarcinoma arising in sigmoid colon neovagina 53 years after construction. World J Surg Oncol 2018;16:88. PMID:29703260 https://doi.org/10.1186/s12957-018-1372-z
361. Hiroi H, Yasugi T, Matsumoto K, et al. Mucinous adenocarcinoma arising in a neovagina using the sigmoid colon thirty years after operation: a case report. J Surg Oncol 2001;77:61–4. PMID:11344485 https://doi.org/10.1002/jso.1067
362. Heller DS. Lesions of the neovagina—a review. J Low Genit Tract Dis 2015;19:267–70. PMID:26111041 https://doi.org/10.1097/LGT.0000000000000110
363. Scheim AI, Bauer GR, Travers R. HIV-related sexual risk among transgender men who are gay, bisexual, or have sex with men. J Acquir Immune Defic Syndr 2017;74:e89–96. PMID:27798432 https://doi.org/10.1097/QAI.0000000000001222
364. Sevelius J. "There's no pamphlet for the kind of sex I have": HIV-related risk factors and protective behaviors among transgender men who have sex with nontransgender men. J Assoc Nurses AIDS Care 2009;20:398–410. PMID:19732698 https://doi.org/10.1016/j.jana.2009.06.001
365. Pitasi MA, Oraka E, Clark H, Town M, DiNenno EA. HIV testing among transgender women and men—27 states and Guam, 2014–2015. MMWR Morb Mortal Wkly Rep 2017;66:883–7. PMID:28837547 https://doi.org/10.15585/mmwr.mm6633a3
366. Reisner SL, Perkovich B, Mimiaga MJ. A mixed methods study of the sexual health needs of New England transmen who have sex with nontransgender men. AIDS Patient Care STDS 2010;24:501–13. PMID:20666586 https://doi.org/10.1089/apc.2010.0059
367. Hembree WC, Cohen-Kettenis PT, Gooren L, et al. Endocrine treatment of gender-dysphoric/gender-incongruent persons: an Endocrine Society Clinical Practice Guideline. J Clin Endocrinol Metab 2017;102:3869–903. PMID:28945902 https://doi.org/10.1210/jc.2017-01658

338. Grant JM, Mottet LA, Tanis J.全国跨性别歧视调查健康与医疗保健报告。Washington, DC: National Center for transgender Equality and the National Gay and Lesbian Task Force; 2010. https://cancer-network.org/wp-content/uploads/2017/02/National_transgender_discrimination_Survey_Report_on_health_and_health_care.pdf
339. Jaffee KD, Shires DA, Stroumsa D.跨性别女性和男性中的歧视与延迟就医：对改进医学教育和医疗服务提供的启示。Med Care 2016;54:1010-6. PMID:27314263 https://doi.org/10.1097/MLR.0000000000000583
340. Glick JL, Theall KP, Andrinopoulos KM, Kendall C.歧视在美国全国跨性别歧视调查中跨女性个体延迟就医中的作用。LGBT Health 2018;5:171-9. PMID:29589995 https://doi.org/10.1089/ lgbt.2017.0093
341. Callander D, Cook T, Cornelisse V, et al.跨性别和性别多元人群的性健康照护经历与性健康筛查接受度相关。Sex Transm Infect 2019;95(Suppl 1): A64. https://sti.bmj.com/content/sextrans/95/Suppl_1.toc.pdf
342. Casey LS, Reisner SL, Findling MG, et al.美国的歧视：女同性恋、男同性恋、双性恋、跨性别和酷儿美国人的经历。Health Serv Res 2019;54(Suppl 2): 1454-66. PMID:31659745 https://doi.org/10.1111/1475-6773.13229
343. Potter J, Peitzmeier SM, Bernstein I, et al.女性至男性谱系患者的宫颈癌筛查：叙述性综述和临床医生指南。J Gen Intern Med 2015;30:1857-64. PMID:26160483 https://doi.org/10.1007/s11606-015-3462-8
344. Becasen JS, Denard CL, Mullins MM, Higa DH, Sipe TA.估计美国跨性别人群中HIV和性行为的流行率：系统综述和meta分析，2006-2017。Am J Public Health 2019;109:e1-8. PMID:30496000 https://doi.org/10.2105/AJPH.2018.304727
345. Baral SD, Poteat T, Strömdahl S, Wirtz AL, Guadamuz TE, Beyrer C.全球跨性别女性HIV负担：系统综述和meta分析。Lancet Infect Dis 2013;13:214-22. PMID:23260128 https://doi.org/10.1016/S1473-3099(12) 70315-8
346. Allan-Blitz LT, Konda KA, Calvo GM, et al.秘鲁高危男男性行为人群和跨性别女性中生殖器外淋球菌和衣原体感染的高发病率。Int J STD AIDS 2018;29:568-76. PMID:29183269 https://doi.org/10.1177/0956462417744098
347. Hiransuthikul A, Janamnuaysook R, Sungsing T, et al.泰国跨性别女性咽部、直肠和尿道部位衣原体和淋病的高负担：对STI筛查解剖部位选择的启示。Sex Transm Infect 2019;95:534-9. PMID:30982000 https://doi.org/10.1136/sextrans-2018-053835
348. Kojima N, Park H, Konda KA, et al.PICASSO队列：秘鲁利马梅毒感染高危男男性行为人群和男性至女性跨性别女性队列的基线特征。BMC Infect Dis 2017;17:255. PMID:28399798 https://doi.org/10.1186/s12879-017-2332-x
349. Pitasi MA, Kerani RP, Kohn R, et al.美国六个城市提供性传播疾病服务的诊所中跨性别女性和跨性别男性的衣原体、淋病和人类免疫缺陷病毒感染：性传播疾病监测网络结果。Sex Transm Dis 2019;46:112-7. PMID:30278030 https://doi.org/10.1097/OLQ.0000000000000917
350. James S, Herman JL, Rankin S, Keisling M, Mottet L, Anafi M.2015年美国跨性别调查报告。华盛顿特区：国家跨性别平等中心；2016。https://transequality.org/sites/ default/files/docs/usts/USTS-Full-Report-Dec17.pdf
351. Hadj-Moussa M, Ohl DA, Kuzon WM Jr.女性化生殖器性别确认手术。Sex Med Rev 2018;6:457-468.e2. PMID:29454634 https://doi.org/10.1016/j.sxmr.2017.11.005
352. Salgado CJ, Nugent A, Kuhn J, Janette M, Bahna H.跨性别女性原发性乙状结肠阴道成形术：技术和结果。BioMed Res Int 2018;2018:4907208. PMID:29862275 https://doi.org/10.1155/2018/4907208
353. Radix AE, Harris AB, Belkind U, Ting J, Goldstein ZG.沙眼衣原体感染跨性别女性新阴道。Open Forum Infect Dis 2019;6:ofz470. PMID:32395566 https://doi.org/10.1093/ofid/ofz470
354. Elfering L, van der Sluis WB, Mermans JF, Buncamper ME.新阴唇疱疹：跨性别女性新阴唇的单纯疱疹病毒1型感染。Int J STD AIDS 2017;28:841-3. PMID:28632111 https://doi.org/10.1177/0956462416685658
355. van der Sluis WB, Buncamper ME, Bouman MB, et al.荷兰跨性别女性中新阴道高危人乳头瘤病毒的流行率。Sex Transm Dis 2016;43:503-5. PMID:27414682 https://doi.org/10.1097/OLQ.0000000000000476
356. Yang C, Liu S, Xu K, Xiang Q, Yang S, Zhang X.巨大尖锐湿疣一例男性变性者。Int J STD AIDS 2009;20:211-2. PMID:19255276
357. https://doi.org/10.1258/ijsa.2008.008213
Matsuki S, Kusatake K, Hein KZ, Anraku K, Morita E.尖锐湿疣男性至女性性别重置术后新阴道，接受CO 2激光和咪喹莫特治疗。Int J STD AIDS 2015;26:509-11. PMID:24970474 https://doi.org/10.1177/0956462414542476
358. Bodsworth NJ, Price R, Davies SC.男性至女性变性者新阴道淋球菌感染。Sex Transm Dis 1994;21:211-2. PMID:7974071 https://doi.org/10.1097/00007435-199407000-00005
359. Haustein UF.变性患者人工阴道因淋球菌感染引起的瘙痒[德语]。Hautarzt 1995;46:858-9. PMID:8567271 https://doi.org/10.1007/s001050050354
360. Yamada K, Shida D, Kato T, Yoshida H, Yoshinaga S, Kanemitsu Y.乙状结肠新阴道构建53年后发生的腺癌。World J Surg Oncol 2018;16:88. PMID:29703260 https://doi.org/10.1186/s12957-018-1372-z
361. Hiroi H, Yasugi T, Matsumoto K, et al.使用乙状结肠的新阴道术后三十年发生的黏液腺癌：病例报告。J Surg Oncol 2001;77:61-4. PMID:11344485 https://doi.org/10.1002/jso.1067
362. Heller DS.新阴道病变--综述。J Low Genit Tract Dis 2015;19:267-70. PMID:26111041 https://doi.org/10.1097/ LGT.0000000000000110
363. Scheim AI, Bauer GR, Travers R.男同性恋、双性恋或与男性发生性行为的跨性别男性中HIV相关危险性行为。J Acquir Immune Defic Syndr 2017;74:e89-96. PMID:27798432 https://doi.org/10.1097/QAI.0000000000001222
364. Sevelius J.“没有针对我所进行的性行为类型的手册”：与顺性别男性发生性行为的跨性别男性中HIV相关危险因素和保护行为。J Assoc Nurses AIDS Care 2009;20:398-410. PMID:19732698 https://doi.org/10.1016/j.jana.2009.06.001
365. Pitasi MA, Oraka E, Clark H, Town M, DiNenno EA.跨性别女性和男性的HIV检测--27个州和关岛，2014-2015。MMWR Morb Mortal Wkly Rep 2017;66:883-7. PMID:28837547 https://doi.org/10.15585/mmwr.mm6633a3
366. Reisner SL, Perkovich B, Mimiaga MJ.新英格兰与顺性别男性发生性行为的跨性别男性性健康需求的混合方法研究。AIDS Patient Care STDS 2010;24:501-13. PMID:20666586 https://doi.org/10.1089/apc.2010.0059
367. Hembree WC, Cohen-Kettenis PT, Gooren L, et al.性别烦躁/性别不一致者的内分泌治疗：内分泌学会临床实践指南。J Clin Endocrinol Metab 2017;102:3869-903. PMID:28945902 https://doi.org/10.1210/jc.2017-01658

368. Deutsch M, ed. Guidelines for the primary and gender-affirming care of transgender and gender nonbinary people. San Francisco, CA: University of California San Francisco, Department of Family and Community Medicine, Center of Excellence for Transgender Care; 2016. https://transcare.ucsf.edu/sites/transcare.ucsf.edu/files/Transgender-PGACG-6-17-16.pdf
369. Peitzmeier SM, Reisner SL, Harigopal P, Potter J. Female-to-male patients have high prevalence of unsatisfactory Paps compared to non-transgender females: implications for cervical cancer screening. J Gen Intern Med 2014;29:778–84. PMID:24424775 https://doi.org/10.1007/s11606-013-2753-1
370. Peitzmeier SM, Khullar K, Reisner SL, Potter J. Pap test use is lower among female-to-male patients than non-transgender women. Am J Prev Med 2014;47:808–12. PMID:25455121 https://doi.org/10.1016/j.amepre.2014.07.031
371. Reisner SL, Deutsch MB, Peitzmeier SM, et al. Test performance and acceptability of self- versus provider-collected swabs for high-risk HPV DNA testing in female-to-male trans masculine patients. PLoS One 2018;13:e0190172. PMID:29538411 https://doi.org/10.1371/journal.pone.0190172
372. CDC. Surveillance for viral hepatitis—United States, 2017. Atlanta, GA: US Department of Health and Human Services, CDC; 2019. https://www.cdc.gov/hepatitis/statistics/2017surveillance/pdfs/2017HepSurveillanceRpt.pdf
373. Kouyoumdjian FG, Leto D, John S, Henein H, Bondy S. A systematic review and meta-analysis of the prevalence of chlamydia, gonorrhoea and syphilis in incarcerated persons. Int J STD AIDS 2012;23:248–54. PMID:22581947 https://doi.org/10.1258/ijsa.2011.011194
374. CDC. Evaluation of large jail STD screening programs, 2008–2009. Atlanta, GA: US Department of Health and Human Services, CDC; 2011. https://www.cdc.gov/std/publications/JailScreening2011.pdf
375. Pathela P, Hennessy RR, Blank S, Parvez F, Franklin W, Schillinger JA. The contribution of a urine-based jail screening program to citywide male chlamydia and gonorrhea case rates in New York City. Sex Transm Dis 2009;36(Suppl):S58–61. PMID:17989586 https://doi.org/10.1097/OLQ.0b013e31815615bb
376. Joesoef MR, Weinstock HS, Kent CK, et al.; Corrections STD Prevalence Monitoring Group. Sex and age correlates of chlamydia prevalence in adolescents and adults entering correctional facilities, 2005: implications for screening policy. Sex Transm Dis 2009;36(Suppl):S67–71. PMID:19125147 https://doi.org/10.1097/OLQ.0b013e31815d6de8
377. Blank S, McDonnell DD, Rubin SR, et al. New approaches to syphilis control. Finding opportunities for syphilis treatment and congenital syphilis prevention in a women's correctional setting. Sex Transm Dis 1997;24:218–26. PMID:9101633 https://doi.org/10.1097/00007435-199704000-00006
378. Owusu-Edusei K Jr, Gift TL, Chesson HW, Kent CK. Investigating the potential public health benefit of jail-based screening and treatment programs for chlamydia. Am J Epidemiol 2013;177:463–73. PMID:23403986 https://doi.org/10.1093/aje/kws240
379. Spaulding AC, Miller J, Trigg BG, et al. Screening for sexually transmitted diseases in short-term correctional institutions: summary of evidence reviewed for the 2010 Centers for Disease Control and Prevention Sexually Transmitted Diseases Treatment Guidelines. Sex Transm Dis 2013;40:679–84. PMID:23945422 https://doi.org/10.1097/01.olq.0000431353.88464.ab
380. CDC. Male chlamydia screening consultation, March 28–29, 2006, meeting report. Atlanta, GA: US Department of Health and Human Services, CDC; 2007. https://www.cdc.gov/std/chlamydia/chlamydiascreening-males.pdf
381. Cole J, Hotton A, Zawitz C, Kessler H. Opt-out screening for *Chlamydia trachomatis* and *Neisseria gonorrhoeae* in female detainees at Cook County jail in Chicago, IL. Sex Transm Dis 2014;41:161–5. PMID:24521720 https://doi.org/10.1097/OLQ.0000000000000106
382. Shaikh RA, Simonsen KA, O'Keefe A, et al. Comparison of opt-in versus opt-out testing for sexually transmitted infections among inmates in a county jail. J Correct Health Care 2015;21:408–16. PMID:26285597 https://doi.org/10.1177/1078345815600447
383. Spaulding AC, Kim MJ, Corpening KT, Carpenter T, Watlington P, Bowden CJ. Establishing an HIV screening program led by staff nurses in a county jail. J Public Health Manag Pract 2015;21:538–45. PMID:25427254 https://doi.org/10.1097/PHH.0000000000000183
384. Rosen DL, Wohl DA, Golin CE, et al. Comparing HIV case detection in prison during opt-in vs. opt-out testing policies. J Acquir Immune Defic Syndr 2016;71:e85–8. PMID:26536318 https://doi.org/10.1097/QAI.0000000000000889
385. Gratrix J, Smyczek P, Bertholet L, et al. A cross-sectional evaluation of opt-in testing for sexually transmitted and blood-borne infections in three Canadian provincial correctional facilities: a missed opportunity for public health? Int J Prison Health 2019;15:273–81. PMID:31329036 https://doi.org/10.1108/IJPH-07-2018-0043
386. Sutcliffe S, Newman SB, Hardick A, Gaydos CA. Prevalence and correlates of *Trichomonas vaginalis* infection among female US federal prison inmates. Sex Transm Dis 2010;37:585–90. PMID:20803782 https://doi.org/10.1097/OLQ.0b013e3181de4113
387. Freeman AH, Katz KA, Pandori MW, et al. Prevalence and correlates of *Trichomonas vaginalis* among incarcerated persons assessed using a highly sensitive molecular assay. Sex Transm Dis 2010;37:165–8. PMID:20023598 https://doi.org/10.1097/OLQ.0b013e3181bcd3fc
388. Sosman J, Macgowan R, Margolis A, et al.; Project START Biologics Study Group. Sexually transmitted infections and hepatitis in men with a history of incarceration. Sex Transm Dis 2011;38:634–9. PMID:21844713 https://doi.org/10.1097/OLQ.0b013e31820bc86c
389. Javanbakht M, Stirland A, Stahlman S, et al. Prevalence and factors associated with *Trichomonas vaginalis* infection among high-risk women in Los Angeles. Sex Transm Dis 2013;40:804–7. PMID:24275733 https://doi.org/10.1097/OLQ.0000000000000026
390. Nijhawan AE, Chapin KC, Salloway R, et al. Prevalence and predictors of *Trichomonas* infection in newly incarcerated women. Sex Transm Dis 2012;39:973–8. PMID:23191953 https://doi.org/10.1097/OLQ.0b013e31826e8847
391. Nijhawan AE, DeLong AK, Celentano DD, et al. The association between *Trichomonas* infection and incarceration in HIV-seropositive and at-risk HIV-seronegative women. Sex Transm Dis 2011;38:1094–100. PMID:22082718 https://doi.org/10.1097/OLQ.0b013e31822ea147
392. Willers DM, Peipert JF, Allsworth JE, Stein MD, Rose JS, Clarke JG. Prevalence and predictors of sexually transmitted infection among newly incarcerated females. Sex Transm Dis 2008;35:68–72. PMID:18090178 https://doi.org/10.1097/OLQ.0b013e318154bdb2
393. Nijhawan AE, Salloway R, Nunn AS, Poshkus M, Clarke JG. Preventive healthcare for underserved women: results of a prison survey. J Womens Health (Larchmt) 2010;19:17–22. PMID:20088654 https://doi.org/10.1089/jwh.2009.1469
394. Binswanger IA, White MC, Pérez-Stable EJ, Goldenson J, Tulsky JP. Cancer screening among jail inmates: frequency, knowledge, and willingness. Am J Public Health 2005;95:1781–7. PMID:16186455 https://doi.org/10.2105/AJPH.2004.052498
395. Brinkley-Rubinstein L, Peterson M, Arnold T, et al. Knowledge, interest, and anticipated barriers of pre-exposure prophylaxis uptake and adherence among gay, bisexual, and men who have sex with men who are incarcerated. PLoS One 2018;13:e0205593. PMID:30532275 https://doi.org/10.1371/journal.pone.0205593
396. Brinkley-Rubinstein L, Dauria E, Tolou-Shams M, et al. The path to implementation of HIV pre-exposure prophylaxis for people involved in criminal justice systems. Curr HIV/AIDS Rep 2018;15:93–5. PMID:29516265 https://doi.org/10.1007/s11904-018-0389-9

368. Deutsch M, ed.跨性别和性别非二元人群的初级保健和性别肯定照护指南。加利福尼亚州旧金山：加利福尼亚大学旧金山分校家庭与社区医学系跨性别照护卓越中心；2016。https://transcare.ucsf.edu/sites/transcare.ucsf.edu/files/ transgender-PGACG-6-17-16.pdf
369. Peitzmeier SM, Reisner SL, Harigopal P, Potter J.与非跨性别女性相比，女转男患者的不满意Pap涂片患病率较高：对宫颈癌筛查的启示。J Gen Intern Med 2014;29:778-84. PMID:24424775 https://doi.org/10.1007/s11606-013-2753-1
370. Peitzmeier SM, Khullar K, Reisner SL, Potter J.女转男患者的Pap检查使用率低于非跨性别女性。Am J Prev Med 2014;47:808-12. PMID:25455121 https://doi.org/10.1016/j.amepre.2014.07.031
371. Reisner SL, Deutsch MB, Peitzmeier SM, et al.女转男跨性别男性患者中自采与医务人员采集拭子用于高危HPV DNA检测的检测性能与可接受性。PLoS One 2018;13:e0190172. PMID:29538411 https://doi.org/10.1371/journal.pone.0190172
372. CDC.病毒性肝炎监测--美国，2017年。Atlanta, GA: US Department of Health and Human Services, CDC; 2019. https://www.cdc.gov/hepatitis/statistics/2017Surveillance/ pdfs/2017HepSurveillanceRpt.pdf
373. Kouyoumdjian FG, Leto D, John S, Henein H, Bondy S.被监禁人群中衣原体、淋病和梅毒患病率的系统综述与meta分析。Int J STD AIDS 2012;23:248-54. PMID:22581947 https://doi.org/10.1258/ijsa.2011.011194
374. CDC.大型监狱STD筛查项目评估，2008-2009年。Atlanta, GA: US Department of Health and Human Services, CDC; 2011. https://www.cdc.gov/std/publications/JailScreening2011.pdf
375. Pathela P, Hennessy RR, Blank S, Parvez F, Franklin W, Schillinger JA.基于尿液的监狱筛查项目对纽约市全市男性衣原体和淋病病例率的贡献。Sex Transm Dis 2009;36(Suppl): S58-61. PMID:17989586 https://doi.org/10.1097/OLQ.0b013e31815615bb
376. Joesoef MR, Weinstock HS, Kent CK, et al.; Corrections STD Prevalence Monitoring Group.2005年进入惩教机构的青少年和成人中衣原体患病率与性别和年龄的相关性：对筛查政策的启示。Sex Transm Dis 2009;36(Suppl): S67-71. PMID:19125147 https://doi.org/10.1097/OLQ.0b013e31815d6de8
377. Blank S, McDonnell DD, Rubin SR, et al.梅毒控制的新方法：在女子惩教环境中寻找梅毒治疗和先天性梅毒预防的机会。Sex Transm Dis 1997; 24:218-26. PMID:9101633 https://doi.org/10.1097/00007435-199704000-00006
378. Owusu-Edusei K Jr, Gift TL, Chesson HW, Kent CK.调查基于监狱的衣原体筛查和治疗项目潜在的公共卫生效益。Am J Epidemiol 2013;177:463-73. PMID:23403986 https://doi.org/10.1093/aje/kws240
379. Spaulding AC, Miller J, Trigg BG, et al.短期惩教机构中的性传播疾病筛查：2010年Centers for Disease Control and Prevention Sexually transmitted Diseases Treatment Guidelines审查证据摘要。Sex Transm Dis 2013;40:679-84. PMID:23945422 https://doi.org/10.1097/01.olq.0000431353.88464.ab
380. CDC.男性衣原体筛查咨询会，2006年3月28-29日，会议报告。Atlanta, GA: US Department of Health and Human Services, CDC; 2007. https://www.cdc.gov/std/chlamydia/ chlamydia screening-males.pdf
381. Cole J, Hotton A, Zawitz C, Kessler H.伊利诺伊州芝加哥Cook County监狱女性被拘留者中沙眼衣原体和淋病奈瑟菌的退出式筛查。Sex Transm Dis 2014;41:161-5. PMID:24521720 https://doi.org/10.1097/OLQ.0000000000000106
382. Shaikh RA, Simonsen KA, O'Keefe A, et al.县监狱被监禁人员中性传播感染选择加入与退出检测的比较。J Correct Health Care 2015;21:408-16. PMID:26285597 https://doi.org/10.1177/1078345815600447
383. Spaulding AC, Kim MJ, Corpening KT, Carpenter T, Watlington P, Bowden CJ.在县监狱建立由护士主导的HIV筛查项目。J Public Health Manag Pract 2015;21:538-45. PMID:25427254 https://doi.org/10.1097/PHH.0000000000000183
384. Rosen DL, Wohl DA, Golin CE, et al.比较监狱中选择加入与退出检测政策期间的HIV病例发现。J Acquir Immune Defic Syndr 2016;71:e85-8. PMID:26536318 https://doi.org/10.1097/QAI.0000000000000889
385. Gratrix J, Smyczek P, Bertholet L, et al.加拿大三个省级惩教机构中性传播和血源性感染选择加入检测的横断面评估：公共卫生的错失机会?Int J Prison Health 2019;15:273-81. PMID:31329036 https://doi.org/10.1108/IJPH-07-2018-0043
386. Sutcliffe S, Newman SB, Hardick A, Gaydos CA.美国联邦监狱女性被监禁者中阴道毛滴虫感染的患病率及相关因素。Sex Transm Dis 2010;37:585-90. PMID:20803782 https://doi.org/10.1097/OLQ.0b013e3181de4113
387. Freeman AH, Katz KA, Pandori MW, et al.使用高灵敏度分子检测评估的被监禁人员中阴道毛滴虫的患病率及相关因素。Sex Transm Dis 2010;37:165-8. PMID:20023598 https://doi.org/10.1097/OLQ.0b013e3181bcd3fc
388. Sosman J, Macgowan R, Margolis A, et al.; Project START Biologics Study Group.有监禁史男性中的性传播感染和肝炎。Sex Transm Dis 2011;38:634-9. PMID:21844713 https://doi.org/10.1097/OLQ.0b013e31820bc86c
389. Javanbakht M, Stirland A, Stahlman S, et al.洛杉矶高危女性中阴道毛滴虫感染的患病率及相关因素。Sex Transm Dis 2013;40:804-7. PMID:24275733 https://doi.org/10.1097/OLQ.0000000000000026
390. Nijhawan AE, Chapin KC, Salloway R, et al.新入监女性中滴虫感染的患病率及预测因素。Sex Transm Dis 2012;39:973-8. PMID:23191953 https://doi.org/10.1097/ OLQ.0b013e31826e8847
391. Nijhawan AE, DeLong AK, Celentano DD, et al.HIV血清阳性和高危HIV血清阴性女性中滴虫感染与监禁之间的关联。Sex Transm Dis 2011;38:1094-100. PMID:22082718 https://doi.org/10.1097/OLQ.0b013e31822ea147
392. Willers DM, Peipert JF, Allsworth JE, Stein MD, Rose JS, Clarke JG.新入监女性中性传播感染的患病率及预测因素。Sex Transm Dis 2008;35:68-72. PMID:18090178 https://doi.org/10.1097/OLQ.0b013e318154bdb2
393. Nijhawan AE, Salloway R, Nunn AS, Poshkus M, Clarke JG.为服务不足女性提供的预防性医疗保健：一项监狱调查的结果。J Womens Health(Larchmt) 2010;19:17-22. PMID:20088654 https://doi.org/10.1089/jwh.2009.1469
394. Binswanger IA, White MC, Pérez-Stable EJ, Goldenson J, Tulsky JP 监狱被监禁者的癌症筛查：频率、知识和意愿。Am J Public Health 2005;95:1781-7. PMID:16186455 https://doi.org/10.2105/AJPH.2004.052498
395. Brinkley-Rubinstein L, Peterson M, Arnold T, et al.被监禁的男同性恋、双性恋和男男性行为人群对暴露前预防接种知识和依从性的知识、兴趣及预期障碍。PLoS One 2018;13:e0205593. PMID:30532275 https://doi.org/10.1371/journal.pone.0205593
396. Brinkley-Rubinstein L, Dauria E, Tolou-Shams M, et al.为涉及刑事司法系统的人群实施HIV暴露前预防的路径。Curr HIV/AIDS Rep 2018;15:93-5. PMID:29516265 https://doi.org/10.1007/s11904-018-0389-9

397. Morrow KM; Project START Study Group. HIV, STD, and hepatitis risk behaviors of young men before and after incarceration. AIDS Care 2009;21:235–43. PMID:19229694 https://doi.org/10.1080/09540120802017586
398. Bryan AD, Magnan RE, Gillman AS, et al. Effect of including alcohol and cannabis content in a sexual risk-reduction intervention on the incidence of sexually transmitted infections in adolescents: a cluster randomized clinical trial. JAMA Pediatr 2018;172:e175621. PMID:29435591 https://doi.org/10.1001/jamapediatrics.2017.5621
399. DiClemente RJ, Davis TL, Swartzendruber A, et al. Efficacy of an HIV/STI sexual risk-reduction intervention for African American adolescent girls in juvenile detention centers: a randomized controlled trial. Women Health 2014;54:726–49. PMID:25190056 https://doi.org/10.1080/03630242.2014.932893
400. Fogel CI, Crandell JL, Neevel AM, et al. Efficacy of an adapted HIV and sexually transmitted infection prevention intervention for incarcerated women: a randomized controlled trial. Am J Public Health 2015;105:802–9. PMID:25211714 https://doi.org/10.2105/AJPH.2014.302105
401. Son J, Miller WM, Tossone K, Butcher F, Kuo K. The effect of interprofessional student-led reproductive health education on youths in juvenile detention. J Pediatr Adolesc Gynecol 2017;30:370–5. PMID:27871918 https://doi.org/10.1016/j.jpag.2016.11.002
402. Costumbrado J, Stirland A, Cox G, et al. Implementation of a hepatitis A/B vaccination program using an accelerated schedule among high-risk inmates, Los Angeles County Jail, 2007–2010. Vaccine 2012;30:6878–82. PMID:22989688 https://doi.org/10.1016/j.vaccine.2012.09.006
403. Allison M, Musser B, Satterwhite C, Ault K, Kelly P, Ramaswamy M. Human papillomavirus vaccine knowledge and intention among adult inmates in Kansas, 2016–2017. Am J Public Health 2018;108:1000–2. PMID:29927651 https://doi.org/10.2105/AJPH.2018.304499
404. Lucas KD, Miller JL, Eckert V, Horne RL, Samuel MC, Mohle-Boetani JC. Risk, feasibility, and cost evaluation of a prisoner condom access pilot program in one California state prison. J Correct Health Care 2014;20:184–94. PMID:24934836 https://doi.org/10.1177/1078345814530869
405. Scott N, McBryde E, Kirwan A, Stoové M. Modelling the impact of condom distribution on the incidence and prevalence of sexually transmitted infections in an adult male prison system. PLoS One 2015;10:e0144869. PMID:26658518 https://doi.org/10.1371/journal.pone.0144869
406. Schacker T, Collier AC, Hughes J, Shea T, Corey L. Clinical and epidemiologic features of primary HIV infection. Ann Intern Med 1996;125:257–64. PMID:8678387 https://doi.org/10.7326/0003-4819-125-4-199608150-00001
407. Henn A, Flateau C, Gallien S. Primary HIV infection: clinical presentation, testing, and treatment. Curr Infect Dis Rep 2017;19:37. PMID:28884279 https://doi.org/10.1007/s11908-017-0588-3
408. Robb ML, Eller LA, Kibuuka H, et al.; RV 217 Study Team. Prospective study of acute HIV-1 infection in adults in East Africa and Thailand. N Engl J Med 2016;374:2120–30. PMID:27192360 https://doi.org/10.1056/NEJMoa1508952
409. Hoenigl M, Green N, Camacho M, et al. Signs or symptoms of acute HIV infection in a cohort undergoing community-based screening. Emerg Infect Dis 2016;22:532–4. PMID:26890854 https://doi.org/10.3201/eid2203.151607
410. Legarth RA, Ahlström MG, Kronborg G, et al. Long-term mortality in HIV-infected individuals 50 years or older: a nationwide, population-based cohort study. J Acquir Immune Defic Syndr 2016;71:213–8. PMID:26334734 https://doi.org/10.1097/QAI.0000000000000825
411. Marcus JL, Chao CR, Leyden WA, et al. Narrowing the gap in life expectancy between HIV-infected and HIV-uninfected individuals with access to care. J Acquir Immune Defic Syndr 2016;73:39–46. PMID:27028501 https://doi.org/10.1097/QAI.0000000000001014
412. Cohen MS, Chen YQ, McCauley M, et al.; HPTN 052 Study Team. Antiretroviral therapy for the prevention of HIV-1 transmission. N Engl J Med 2016;375:830–9. PMID:27424812 https://doi.org/10.1056/NEJMoa1600693
413. Saag MS, Benson CA, Gandhi RT, et al. Antiretroviral drugs for treatment and prevention of HIV infection in adults: 2018 recommendations of the International Antiviral Society-USA Panel. JAMA 2018;320:379–96. PMID:30043070 https://doi.org/10.1001/jama.2018.8431
414. Seth P, Wang G, Sizemore E, Hogben M. HIV testing and HIV service delivery to populations at high risk attending sexually transmitted disease clinics in the United States, 2011–2013. Am J Public Health 2015;105:2374–81. PMID:26378854 https://doi.org/10.2105/AJPH.2015.302778
415. Benton S, Smith J, Wang F, Heitgerd J, Belcher L, Patel H. HIV testing, diagnosis, and linkage to care among persons tested in select CDC-funded health care and non-health care settings, 2012–2017. Presented at the National HIV Prevention Conference, Atlanta, GA: March 18–21, 2019.
416. Pathela P, Braunstein SL, Schillinger JA, Shepard C, Sweeney M, Blank S. Men who have sex with men have a 140-fold higher risk for newly diagnosed HIV and syphilis compared with heterosexual men in New York City. J Acquir Immune Defic Syndr 2011;58:408–16. PMID:21857351 https://doi.org/10.1097/QAI.0b013e318230e1ca
417. Chou R, Selph S, Dana T, et al. Screening for HIV: systematic review to update the 2005 U.S. Preventive Services Task Force recommendation. Ann Intern Med 2012;157:706–18. PMID:23165662 https://doi.org/10.7326/0003-4819-157-10-201211200-00007
418. Branson BM, Handsfield HH, Lampe MA, et al.; CDC. Revised recommendations for HIV testing of adults, adolescents, and pregnant women in health-care settings. MMWR Recomm Rep 2006;55(No. RR-14). PMID:16988643
419. DiNenno EA, Prejean J, Irwin K, et al. Recommendations for HIV screening of gay, bisexual, and other men who have sex with men—United States, 2017. MMWR Morb Mortal Wkly Rep 2017;66:830–2. PMID:28796758 https://doi.org/10.15585/mmwr.mm6631a3
420. CDC. HIV-2 infection surveillance—United States, 1987–2009. MMWR Morb Mortal Wkly Rep 2011;60:985–8. PMID:21796096
421. Wawer MJ, Gray RH, Sewankambo NK, et al. Rates of HIV-1 transmission per coital act, by stage of HIV-1 infection, in Rakai, Uganda. J Infect Dis 2005;191:1403–9. PMID:15809897 https://doi.org/10.1086/429411
422. Pilcher CD, Eron JJ Jr, Vemazza PL, et al. Sexual transmission during the incubation period of primary HIV infection. JAMA 2001;286:1713–4. PMID:11594895 https://doi.org/10.1001/jama.286.14.1713
423. Calabrese SK, Mayer KH. Providers should discuss U=U with all patients living with HIV. Lancet HIV 2019;6:e211–3. PMID:30772420 https://doi.org/10.1016/S2352-3018(19)30030-X
424. Gilbert P, Ciccarone D, Gansky SA, et al. Interactive "Video Doctor" counseling reduces drug and sexual risk behaviors among HIV-positive patients in diverse outpatient settings. PLoS One 2008;3:e1988. PMID:18431475 https://doi.org/10.1371/journal.pone.0001988
425. Aberg JA, Gallant JE, Ghanem KG, Emmanuel P, Zingman BS, Horberg MA; Infectious Diseases Society of America. Primary care guidelines for the management of persons infected with HIV: 2013 update by the HIV medicine association of the Infectious Diseases Society of America. Clin Infect Dis 2014;58:e1–34. PMID:24235263 https://doi.org/10.1093/cid/cit665
426. DiCarlo RP, Martin DH. The clinical diagnosis of genital ulcer disease in men. Clin Infect Dis 1997;25:292–8. PMID:9332527 https://doi.org/10.1086/514548
427. Lockett AE, Dance DA, Mabey DC, Drasar BS. Serum-free media for isolation of *Haemophilus ducreyi*. Lancet 1991;338:326. PMID:1677152 https://doi.org/10.1016/0140-6736(91)90473-3

397. Morrow KM; Project START Study Group.年轻男性监禁前后的HIV、STD和肝炎风险行为。AIDS Care 2009;21:235-43. PMID:19229694 https://doi.org/10.1080/09540120802017586
398. Bryan AD, Magnan RE, Gillman AS, et al.在青少年性风险降低干预中纳入酒精和大麻内容对性传播感染发病率的影响：一项整群随机临床试验。JAMA Pediatr 2018;172:e175621. PMID:29435591 https://doi.org/10.1001/jamapediatrics.2017.5621
399. DiClemente RJ, Davis TL, Swartzendruber A, et al.针对少年拘留中心非裔美国青少年女孩的HIV/STI性风险降低干预措施的效果：一项随机对照试验。Women Health 2014;54:726-49. PMID:25190056 https://doi.org/10.1080/03630242.2014.932893
400. Fogel CI, Crandell JL, Neevel AM, et al.针对被监禁女性的适应性HIV和性传播感染预防干预措施的效果：一项随机对照试验。Am J Public Health 2015;105:802-9. PMID:25211714 https://doi.org/10.2105/AJPH.2014.302105
401. Son J, Miller WM, Tossone K, Butcher F, Kuo K.跨专业学生主导的生殖健康教育对少年拘留所青少年的影响。J Pediatr Adolesc Gynecol 2017;30:370-5. PMID:27871918 https://doi.org/10.1016/j.jpag.2016.11.002
402. Costumbrado J, Stirland A, Cox G, et al.在洛杉矶县监狱高风险囚犯中实施采用加速程序的甲型/乙型肝炎疫苗接种计划，2007-2010年。Vaccine 2012;30:6878-82. PMID:22989688 https://doi.org/10.1016/j.vaccine.2012.09.006
403. Allison M, Musser B, Satterwhite C, Ault K, Kelly P, Ramaswamy M.2016-2017年堪萨斯州成年囚犯对人乳头瘤病毒疫苗的认知与接种意愿。Am J Public Health 2018;108:1000-2. PMID:29927651 https://doi.org/10.2105/AJPH.2018.304499
404. Lucas KD, Miller JL, Eckert V, Horne RL, Samuel MC, Mohle-Boetani JC.加利福尼亚州一所州立监狱囚犯安全套获取试点项目的风险、可行性和成本评估。J Correct Health Care 2014; 20: 184-94. PMID: 24934836 https://doi.org/10.1177/1078345814530869
405. Scott N, McBryde E, Kirwan A, Stoové M.在成年男性监狱系统中模拟安全套发放对性传播感染发病率和患病率的影响。PLoS One 2015;10:e0144869. PMID:26658518 https://doi.org/10.1371/journal.pone.0144869
406. Schacker T, Collier AC, Hughes J, Shea T, Corey L.原发性HIV感染的临床和流行病学特征。Ann Intern Med 1996;125:257-64. PMID: 8678387 https://doi.org/10.7326/0003-4819-125-4-199608150-00001
407. Henn A, Flateau C, Gallien S.原发性HIV感染：临床表现、检测与治疗。Curr Infect Dis Rep 2017;19:37. PMID:28884279 https://doi.org/10.1007/s11908-017-0588-3
408. Robb ML, Eller LA, Kibuuka H, et al.; RV 217研究团队.东非和泰国成人急性HIV-1感染的前瞻性研究.N Engl J Med 2016;374:2120-30. PMID:27192360 https://doi.org/10.1056/NEJMoa1508952
409. Hoenigl M, Green N, Camacho M, et al.在社区筛查队列中急性HIV感染的体征或症状。Emerg Infect Dis 2016;22:532-4. PMID:26890854 https://doi.org/10.3201/eid2203.151607
410. Legarth RA, Ahlström MG, Kronborg G, et al.50岁及以上HIV感染者的长期死亡率：一项全国性、基于人群的队列研究。J Acquir Immune Defic Syndr 2016;71:213-8. PMID:26334734 https://doi.org/10.1097/QAI.0000000000000825
411. Marcus JL, Chao CR, Leyden WA, et al.缩小有医疗可及性的HIV感染者与未感染者之间的预期寿命差距。J Acquir Immune Defic Syndr 2016;73:39-46. PMID:27028501 https://doi.org/10.1097/QAI.0000000000001014
412. Cohen MS, Chen YQ, McCauley M, et al.; HPTN 052 Study Team.抗逆转录病毒治疗用于预防HIV-1传播。N Engl J Med 2016;375:830-9. PMID:27424812 https://doi.org/10.1056/ NEJMoa1600693
413. Saag MS, Benson CA, Gandhi RT, et al.成人HIV感染治疗和预防的抗逆转录病毒药物：2018年美国国际抗病毒学会专家组的建议。JAMA 2018;320:379-96. PMID:30043070 https://doi.org/10.1001/jama.2018.8431
414. Seth P, Wang G, Sizemore E, Hogben M.2011-2013年美国性病诊所就诊的高风险人群中HIV检测及HIV服务提供情况.Am J Public Health 2015;105:2374-81. PMID:26378854 https://doi.org/10.2105/AJPH.2015.302778
415. Benton S, Smith J, Wang F, Heitgerd J, Belcher L, Patel H.2012-2017年在选定的CDC资助的医疗保健和非医疗保健机构中接受检测者的HIV检测、诊断及与照护的衔接。发表于国家HIV预防会议，佐治亚州亚特兰大：2019年3月18-21日。
416. Pathela P, Braunstein SL, Schillinger JA, Shepard C, Sweeney M, Blank S.男男性行为人群新诊断HIV和梅毒的风险是纽约市异性恋男性的140倍。J Acquir Immune Defic Syndr 2011;58:408-16. PMID:21857351 https://doi.org/10.1097/QAI.0b013e318230e1ca
417. Chou R, Selph S, Dana T, et al.筛查HIV：系统综述以更新2005年美国预防服务工作组建议。Ann Intern Med 2012;157:706-18. PMID:23165662 https://doi.org/10.7326/0003-4819-157-10-201211200-00007
418. Branson BM, Handsfield HH, Lampe MA, et al.; CDC.修订的卫生保健机构中成人、青少年和孕妇HIV检测建议。MMWR Recomm Rep 2006;55(No.RR-14).PMID:16988643
419. DiNenno EA, Prejean J, Irwin K, et al.男同性恋、双性恋及其他男男性行为人群HIV筛查建议--美国，2017年。MMWR Morb Mortal Wkly Rep 2017;66:830-2. PMID:28796758 https://doi.org/10.15585/mmwr.mm6631a3
420. CDC.HIV-2感染监测--美国，1987-2009年。MMWR Morb Mortal Wkly Rep 2011;60:985-8. PMID:21796096
421. Wawer MJ, Gray RH, Sewankambo NK, et al.乌干达拉凯地区按HIV-1感染阶段划分的每次性交HIV-1传播率。J Infect Dis 2005;191:1403-9. PMID:15809897 https://doi.org/10.1086/429411
422. Pilcher CD, Eron JJ Jr, Vemazza PL, et al.原发性HIV感染潜伏期期间的性传播。JAMA 2001;286:1713-4. PMID:11594895 https://doi.org/10.1001/ jama.286.14.1713
423. Calabrese SK, Mayer KH.医疗服务提供者应与所有HIV感染者讨论U=U。Lancet HIV 2019;6:e211-3. PMID:30772420 https://doi.org/10.1016/S2352-3018(19) 30030-X
424. Gilbert P, Ciccarone D, Gansky SA, et al.互动式"视频医生"咨询减少不同门诊环境中HIV阳性患者的毒品和性风险行为。PLoS One 2008;3:e1988. PMID:18431475 https://doi.org/10.1371/journal.pone.0001988
425. Aberg JA, Gallant JE, Ghanem KG, Emmanuel P, Zingman BS, Horberg MA； 美国感染病学会.HIV感染者管理初级保健指南：2013年美国感染病学会HIV医学协会更新。Clin Infect Dis 2014;58:e1-34. PMID:24235263 https:// doi.org/10.1093/cid/cit665
426. DiCarlo RP, Martin DH.男性生殖器溃疡病的临床诊断。Clin Infect Dis 1997;25:292-8. PMID:9332527 https://doi.org/10.1086/514548
427. Lockett AE, Dance DA, Mabey DC, Drasar BS.用于分离杜克雷嗜血杆菌的无血清培养基。Lancet 1991;338:326. PMID:1677152 https://doi.org/10.1016/0140-6736(91) 90473-3

428. Lewis DA, Mitjà O. *Haemophilus ducreyi*: from sexually transmitted infection to skin ulcer pathogen. Curr Opin Infect Dis 2016;29:52–7. PMID:26658654 https://doi.org/10.1097/QCO.0000000000000226
429. Romero L, Huerfano C, Grillo-Ardila CF. Macrolides for treatment of *Haemophilus ducreyi* infection in sexually active adults. Cochrane Database Syst Rev 2017;12:CD012492. PMID:29226307 https://doi.org/10.1002/14651858.CD012492.pub2
430. Jessamine PG, Plummer FA, Ndinya Achola JO, et al. Human immunodeficiency virus, genital ulcers and the male foreskin: synergism in HIV-1 transmission. Scand J Infect Dis Suppl 1990;69:181–6. PMID:2263893
431. Briggs GC. Drugs in pregnancy and lactation: a reference guide to fetal and neonatal risk. 11th ed. Philadelphia, PA: Wolters Kluwer; 2017.
432. Lewis DA. Epidemiology, clinical features, diagnosis and treatment of *Haemophilus ducreyi*—a disappearing pathogen? Expert Rev Anti Infect Ther 2014;12:687–96. PMID:24597521 https://doi.org/10.1586/14787210.2014.892414
433. Mitjà O, Lukehart SA, Pokowas G, et al. *Haemophilus ducreyi* as a cause of skin ulcers in children from a yaws-endemic area of Papua New Guinea: a prospective cohort study. Lancet Glob Health 2014;2:e235–41. PMID:25103064 https://doi.org/10.1016/S2214-109X(14)70019-1
434. Marks M, Chi KH, Vahi V, et al. *Haemophilus ducreyi* associated with skin ulcers among children, Solomon Islands. Emerg Infect Dis 2014;20:1705–7. PMID:25271477 https://doi.org/10.3201/eid2010.140573
435. Ghinai R, El-Duah P, Chi KH, et al. A cross-sectional study of 'yaws' in districts of Ghana which have previously undertaken azithromycin mass drug administration for trachoma control. PLoS Negl Trop Dis 2015;9:e0003496. PMID:25632942 https://doi.org/10.1371/journal.pntd.0003496
436. McQuillan G, Kruszon-Moran D, Flagg EW, Paulose-Ram R. Prevalence of herpes simplex virus type 1 and type 2 in persons aged 14–49: United States, 2015–2016. NCHS Data Brief 2018;304:1–8. PMID:29442994
437. Ryder N, Jin F, McNulty AM, Grulich AE, Donovan B. Increasing role of herpes simplex virus type 1 in first-episode anogenital herpes in heterosexual women and younger men who have sex with men, 1992–2006. Sex Transm Infect 2009;85:416–9. PMID:19273479 https://doi.org/10.1136/sti.2008.033902
438. Roberts CM, Pfister JR, Spear SJ. Increasing proportion of herpes simplex virus type 1 as a cause of genital herpes infection in college students. Sex Transm Dis 2003;30:797–800. PMID:14520181 https://doi.org/10.1097/01.OLQ.0000092387.58746.C7
439. Benedetti J, Corey L, Ashley R. Recurrence rates in genital herpes after symptomatic first-episode infection. Ann Intern Med 1994;121:847–54. PMID:7978697 https://doi.org/10.7326/0003-4819-121-11-199412010-00004
440. Engelberg R, Carrell D, Krantz E, Corey L, Wald A. Natural history of genital herpes simplex virus type 1 infection. Sex Transm Dis 2003;30:174–7. PMID:12567178 https://doi.org/10.1097/00007435-200302000-00015
441. Masese L, Baeten JM, Richardson BA, et al. Changes in the contribution of genital tract infections to HIV acquisition among Kenyan high-risk women from 1993 to 2012. AIDS 2015;29:1077–85. PMID:26125141 https://doi.org/10.1097/QAD.0000000000000646
442. Sam SS, Caliendo AM, Ingersoll J, Abdul-Ali D, Kraft CS. Performance evaluation of the Aptima HSV-1 and 2 assay for the detection of HSV in cutaneous and mucocutaneous lesion specimens. J Clin Virol 2018;99-100:1–4. PMID:29253834 https://doi.org/10.1016/j.jcv.2017.12.006
443. Wald A, Huang ML, Carrell D, Selke S, Corey L. Polymerase chain reaction for detection of herpes simplex virus (HSV) DNA on mucosal surfaces: comparison with HSV isolation in cell culture. J Infect Dis 2003;188:1345–51. PMID:14593592 https://doi.org/10.1086/379043
444. Van Der Pol B, Warren T, Taylor SN, et al. Type-specific identification of anogenital herpes simplex virus infections by use of a commercially available nucleic acid amplification test. J Clin Microbiol 2012;50:3466–71. PMID:22875892 https://doi.org/10.1128/JCM.01685-12
445. Binnicker MJ, Espy MJ, Duresko B, Irish C, Mandrekar J. Automated processing, extraction and detection of herpes simplex virus types 1 and 2: a comparative evaluation of three commercial platforms using clinical specimens. J Clin Virol 2017;89:30–3. PMID:28226272 https://doi.org/10.1016/j.jcv.2017.02.006
446. Teo JW, Chiang D, Jureen R, Lin RT. Clinical evaluation of a helicase-dependant amplification (HDA)-based commercial assay for the simultaneous detection of HSV-1 and HSV-2. Diagn Microbiol Infect Dis 2015;83:261–2. PMID:26302856 https://doi.org/10.1016/j.diagmicrobio.2015.07.018
447. Gitman MR, Ferguson D, Landry ML. Comparison of Simplexa HSV 1 & 2 PCR with culture, immunofluorescence, and laboratory-developed TaqMan PCR for detection of herpes simplex virus in swab specimens. J Clin Microbiol 2013;51:3765–9. PMID:24006008 https://doi.org/10.1128/JCM.01413-13
448. Corey L, Holmes KK. Genital herpes simplex virus infections: current concepts in diagnosis, therapy, and prevention. Ann Intern Med 1983;98:973–83. PMID:6344713 https://doi.org/10.7326/0003-4819-98-6-958
449. Caviness AC, Oelze LL, Saz UE, Greer JM, Demmler-Harrison GJ. Direct immunofluorescence assay compared to cell culture for the diagnosis of mucocutaneous herpes simplex virus infections in children. J Clin Virol 2010;49:58–60. PMID:20620099 https://doi.org/10.1016/j.jcv.2010.06.006
450. Song B, Dwyer DE, Mindel A. HSV type specific serology in sexual health clinics: use, benefits, and who gets tested. Sex Transm Infect 2004;80:113–7. PMID:15054171 https://doi.org/10.1136/sti.2003.006783
451. Whittington WL, Celum CL, Cent A, Ashley RL. Use of a glycoprotein G-based type-specific assay to detect antibodies to herpes simplex virus type 2 among persons attending sexually transmitted disease clinics. Sex Transm Dis 2001;28:99–104. PMID:11234793 https://doi.org/10.1097/00007435-200102000-00007
452. Zimet GD, Rosenthal SL, Fortenberry JD, et al. Factors predicting the acceptance of herpes simplex virus type 2 antibody testing among adolescents and young adults. Sex Transm Dis 2004;31:665–9. PMID:15502674 https://doi.org/10.1097/01.olq.0000143089.77493.c2
453. Turner KR, Wong EH, Kent CK, Klausner JD. Serologic herpes testing in the real world: validation of new type-specific serologic herpes simplex virus tests in a public health laboratory. Sex Transm Dis 2002;29:422–5. PMID:12170133 https://doi.org/10.1097/00007435-200207000-00011
454. Eing BR, Lippelt L, Lorentzen EU, et al. Evaluation of confirmatory strategies for detection of type-specific antibodies against herpes simplex virus type 2. J Clin Microbiol 2002;40:407–13. PMID:11825950 https://doi.org/10.1128/JCM.40.2.407-413.2002
455. Golden MR, Ashley-Morrow R, Swenson P, Hogrefe WR, Handsfield HH, Wald A. Herpes simplex virus type 2 (HSV-2) Western blot confirmatory testing among men testing positive for HSV-2 using the focus enzyme-linked immunosorbent assay in a sexually transmitted disease clinic. Sex Transm Dis 2005;32:771–7. PMID:16314775 https://doi.org/10.1097/01.olq.0000175377.88358.f3
456. Morrow RA, Friedrich D, Meier A, Corey L. Use of "biokit HSV-2 Rapid Assay" to improve the positive predictive value of Focus HerpeSelect HSV-2 ELISA. BMC Infect Dis 2005;5:84. PMID:16225691 https://doi.org/10.1186/1471-2334-5-84
457. Ngo TD, Laeyendecker O, La H, Hogrefe W, Morrow RA, Quinn TC. Use of commercial enzyme immunoassays to detect antibodies to the herpes simplex virus type 2 glycoprotein G in a low-risk population in Hanoi, Vietnam. Clin Vaccine Immunol 2008;15:382–4. PMID:18077617 https://doi.org/10.1128/CVI.00437-06

428. Lewis DA, Mitjà O.杜克雷嗜血杆菌：从性传播感染到皮肤溃疡病原体。Curr Opin Infect Dis 2016;29:52-7. PMID:26658654 https://doi.org/10.1097/QCO.0000000000000226
429. Romero L, Huerfano C, Grillo-Ardila CF.大环内酯类药物治疗性活跃成人杜克雷嗜血杆菌感染。Cochrane Database Syst Rev 2017;12:CD012492. PMID:29226307 https://doi.org/10.1002/14651858.CD012492.pub2
430. Jessamine PG, Plummer FA, Ndinya Achola JO, et al.人类免疫缺陷病毒、生殖器溃疡和男性包皮：HIV-1传播中的协同作用。Scand J Infect Dis Suppl 1990;69:181-6. PMID:2263893
431. Briggs GC.妊娠和哺乳期用药：胎儿和新生儿风险参考指南。第11版。Philadelphia, PA: Wolters Kluwer; 2017.
432. Lewis DA.杜克雷嗜血杆菌的流行病学、临床特征、诊断和治疗--一个正在消失的病原体?Expert Rev Anti Infect Ther 2014;12:687-96. PMID:24597521 https://doi.org/10.1586/14 787210.2014.892414
433. Mitjà O, Lukehart SA, Pokowas G, et al.杜克雷嗜血杆菌作为巴布亚新几内亚雅司病流行区儿童皮肤溃疡的病因：一项前瞻性队列研究。Lancet Glob Health 2014;2:e235-41. PMID:25103064 https://doi.org/10.1016/S2214-109X(14) 70019-1
434. Marks M, Chi KH, Vahi V, et al.杜克雷嗜血杆菌与所罗门群岛儿童皮肤溃疡相关。Emerg Infect Dis 2014;20:1705-7. PMID:25271477 https://doi.org/10.3201/ eid2010.140573
435. Ghinai R, El-Duah P, Chi KH, et al.对加纳曾开展阿奇霉素群体给药控制沙眼地区"雅司病"的横断面研究。PLoS Negl Trop Dis 2015;9:e0003496. PMID:25632942 https://doi.org/10.1371/journal.pntd.0003496
436. McQuillan G, Kruszon-Moran D, Flagg EW, Paulose-Ram R.14-49岁人群中1型和2型单纯疱疹病毒患病率：美国，2015-2016年。NCHS Data Brief 2018;304:1-8. PMID:29442994
437. Ryder N, Jin F, McNulty AM, Grulich AE, Donovan B.1992-2006年1型单纯疱疹病毒在异性恋女性和较年轻男男性行为人群首发肛门生殖器疱疹中作用增加。Sex Transm Infect 2009;85:416-9. PMID:19273479 https://doi.org/10.1136/sti.2008.033902
438. Roberts CM, Pfister JR, Spear SJ.大学生中1型单纯疱疹病毒作为生殖器疱疹感染病因的比例增加。Sex Transm Dis 2003;30:797-800. PMID:14520181 https:// doi.org/10.1097/01.OLQ.0000092387.58746.C7
439. Benedetti J, Corey L, Ashley R.有症状首发感染后生殖器疱疹的复发率。Ann Intern Med 1994;121:847-54. PMID:7978697 https://doi.org/10.7326/0003-4819-121-11-199412010-00004
440. Engelberg R, Carrell D, Krantz E, Corey L, Wald A.1型单纯疱疹病毒生殖器感染的自然史。Sex Transm Dis 2003;30:174-7. PMID:12567178 https://doi.org/10.1097/00007435-200302000-00015
441. Masese L, Baeten JM, Richardson BA, et al.1993年至2012年肯尼亚高危女性中生殖道感染对HIV感染贡献的变化。AIDS 2015;29:1077-85. PMID:26125141 https://doi.org/10.1097/QAD.0000000000000646
442. Sam SS, Caliendo AM, Ingersoll J, Abdul-Ali D, Kraft CS.Aptima HSV-1和2检测试剂盒在皮肤及黏膜皮肤病变标本中检测HSV的性能评价。J Clin Virol 2018;99-100:1-4. PMID:29253834 https://doi.org/10.1016/ j.jcv.2017.12.006
443. Wald A, Huang ML, Carrell D, Selke S, Corey L.聚合酶链反应检测黏膜表面单纯疱疹病毒(HSV)DNA：与细胞培养HSV分离法的比较。J Infect Dis 2003;188:1345-51. PMID:14593592 https://doi.org/10.1086/379043
444. Van Der Pol B, Warren T, Taylor SN, et al.使用市售核酸扩增检测对肛门生殖器单纯疱疹病毒感染进行型别特异性鉴定。J Clin Microbiol 2012;50:3466-71. PMID:22875892 https://doi.org/10.1128/JCM.01685-12
445. Binnicker MJ, Espy MJ, Duresko B, Irish C, Mandrekar J.单纯疱疹病毒1型和2型的自动化处理、提取和检测：使用临床标本对三种商业平台的比较评价。J Clin Virol 2017;89:30-3. PMID:28226272 https://doi.org/10.1016/j.jcv.2017.02.006
446. Teo JW, Chiang D, Jureen R, Lin RT.基于解旋酶依赖性扩增(HDA)的商业检测试剂盒同时检测HSV-1和HSV-2的临床评价。Diagn Microbiol Infect Dis 2015;83:261-2. PMID:26302856 https://doi.org/10.1016/j.diagmicrobio.2015.07.018
447. Gitman MR, Ferguson D, Landry ML.Simplexa HSV 1 & 2 PCR与培养法、免疫荧光法及实验室自建TaqMan PCR检测拭子标本中单纯疱疹病毒的比较。J Clin Microbiol 2013;51:3765-9. PMID:24006008 https://doi.org/10.1128/JCM.01413-13
448. Corey L, Holmes KK.生殖器单纯疱疹病毒感染：诊断、治疗和预防的当前概念。Ann Intern Med 1983;98:973-83. PMID:6344713 https://doi.org/10.7326/0003-4819-98-6-958
449. Caviness AC, Oelze LL, Saz UE, Greer JM, Demmler-Harrison GJ.直接免疫荧光法与细胞培养法诊断儿童黏膜皮肤单纯疱疹病毒感染的比较。J Clin Virol 2010;49:58-60. PMID:20620099 https://doi.org/10.1016/j.jcv.2010.06.006
450. Song B, Dwyer DE, Mindel A.性健康门诊中的HSV型别特异性血清学检测：使用、获益及受检人群。Sex Transm Infect 2004;80:113-7. PMID:15054171 https://doi.org/10.1136/ sti.2003.006783
451. Whittington WL, Celum CL, Cent A, Ashley RL.使用基于糖蛋白G的型别特异性检测在性传播疾病门诊就诊者中检测2型单纯疱疹病毒抗体。Sex Transm Dis 2001;28:99-104. PMID:11234793 https://doi.org/10.1097/00007435-200102000-00007
452. Zimet GD, Rosenthal SL, Fortenberry JD, et al.预测青少年和年轻成人接受2型单纯疱疹病毒抗体检测的因素。Sex Transm Dis 2004;31:665-9. PMID:15502674 https://doi.org/10.1097/01.olq.0000143089.77493.c2
453. Turner KR, Wong EH, Kent CK, Klausner JD.现实世界中的血清学疱疹检测：在公共卫生实验室验证新型型别特异性血清学单纯疱疹病毒检测。Sex Transm Dis 2002;29:422-5. PMID:12170133 https://doi.org/10.1097/00007435-200207000-00011
454. Eing BR, Lippelt L, Lorentzen EU, et al.2型单纯疱疹病毒型别特异性抗体检测确认策略的评价。J Clin Microbiol 2002;40:407-13. PMID:11825950 https://doi.org/10.1128/JCM.40.2.407-413.2002
455. Golden MR, Ashley-Morrow R, Swenson P, Hogrefe WR, Handsfield HH, Wald A.在性传播疾病门诊中使用Focus酶联免疫吸附试验检测HSV-2阳性男性中2型单纯疱疹病毒(HSV-2)Western blot确认检测。Sex Transm Dis 2005;32:771-7. PMID:16314775 https://doi.org/10.1097/01.olq.0000175377.88358.f3
456. Morrow RA, Friedrich D, Meier A, Corey L.使用"biokit HSV-2 Rapid Assay"提高Focus HerpeSelect HSV-2 ELISA的阳性预测值。BMC Infect Dis 2005;5:84. PMID:16225691 https://doi.org/10.1186/1471-2334-5-84
457. Ngo TD, Laeyendecker O, La H, Hogrefe W, Morrow RA, Quinn TC.在越南河内低风险人群中使用商业酶免疫检测法检测2型单纯疱疹病毒糖蛋白G抗体。Clin Vaccine Immunol 2008;15:382-4. PMID:18077617 https://doi.org/10.1128/CVI.00437-06

458. Agyemang E, Le QA, Warren T, et al. Performance of commercial enzyme-linked immunoassays for diagnosis of herpes simplex virus-1 and herpes simplex virus-2 infection in a clinical setting. Sex Transm Dis 2017;44:763–7. PMID:28876290 https://doi.org/10.1097/OLQ.0000000000000689
459. Morrow R, Friedrich D. Performance of a novel test for IgM and IgG antibodies in subjects with culture-documented genital herpes simplex virus-1 or -2 infection. Clin Microbiol Infect 2006;12:463–9. PMID:16643524 https://doi.org/10.1111/j.1469-0691.2006.01370.x
460. Ameli N, Bacchetti P, Morrow RA, et al. Herpes simplex virus infection in women in the WIHS: epidemiology and effect of antiretroviral therapy on clinical manifestations. AIDS 2006;20:1051–8. PMID:16603858 https://doi.org/10.1097/01.aids.0000222078.75867.77
461. Bradley H, Markowitz LE, Gibson T, McQuillan GM. Seroprevalence of herpes simplex virus types 1 and 2—United States, 1999–2010. J Infect Dis 2014;209:325–33. PMID:24136792 https://doi.org/10.1093/infdis/jit458
462. Bernstein DI, Bellamy AR, Hook EW 3rd, et al. Epidemiology, clinical presentation, and antibody response to primary infection with herpes simplex virus type 1 and type 2 in young women. Clin Infect Dis 2013;56:344–51. PMID:23087395 https://doi.org/10.1093/cid/cis891
463. Leone PA, Trottier S, Miller JM. Valacyclovir for episodic treatment of genital herpes: a shorter 3-day treatment course compared with 5-day treatment. Clin Infect Dis 2002;34:958–62. PMID:11880962 https://doi.org/10.1086/339326
464. Wald A, Carrell D, Remington M, Kexel E, Zeh J, Corey L. Two-day regimen of acyclovir for treatment of recurrent genital herpes simplex virus type 2 infection. Clin Infect Dis 2002;34:944–8. PMID:11880960 https://doi.org/10.1086/339325
465. Aoki FY, Tyring S, Diaz-Mitoma F, Gross G, Gao J, Hamed K. Single-day, patient-initiated famciclovir therapy for recurrent genital herpes: a randomized, double-blind, placebo-controlled trial. Clin Infect Dis 2006;42:8–13. PMID:16323085 https://doi.org/10.1086/498521
466. Chosidow O, Drouault Y, Leconte-Veyriac F, et al. Famciclovir vs. aciclovir in immunocompetent patients with recurrent genital herpes infections: a parallel-groups, randomized, double-blind clinical trial. Br J Dermatol 2001;144:818–24. PMID:11298543 https://doi.org/10.1046/j.1365-2133.2001.04139.x
467. Bodsworth NJ, Crooks RJ, Borelli S, et al.; International Valaciclovir HSV Study Group. Valaciclovir versus aciclovir in patient initiated treatment of recurrent genital herpes: a randomised, double blind clinical trial. Genitourin Med 1997;73:110–6. PMID:9215092
468. Fife KH, Barbarash RA, Rudolph T, Degregorio B, Roth R; The Valaciclovir International Herpes Simplex Virus Study Group. Valaciclovir versus acyclovir in the treatment of first-episode genital herpes infection. Results of an international, multicenter, double-blind, randomized clinical trial. Sex Transm Dis 1997;24:481–6. PMID:9293612 https://doi.org/10.1097/00007435-199709000-00007
469. Diaz-Mitoma F, Sibbald RG, Shafran SD, Boon R, Saltzman RL; Collaborative Famciclovir Genital Herpes Research Group. Oral famciclovir for the suppression of recurrent genital herpes: a randomized controlled trial. JAMA 1998;280:887–92. PMID:9739972 https://doi.org/10.1001/jama.280.10.887
470. Mertz GJ, Loveless MO, Levin MJ, et al.; Collaborative Famciclovir Genital Herpes Research Group. Oral famciclovir for suppression of recurrent genital herpes simplex virus infection in women. A multicenter, double-blind, placebo-controlled trial. Arch Intern Med 1997;157:343–9. PMID:9040303 https://doi.org/10.1001/archinte.1997.00440240109016
471. Reitano M, Tyring S, Lang W, et al.; International Valaciclovir HSV Study Group. Valaciclovir for the suppression of recurrent genital herpes simplex virus infection: a large-scale dose range-finding study. J Infect Dis 1998;178:603–10. PMID:9728526 https://doi.org/10.1086/515385
472. Romanowski B, Marina RB, Roberts JN; Valtrex HS230017 Study Group. Patients' preference of valacyclovir once-daily suppressive therapy versus twice-daily episodic therapy for recurrent genital herpes: a randomized study. Sex Transm Dis 2003;30:226–31. PMID:12616141 https://doi.org/10.1097/00007435-200303000-00010
473. Corey L, Wald A, Patel R, et al.; Valacyclovir HSV Transmission Study Group. Once-daily valacyclovir to reduce the risk of transmission of genital herpes. N Engl J Med 2004;350:11–20. PMID:14702423 https://doi.org/10.1056/NEJMoa035144
474. Tyring SK, Baker D, Snowden W. Valacyclovir for herpes simplex virus infection: long-term safety and sustained efficacy after 20 years' experience with acyclovir. J Infect Dis 2002;186(Suppl 1):S40–6. PMID:12353186 https://doi.org/10.1086/342966
475. Bartlett BL, Tyring SK, Fife K, et al. Famciclovir treatment options for patients with frequent outbreaks of recurrent genital herpes: the RELIEF trial. J Clin Virol 2008;43:190–5. PMID:18621575 https://doi.org/10.1016/j.jcv.2008.06.004
476. Tronstein E, Johnston C, Huang ML, et al. Genital shedding of herpes simplex virus among symptomatic and asymptomatic persons with HSV-2 infection. JAMA 2011;305:1441–9. PMID:21486977 https://doi.org/10.1001/jama.2011.420
477. Bender Ignacio RA, Perti T, Magaret AS, et al. Oral and vaginal tenofovir for genital herpes simplex virus type 2 shedding in immunocompetent women: a double-blind, randomized, cross-over trial. J Infect Dis 2015;212:1949–56. PMID:26044291 https://doi.org/10.1093/infdis/jiv317
478. Wald A, Selke S, Warren T, et al. Comparative efficacy of famciclovir and valacyclovir for suppression of recurrent genital herpes and viral shedding. Sex Transm Dis 2006;33:529–33. PMID:16540883 https://doi.org/10.1097/01.olq.0000204723.15765.91
479. Johnston C, Magaret A, Stern M, et al. Natural history of genital and oral herpes simplex virus-1 (HSV-1) shedding after first episode genital HSV-1 infection. Sex Transm Infect 2019;95:A42.
480. Tang YW, Cleavinger PJ, Li H, Mitchell PS, Smith TF, Persing DH. Analysis of candidate-host immunogenetic determinants in herpes simplex virus-associated Mollaret's meningitis. Clin Infect Dis 2000;30:176–8. PMID:10619748 https://doi.org/10.1086/313616
481. Shalabi M, Whitley RJ. Recurrent benign lymphocytic meningitis. Clin Infect Dis 2006;43:1194–7. PMID:17029141 https://doi.org/10.1086/508281
482. Landry ML, Greenwold J, Vikram HR. Herpes simplex type-2 meningitis: presentation and lack of standardized therapy. Am J Med 2009;122:688–91. PMID:19559173 https://doi.org/10.1016/j.amjmed.2009.02.017
483. Aurelius E, Franzen-Röhl E, Glimåker M, et al.; HSV-2 Meningitis Study Group. Long-term valacyclovir suppressive treatment after herpes simplex virus type 2 meningitis: a double-blind, randomized controlled trial. Clin Infect Dis 2012;54:1304–13. PMID:22460966 https://doi.org/10.1093/cid/cis031
484. Magawa S, Tanaka H, Furuhashi F, et al. A literature review of herpes simplex virus hepatitis in pregnancy. J Matern Fetal Neonatal Med 2020;33:1774–9. PMID:30235956 https://doi.org/10.1080/14767058.2018.1527311
485. Masadeh M, Shen H, Lee Y, et al. A fatal case of herpes simplex virus hepatitis in a pregnant patient. Intractable Rare Dis Res 2017;6:124–7. PMID:28580213 https://doi.org/10.5582/irdr.2017.01013
486. Martin ET, Krantz E, Gottlieb SL, et al. A pooled analysis of the effect of condoms in preventing HSV-2 acquisition. Arch Intern Med 2009;169:1233–40. PMID:19597073 https://doi.org/10.1001/archinternmed.2009.177
487. Wald A, Langenberg AG, Krantz E, et al. The relationship between condom use and herpes simplex virus acquisition. Ann Intern Med 2005;143:707–13. PMID:16287791 https://doi.org/10.7326/0003-4819-143-10-200511150-00007

458. Agyemang E, Le QA, Warren T, et al.商业酶联免疫检测法在临床环境中诊断1型单纯疱疹病毒和2型单纯疱疹病毒感染的表现。Sex Transm Dis 2017;44:763-7. PMID:28876290 https://doi.org/10.1097/OLQ.0000000000000689
459. Morrow R, Friedrich D.一种新型IgM和IgG抗体检测在培养确诊的生殖器1型或2型单纯疱疹病毒感染受试者中的表现。Clin Microbiol Infect 2006;12:463-9. PMID:16643524 https://doi.org/10.1111/j.1469-0691.2006.01370.x
460. Ameli N, Bacchetti P, Morrow RA, et al.WIHS中女性的单纯疱疹病毒感染：流行病学及抗逆转录病毒治疗对临床表现的影响。AIDS 2006;20:1051-8. PMID:16603858 https://doi.org/10.1097/01.aids.0000222078.75867.77
461. Bradley H, Markowitz LE, Gibson T, McQuillan GM.1型和2型单纯疱疹病毒血清阳性率--美国，1999-2010年。J Infect Dis 2014;209:325-33. PMID:24136792 https://doi.org/10.1093/ infdis/jit458
462. Bernstein DI, Bellamy AR, Hook EW 3rd, et al.年轻女性中1型和2型单纯疱疹病毒原发感染的流行病学、临床表现和抗体反应。Clin Infect Dis 2013;56:344-51. PMID:23087395 https://doi.org/10.1093/cid/ cis891
463. Leone PA, Trottier S, Miller JM.伐昔洛韦用于生殖器疱疹的发作期治疗：3天短疗程与5天疗程的比较。Clin Infect Dis 2002;34:958-62. PMID:11880962 https:// doi.org/10.1086/339326
464. Wald A, Carrell D, Remington M, Kexel E, Zeh J, Corey L.阿昔洛韦两天方案治疗复发性2型生殖器单纯疱疹病毒感染。Clin Infect Dis 2002;34:944-8. PMID:11880960 https://doi.org/10.1086/339325
465. Aoki FY, Tyring S, Diaz-Mitoma F, Gross G, Gao J, Hamed K.单日患者自行启动的泛昔洛韦治疗复发性生殖器疱疹：一项随机、双盲、安慰剂对照试验。Clin Infect Dis 2006;42:8-13. PMID:16323085 https://doi.org/10.1086/498521
466. Chosidow O, Drouault Y, Leconte-Veyriac F, et al.泛昔洛韦与阿昔洛韦治疗免疫功能正常复发性生殖器疱疹感染患者：一项平行组、随机、双盲临床试验。Br J Dermatol 2001;144:818-24. PMID:11298543 https://doi.org/10.1046/j.1365-2133.2001.04139.x
467. Bodsworth NJ, Crooks RJ, Borelli S, et al.; International Valaciclovir HSV Study Group.伐昔洛韦与阿昔洛韦在患者自行启动治疗复发性生殖器疱疹中的比较：一项随机、双盲临床试验。Genitourin Med 1997;73:110-6. PMID:9215092
468. Fife KH, Barbarash RA, Rudolph T, Degregorio B, Roth R; The Valaciclovir International Herpes Simplex Virus Study Group.伐昔洛韦与阿昔洛韦治疗初发生殖器疱疹感染。一项国际、多中心、双盲、随机临床试验的结果。Sex Transm Dis 1997;24:481-6. PMID:9293612 https://doi.org/10.1097/00007435-199709000-00007
469. Diaz-Mitoma F, Sibbald RG, Shafran SD, Boon R, Saltzman RL; Collaborative Famciclovir Genital Herpes Research Group.口服泛昔洛韦抑制复发性生殖器疱疹：一项随机对照试验。JAMA 1998;280:887-92. PMID:9739972 https://doi.org/10.1001/jama.280.10.887
470. Mertz GJ, Loveless MO, Levin MJ, et al.; Collaborative Famciclovir Genital Herpes Research Group.口服泛昔洛韦抑制女性复发性生殖器单纯疱疹病毒感染。一项多中心、双盲、安慰剂对照试验。Arch Intern Med 1997;157:343-9. PMID:9040303 https://doi.org/10.1001/archinte.1997.00440240109016
471. Reitano M, Tyring S, Lang W, et al.; International Valaciclovir HSV Study Group.伐昔洛韦抑制复发性生殖器单纯疱疹病毒感染：一项大规模剂量范围探索研究。J Infect Dis 1998;178:603-10. PMID:9728526 https://doi.org/10.1086/515385
472. Romanowski B, Marina RB, Roberts JN; Valtrex HS230017 Study Group.患者对伐昔洛韦每日一次抑制疗法与每日两次发作期疗法治疗复发性生殖器疱疹的偏好：一项随机研究。Sex Transm Dis 2003;30:226-31. PMID:12616141 https://doi.org/10.1097/00007435-200303000-00010
473. Corey L, Wald A, Patel R, et al.; Valacyclovir HSV Transmission Study Group.每日一次伐昔洛韦降低生殖器疱疹传播风险。N Engl J Med 2004;350:11-20. PMID:14702423 https://doi.org/10.1056/NEJMoa035144
474. Tyring SK, Baker D, Snowden W.伐昔洛韦用于单纯疱疹病毒感染：阿昔洛韦20年经验后的长期安全性和持续疗效。J Infect Dis 2002;186(Suppl 1): S40-6. PMID:12353186 https://doi.org/10.1086/342966
475. Bartlett BL, Tyring SK, Fife K, et al.泛昔洛韦治疗频繁发作的复发性生殖器疱疹患者的选择：RELIEF试验。J Clin Virol 2008;43:190-5. PMID:18621575 https:// doi.org/10.1016/j.jcv.2008.06.004
476. Tronstein E, Johnston C, Huang ML, et al.有症状和无症状HSV-2感染者生殖器单纯疱疹病毒排毒。JAMA 2011;305:1441-9. PMID:21486977 https:// doi.org/10.1001/jama.2011.420
477. Bender Ignacio RA, Perti T, Magaret AS, et al.口服和阴道替诺福韦用于免疫功能正常女性生殖器单纯疱疹病毒2型排毒：一项双盲、随机、交叉试验。J Infect Dis 2015;212:1949-56. PMID:26044291 https://doi.org/10.1093/infdis/ jiv317
478. Wald A, Selke S, Warren T, et al.泛昔洛韦与伐昔洛韦抑制复发性生殖器疱疹和病毒排毒的疗效比较。Sex Transm Dis 2006;33:529-33. PMID:16540883 https:// doi.org/10.1097/01.olq.0000204723.15765.91
479. Johnston C, Magaret A, Stern M, et al.首次生殖器HSV-1感染后生殖器和口腔单纯疱疹病毒1型(HSV-1)排毒的自然史。Sex Transm Infect 2019;95:A42.
480. Tang YW, Cleavinger PJ, Li H, Mitchell PS, Smith TF, Persing DH.单纯疱疹病毒相关Mollaret脑膜炎候选宿主免疫遗传决定因素分析。Clin Infect Dis 2000;30:176-8. PMID:10619748 https://doi.org/10.1086/313616
481. Shalabi M, Whitley RJ.复发性良性淋巴细胞性脑膜炎。Clin Infect Dis 2006;43:1194-7. PMID:17029141 https://doi.org/10.1086/508281
482. Landry ML, Greenwold J, Vikram HR.单纯疱疹2型脑膜炎：临床表现及缺乏标准化治疗。Am J Med 2009;122:688-91. PMID:19559173 https://doi.org/10.1016/j.amjmed.2009.02.017
483. Aurelius E, Franzen-Röhl E, Glimåker M, et al.; HSV-2 Meningitis Study Group.单纯疱疹病毒2型脑膜炎后长期伐昔洛韦抑制治疗：一项双盲、随机对照试验。Clin Infect Dis 2012;54:1304-13. PMID:22460966 https://doi.org/10.1093/cid/cis031
484. Magawa S, Tanaka H, Furuhashi F, et al.妊娠期单纯疱疹病毒肝炎文献综述。J Matern Fetal Neonatal Med 2020;33:1774-9. PMID:30235956 https://doi.org/10.1080/147670 58.2018.1527311
485. Masadeh M, Shen H, Lee Y, et al.一例妊娠患者单纯疱疹病毒肝炎致死病例。Intractable Rare Dis Res 2017;6:124-7. PMID:28580213 https://doi.org/10.5582/irdr.2017.01013
486. Martin ET, Krantz E, Gottlieb SL, et al.安全套预防HSV-2感染效果的汇总分析。Arch Intern Med 2009;169:1233-40. PMID:19597073 https://doi.org/10.1001/ Arch Intern Med.2009.177
487. Wald A, Langenberg AG, Krantz E, et al.安全套使用与单纯疱疹病毒获得之间的关系。Ann Intern Med 2005;143:707-13. PMID:16287791 https://doi.org/10.7326/0003-4819-143-10-200511150-00007

488. Wald A, Langenberg AG, Link K, et al. Effect of condoms on reducing the transmission of herpes simplex virus type 2 from men to women. JAMA 2001;285:3100–6. PMID:11427138 https://doi.org/10.1001/jama.285.24.3100
489. Magaret AS, Mujugira A, Hughes JP, et al.; Partners in Prevention HSV/HIV Transmission Study Team. Effect of condom use on per-act HSV-2 transmission risk in HIV-1, HSV-2-discordant couples. Clin Infect Dis 2016;62:456–61. PMID:26578538
490. Mehta SD, Moses S, Agot K, et al. Medical male circumcision and herpes simplex virus 2 acquisition: posttrial surveillance in Kisumu, Kenya. J Infect Dis 2013;208:1869–76. PMID:23901089 https://doi.org/10.1093/infdis/jit371
491. Grund JM, Bryant TS, Jackson I, et al. Association between male circumcision and women's biomedical health outcomes: a systematic review. Lancet Glob Health 2017;5:e1113–22. PMID:29025633 https://doi.org/10.1016/S2214-109X(17)30369-8
492. Celum C, Morrow RA, Donnell D, et al.; Partners PrEP Study Team. Daily oral tenofovir and emtricitabine-tenofovir preexposure prophylaxis reduces herpes simplex virus type 2 acquisition among heterosexual HIV-1-uninfected men and women: a subgroup analysis of a randomized trial. Ann Intern Med 2014;161:11–9. PMID:24979446 https://doi.org/10.7326/M13-2471
493. Abdool Karim SS, Abdool Karim Q, Gengiah TN. Tenofovir gel to prevent HSV-2 infection. N Engl J Med 2015;373:1980–1. PMID:26559584 https://doi.org/10.1056/NEJMoa1410649
494. Marcus JL, Glidden DV, McMahan V, et al. Daily oral emtricitabine/tenofovir preexposure prophylaxis and herpes simplex virus type 2 among men who have sex with men. PLoS One 2014;9:e91513. PMID:24637511 https://doi.org/10.1371/journal.pone.0091513
495. Celum C, Hong T, Cent A, et al.; ACTG PEARLS/A5175 Team. Herpes simplex virus type 2 acquisition among HIV-1-infected adults treated with tenofovir disoproxyl fumarate as part of combination antiretroviral therapy: results from the ACTG A5175 PEARLS Study. J Infect Dis 2017;215:907–10. PMID:28453835 https://doi.org/10.1093/infdis/jix029
496. Gilbert LK, Wyand F. Genital herpes education and counselling: testing a one-page 'FAQ' intervention. Herpes 2009;15:51–6. PMID:19306603
497. Rosenthal SL, Zimet GD, Leichliter JS, et al. The psychosocial impact of serological diagnosis of asymptomatic herpes simplex virus type 2 infection. Sex Transm Infect 2006;82:154–7, discussion 157–8. PMID:16581745 https://doi.org/10.1136/sti.2005.016311
498. Miyai T, Turner KR, Kent CK, Klausner J. The psychosocial impact of testing individuals with no history of genital herpes for herpes simplex virus type 2. Sex Transm Dis 2004;31:517–21. PMID:15480111 https://doi.org/10.1097/01.olq.0000137901.71284.6b
499. Ross K, Johnston C, Wald A. Herpes simplex virus type 2 serological testing and psychosocial harm: a systematic review. Sex Transm Infect 2011;87:594–600. PMID:21903980 https://doi.org/10.1136/sextrans-2011-050099
500. Henry RE, Wegmann JA, Hartle JE, Christopher GW. Successful oral acyclovir desensitization. Ann Allergy 1993;70:386–8. PMID:8498729
501. Leeyaphan C, Surawan TM, Chirachanakul P, et al. Clinical characteristics of hypertrophic herpes simplex genitalis and treatment outcomes of imiquimod: a retrospective observational study. Int J Infect Dis 2015;33:165–70. PMID:25660091 https://doi.org/10.1016/j.ijid.2015.02.002
502. Keller MJ, Huber A, Espinoza L, et al. Impact of herpes simplex virus type 2 and human immunodeficiency virus dual infection on female genital tract mucosal immunity and the vaginal microbiome. J Infect Dis 2019;220:852–61. PMID:31111902 https://doi.org/10.1093/infdis/jiz203
503. Posavad CM, Wald A, Kuntz S, et al. Frequent reactivation of herpes simplex virus among HIV-1-infected patients treated with highly active antiretroviral therapy. J Infect Dis 2004;190:693–6. PMID:15272395 https://doi.org/10.1086/422755
504. Tobian AA, Grabowski MK, Serwadda D, et al.; Rakai Health Sciences Program. Reactivation of herpes simplex virus type 2 after initiation of antiretroviral therapy. J Infect Dis 2013;208:839–46. PMID:23812240 https://doi.org/10.1093/infdis/jit252
505. Mujugira A, Magaret AS, Celum C, et al.; Partners in Prevention HSV/HIV Transmission Study Team. Daily acyclovir to decrease herpes simplex virus type 2 (HSV-2) transmission from HSV-2/HIV-1 coinfected persons: a randomized controlled trial. J Infect Dis 2013;208:1366–74. PMID:23901094 https://doi.org/10.1093/infdis/jit333
506. Van Wagoner N, Geisler WM, Bachmann LH, Hook EW. The effect of valacyclovir on HIV and HSV-2 in HIV-infected persons on antiretroviral therapy with previously unrecognised HSV-2. Int J STD AIDS 2015;26:574–81. PMID:25147236 https://doi.org/10.1177/0956462414546504
507. Reyes M, Shaik NS, Graber JM, et al.; Task Force on Herpes Simplex Virus Resistance. Acyclovir-resistant genital herpes among persons attending sexually transmitted disease and human immunodeficiency virus clinics. Arch Intern Med 2003;163:76–80. PMID:12523920 https://doi.org/10.1001/archinte.163.1.76
508. Safrin S, Crumpacker C, Chatis P, et al.; The AIDS Clinical Trials Group. A controlled trial comparing foscarnet with vidarabine for acyclovir-resistant mucocutaneous herpes simplex in the acquired immunodeficiency syndrome. N Engl J Med 1991;325:551–5. PMID:1649971 https://doi.org/10.1056/NEJM199108223250805
509. Levin MJ, Bacon TH, Leary JJ. Resistance of herpes simplex virus infections to nucleoside analogues in HIV-infected patients. Clin Infect Dis 2004;39(Suppl 5):S248–57. PMID:15494896 https://doi.org/10.1086/422364
510. Tandon S, Singh J, Sinha S, Sharma DP. Recalcitrant hypertrophic herpes genitalis in HIV-infected patient successfully treated with topical imiquimod. Dermatol Ther (Heidelb) 2017;30:e12479. PMID:28261899 https://doi.org/10.1111/dth.12479
511. Perkins N, Nisbet M, Thomas M. Topical imiquimod treatment of aciclovir-resistant herpes simplex disease: case series and literature review. Sex Transm Infect 2011;87:292–5. PMID:21406577 https://doi.org/10.1136/sti.2010.047431
512. McElhiney LF. Topical cidofovir for treatment of resistant viral infections. Int J Pharm Compd 2006;10:324–8. PMID:23974309
513. Erard V, Wald A, Corey L, Leisenring WM, Boeckh M. Use of long-term suppressive acyclovir after hematopoietic stem-cell transplantation: impact on herpes simplex virus (HSV) disease and drug-resistant HSV disease. J Infect Dis 2007;196:266–70. PMID:17570114 https://doi.org/10.1086/518938
514. Brown ZA, Selke S, Zeh J, et al. The acquisition of herpes simplex virus during pregnancy. N Engl J Med 1997;337:509–15. PMID:9262493 https://doi.org/10.1056/NEJM199708213370801
515. Pinninti SG, Kimberlin DW. Maternal and neonatal herpes simplex virus infections. Am J Perinatol 2013;30:113–9. PMID:23303485 https://doi.org/10.1055/s-0032-1332802
516. Brown ZA, Benedetti J, Ashley R, et al. Neonatal herpes simplex virus infection in relation to asymptomatic maternal infection at the time of labor. N Engl J Med 1991;324:1247–52. PMID:1849612 https://doi.org/10.1056/NEJM199105023241804
517. Brown ZA, Wald A, Morrow RA, Selke S, Zeh J, Corey L. Effect of serologic status and cesarean delivery on transmission rates of herpes simplex virus from mother to infant. JAMA 2003;289:203–9. PMID:12517231 https://doi.org/10.1001/jama.289.2.203
518. Ahrens KA, Anderka MT, Feldkamp ML, Canfield MA, Mitchell AA, Werler MM; National Birth Defects Prevention Study. Antiherpetic medication use and the risk of gastroschisis: findings from the National Birth Defects Prevention Study, 1997–2007. Paediatr Perinat Epidemiol 2013;27:340–5. PMID:23772935 https://doi.org/10.1111/ppe.12064

488. Wald A, Langenberg AG, Link K, et al.安全套对减少2型单纯疱疹病毒由男性向女性传播的效果。JAMA 2001;285:3100-6. PMID:11427138 https://doi.org/10.1001/ jama.285.24.3100
489. Magaret AS, Mujugira A, Hughes JP, et al.; Partners in Prevention HSV/HIV Transmission Study Team.安全套使用对HIV-1、HSV-2不一致伴侣每次性行为HSV-2传播风险的影响。Clin Infect Dis 2016;62:456-61. PMID:26578538
490. Mehta SD, Moses S, Agot K, et al.男性医疗包皮环切与2型单纯疱疹病毒获得：肯尼亚Kisumu试验后监测。J Infect Dis 2013;208:1869-76. PMID:23901089 https://doi.org/10.1093/infdis/jit371
491. Grund JM, Bryant TS, Jackson I, et al.男性包皮环切与女性生物医学健康结局之间的关联：一项系统综述。Lancet Glob Health 2017;5:e1113-22. PMID:29025633 https://doi.org/10.1016/S2214-109X(17) 30369-8
492. Celum C, Morrow RA, Donnell D, et al.; Partners PrEP Study Team.每日口服替诺福韦和恩曲他滨-替诺福韦暴露前预防减少异性恋HIV-1未感染男性和女性中2型单纯疱疹病毒的获得：一项随机试验的亚组分析。Ann Intern Med 2014;161:11-9. PMID:24979446 https://doi.org/10.7326/M13-2471
493. Abdool Karim SS, Abdool Karim Q, Gengiah TN.替诺福韦凝胶预防HSV-2感染。N Engl J Med 2015;373:1980-1. PMID:26559584 https://doi.org/10.1056/NEJMoa1410649
494. Marcus JL, Glidden DV, McMahan V, et al.每日口服恩曲他滨/替诺福韦暴露前预防与男男性行为人群中的2型单纯疱疹病毒。PLoS One 2014;9:e91513. PMID:24637511 https://doi.org/10.1371/journal.pone.0091513
495. Celum C, Hong T, Cent A, et al.; ACTG PEARLS/A5175 Team.接受富马酸替诺福韦二吡呋酯作为联合抗逆转录病毒治疗一部分的HIV-1感染成人中2型单纯疱疹病毒的获得：ACTG A5175 PEARLS研究结果。J Infect Dis 2017;215:907-10. PMID:28453835 https://doi.org/10.1093/infdis/jix029
496. Gilbert LK, Wyand F.生殖器疱疹教育与咨询：测试一页式"FAQ"干预。Herpes 2009;15:51-6. PMID:19306603
497. Rosenthal SL, Zimet GD, Leichliter JS, et al.无症状2型单纯疱疹病毒感染血清学诊断的社会心理影响。Sex Transm Infect 2006;82:154-7, discussion 157-8. PMID:16581745 https://doi.org/10.1136/sti.2005.016311
498. Miyai T, Turner KR, Kent CK, Klausner J.对无生殖器疱疹史个体进行2型单纯疱疹病毒检测的社会心理影响。Sex Transm Dis 2004;31:517-21. PMID:15480111 https://doi.org/10.1097/01.olq.0000137901.71284.6b
499. Ross K, Johnston C, Wald A.2型单纯疱疹病毒血清学检测与社会心理危害：一项系统综述。Sex Transm Infect 2011;87:594-600. PMID:21903980 https://doi.org/10.1136/ sextrans-2011-050099
500. Henry RE, Wegmann JA, Hartle JE, Christopher GW.成功的口服阿昔洛韦脱敏。Ann Allergy 1993;70:386-8. PMID:8498729
501. Leeyaphan C, Surawan TM, Chirachanakul P, et al.肥厚性生殖器单纯疱疹的临床特征及咪喹莫特治疗结局：一项回顾性观察研究。Int J Infect Dis 2015;33:165-70. PMID:25660091 https://doi.org/10.1016/j.ijid.2015.02.002
502. Keller MJ, Huber A, Espinoza L, et al.单纯疱疹病毒2型与人类免疫缺陷病毒双重感染对女性生殖道黏膜免疫及阴道微生物组的影响。J Infect Dis 2019;220:852-61. PMID:31111902 https://doi.org/10.1093/ infdis/jiz203
503. Posavad CM, Wald A, Kuntz S, et al.接受高效抗逆转录病毒治疗的HIV-1感染患者中单纯疱疹病毒的频繁再激活。J Infect Dis 2004;190:693-6. PMID:15272395 https://doi.org/10.1086/422755
504. Tobian AA, Grabowski MK, Serwadda D, et al.; Rakai Health Sciences Program.启动抗逆转录病毒治疗后单纯疱疹病毒2型的再激活。J Infect Dis 2013;208:839-46. PMID:23812240 https://doi.org/10.1093/infdis/jit252
505. Mujugira A, Magaret AS, Celum C, et al.; Partners in Prevention HSV/HIV Transmission Study Team.每日阿昔洛韦以减少HSV-2/HIV-1共感染者单纯疱疹病毒2型(HSV-2)传播：一项随机对照试验。J Infect Dis 2013;208:1366-74. PMID:23901094 https://doi.org/10.1093/infdis/jit333
506. Van Wagoner N, Geisler WM, Bachmann LH, Hook EW.伐昔洛韦对接受抗逆转录病毒治疗且既往未识别HSV-2的HIV感染者中HIV和HSV-2的影响。Int J STD AIDS 2015;26:574-81. PMID:25147236 https://doi.org/10.1177/0956462414546504
507. Reyes M, Shaik NS, Graber JM, et al.; Task Force on Herpes Simplex Virus Resistance.就诊于性传播疾病和人类免疫缺陷病毒门诊人群中耐阿昔洛韦生殖器疱疹。Arch Intern Med 2003;163:76-80. PMID:12523920 https://doi.org/10.1001/archinte.163.1.76
508. Safrin S, Crumpacker C, Chatis P, et al.; The AIDS Clinical Trials Group.膦甲酸钠与阿糖腺苷治疗获得性免疫缺陷综合征中耐阿昔洛韦黏膜皮肤单纯疱疹的对照试验。N Engl J Med 1991;325:551-5. PMID:1649971 https://doi.org/10.1056/NEJM199108223250805
509. Levin MJ, Bacon TH, Leary JJ.HIV感染患者中单纯疱疹病毒感染对核苷类似物的耐药性。Clin Infect Dis 2004;39(Suppl 5): S248-57. PMID:15494896 https://doi.org/10.1086/422364
510. Tandon S, Singh J, Sinha S, Sharma DP.HIV感染患者中难治性肥厚性生殖器疱疹经局部咪喹莫特成功治疗。Dermatol Ther(Heidelb) 2017;30:e12479. PMID:28261899 https://doi.org/10.1111/dth.12479
511. Perkins N, Nisbet M, Thomas M.局部咪喹莫特治疗耐阿昔洛韦单纯疱疹疾病：病例系列及文献综述。Sex Transm Infect 2011;87:292-5. PMID:21406577 https:// doi.org/10.1136/sti.2010.047431
512. McElhiney LF.局部西多福韦治疗耐药病毒感染。Int J Pharm Compd 2006;10:324-8. PMID:23974309
513. Erard V, Wald A, Corey L, Leisenring WM, Boeckh M.造血干细胞移植后长期抑制性阿昔洛韦的使用：对单纯疱疹病毒(HSV)疾病及耐药HSV疾病的影响。J Infect Dis 2007;196:266-70. PMID:17570114 https://doi.org/10.1086/518938
514. Brown ZA, Selke S, Zeh J, et al.妊娠期间单纯疱疹病毒的获得。N Engl J Med 1997;337:509-15. PMID:9262493 https:// doi.org/10.1056/NEJM199708213370801
515. Pinninti SG, Kimberlin DW.母亲及新生儿单纯疱疹病毒感染。Am J Perinatol 2013;30:113-9. PMID:23303485 https://doi.org/10.1055/s-0032-1332802
516. Brown ZA, Benedetti J, Ashley R, et al.分娩时无症状母亲感染相关的新生儿单纯疱疹病毒感染。N Engl J Med 1991;324:1247-52. PMID:1849612 https:// doi.org/10.1056/NEJM199105023241804
517. Brown ZA, Wald A, Morrow RA, Selke S, Zeh J, Corey L.血清学状态及剖宫产对单纯疱疹病毒母婴传播率的影响。JAMA 2003;289:203-9. PMID:12517231 https://doi.org/10.1001/jama.289.2.203
518. Ahrens KA, Anderka MT, Feldkamp ML, Canfield MA, Mitchell AA, Werler MM; National Birth Defects Prevention Study.抗疱疹药物使用与腹裂风险：来自National Birth Defects Prevention Study的发现，1997-2007。Paediatr Perinat Epidemiol 2013;27:340-5. PMID:23772935 https:// doi.org/10.1111/ppe.12064

519. Stone KM, Reiff-Eldridge R, White AD, et al. Pregnancy outcomes following systemic prenatal acyclovir exposure: conclusions from the international acyclovir pregnancy registry, 1984–1999. Birth Defects Res A Clin Mol Teratol 2004;70:201–7. PMID:15108247 https://doi.org/10.1002/bdra.20013
520. Pasternak B, Hviid A. Use of acyclovir, valacyclovir, and famciclovir in the first trimester of pregnancy and the risk of birth defects. JAMA 2010;304:859–66. PMID:20736469 https://doi.org/10.1001/jama.2010.1206
521. Sheffield JS, Sánchez PJ, Wendel GD Jr, et al. Placental histopathology of congenital syphilis. Obstet Gynecol 2002;100:126–33. PMID:12100814
522. Watts DH, Brown ZA, Money D, et al. A double-blind, randomized, placebo-controlled trial of acyclovir in late pregnancy for the reduction of herpes simplex virus shedding and cesarean delivery. Am J Obstet Gynecol 2003;188:836–43. PMID:12634667 https://doi.org/10.1067/mob.2003.185
523. Scott LL, Hollier LM, McIntire D, Sanchez PJ, Jackson GL, Wendel GD Jr. Acyclovir suppression to prevent recurrent genital herpes at delivery. Infect Dis Obstet Gynecol 2002;10:71–7. PMID:12530483 https://doi.org/10.1155/S1064744902000054
524. Pinninti SG, Angara R, Feja KN, et al. Neonatal herpes disease following maternal antenatal antiviral suppressive therapy: a multicenter case series. J Pediatr 2012;161:134–8.e1-3. PMID:22336576 https://doi.org/10.1016/j.jpeds.2011.12.053
525. ACOG Committee on Practice Bulletins. ACOG Practice Bulletin. Clinical management guidelines for obstetrician-gynecologists. No. 82 June 2007. Management of herpes in pregnancy. Obstet Gynecol 2007;109:1489–98. PMID:17569194 https://doi.org/10.1097/01.AOG.0000263902.31953.3e
526. Winer RL, Hughes JP, Feng Q, et al. Early natural history of incident, type-specific human papillomavirus infections in newly sexually active young women. Cancer Epidemiol Biomarkers Prev 2011;20:699–707. PMID:21173170 https://doi.org/10.1158/1055-9965.EPI-10-1108
527. Ahmed N, Pillay A, Lawler M, Bobat R, Archary M. Donovanosis causing lymphadenitis, mastoiditis, and meningitis in a child. Lancet 2015;385:2644. PMID:26122163 https://doi.org/10.1016/S0140-6736(15)60992-8
528. Arora AK, Kumaran MS, Narang T, Saikia UN, Handa S. Donovanosis and squamous cell carcinoma: the relationship conundrum! Int J STD AIDS 2017;28:411–4. PMID:27535727 https://doi.org/10.1177/0956462416665996
529. Liverani CA, Lattuada D, Mangano S, et al. Hypertrophic donavanosis in a young pregnant woman. J Pediatr Adolesc Gynecol 2012;25:e81–3. PMID:22840941 https://doi.org/10.1016/j.jpag.2011.10.002
530. Magalhães BM, Veasey JV, Mayor SAS, Lellis RF. Donovanosis in a child victim of sexual abuse: response to doxycycline treatment. An Bras Dermatol 2018;93:592–4. https://doi.org/10.1590/abd1806-4841.20187948
531. Marfatia YS, Menon DS, Jose S, Patel BK. Nonhealing genital ulcer in AIDS: a diagnostic dilemma! Indian J Sex Transm Dis AIDS 2016;37:197–200. PMID:27890958 https://doi.org/10.4103/0253-7184.192130
532. Narang T, Kanwar AJ. Genital elephantiasis due to donovanosis: forgotten but not gone yet. Int J STD AIDS 2012;23:835–6. PMID:23155109 https://doi.org/10.1258/ijsa.2012.012096
533. Pilani A, Vora R, Anjaneyan G. Granuloma inguinale mimicking as squamous cell carcinoma of penis. Indian J Sex Transm Dis AIDS 2014;35:56–8. PMID:24958990 https://doi.org/10.4103/0253-7184.132433
534. Ramdial PK, Sing Y, Ramburan A, et al. Infantile donovanosis presenting as external auditory canal polyps: a diagnostic trap. Am J Dermatopathol 2012;34:818–21. PMID:23169417 https://doi.org/10.1097/DAD.0b013e3182540ccb
535. Wahal SP, Tuli D. Donovanosis: an incidental finding on Pap test. J Cytol 2013;30:217–8. PMID:24130421 https://doi.org/10.4103/0970-9371.117638
536. Bowden FJ; National Donovanosis Eradication Advisory Committee. Donovanosis in Australia: going, going. Sex Transm Infect 2005;81:365–6. PMID:16199732 https://doi.org/10.1136/sti.2004.013227
537. Bright A. National Notifiable Diseases Surveillance System surveillance report: sexually transmissible infections in Aboriginal and Torres Strait Islander people. Commun Dis Intell Q Rep 2015;39:E584–9. PMID:26779731
538. O'Farrell N. Donovanosis. Sex Transm Infect 2002;78:452–7. PMID:12473810 https://doi.org/10.1136/sti.78.6.452
539. Mabey D, Peeling RW. Lymphogranuloma venereum. Sex Transm Infect 2002;78:90–2. PMID:12081191 https://doi.org/10.1136/sti.78.2.90
540. White JA. Manifestations and management of lymphogranuloma venereum. Curr Opin Infect Dis 2009;22:57–66. PMID:19532081 https://doi.org/10.1097/QCO.0b013e328320a8ae
541. de Vries HJ, Zingoni A, White JA, Ross JD, Kreuter A. 2013 European Guideline on the management of proctitis, proctocolitis and enteritis caused by sexually transmissible pathogens. Int J STD AIDS 2014;25:465–74. PMID:24352129 https://doi.org/10.1177/0956462413516100
542. Ward H, Martin I, Macdonald N, et al. Lymphogranuloma venereum in the United kingdom. Clin Infect Dis 2007;44:26–32. PMID:17143811 https://doi.org/10.1086/509922
543. Martin-Iguacel R, Llibre JM, Nielsen H, et al. Lymphogranuloma venereum proctocolitis: a silent endemic disease in men who have sex with men in industrialised countries. Eur J Clin Microbiol Infect Dis 2010;29:917–25. PMID:20509036 https://doi.org/10.1007/s10096-010-0959-2
544. de Voux A, Kent JB, Macomber K, et al. Notes from the field: cluster of lymphogranuloma venereum cases among men who have sex with men—Michigan, August 2015–April 2016. MMWR Morb Mortal Wkly Rep 2016;65:920–1. PMID:27583686 https://doi.org/10.15585/mmwr.mm6534a6
545. Pallawela SN, Sullivan AK, Macdonald N, et al. Clinical predictors of rectal lymphogranuloma venereum infection: results from a multicentre case-control study in the U.K. Sex Transm Infect 2014;90:269–74. PMID:24687130 https://doi.org/10.1136/sextrans-2013-051401
546. de Vrieze NH, de Vries HJ. Lymphogranuloma venereum among men who have sex with men. An epidemiological and clinical review. Expert Rev Anti Infect Ther 2014;12:697–704. PMID:24655220 https://doi.org/10.1586/14787210.2014.901169
547. Koper NE, van der Sande MA, Gotz HM, Koedijk FD; Dutch STI Clinics. Lymphogranuloma venereum among men who have sex with men in the Netherlands: regional differences in testing rates lead to underestimation of the incidence, 2006–2012. Euro Surveill 2013;18:20561. PMID:23987831 https://doi.org/10.2807/1560-7917.ES2013.18.34.20561
548. Haar K, Dudareva-Vizule S, Wisplinghoff H, et al. Lymphogranuloma venereum in men screened for pharyngeal and rectal infection, Germany. Emerg Infect Dis 2013;19:488–92. PMID:23621949 https://doi.org/10.3201/eid1903.121028
549. Riera-Monroig J, Fuertes de Vega I. Lymphogranuloma venereum presenting as an ulcer on the tongue. Sex Transm Infect 2019;95:169–70. PMID:30554142 https://doi.org/10.1136/sextrans-2018-053787
550. Andrada MT, Dhar JK, Wilde H. Oral lymphogranuloma venereum and cervical lymphadenopathy. Case report. Mil Med 1974;139:99–101. PMID:4204816 https://doi.org/10.1093/milmed/139.2.99
551. Ilyas S, Richmond D, Burns G, et al. Orolabial lymphogranuloma venereum, Michigan, USA. Emerg Infect Dis 2019;25:2112–4. PMID:31625852 https://doi.org/10.3201/eid2511.190819

519. Stone KM, Reiff-Eldridge R, White AD, et al.产前全身阿昔洛韦暴露后的妊娠结局：来自国际阿昔洛韦妊娠登记处的结论，1984-1999。Birth Defects Res A Clin Mol Teratol 2004;70:201-7. PMID:15108247 https://doi.org/10.1002/bdra.20013
520. Pasternak B, Hviid A.妊娠早期使用阿昔洛韦、伐昔洛韦和泛昔洛韦与出生缺陷风险。JAMA 2010;304:859-66. PMID:20736469 https://doi.org/10.1001/ jama.2010.1206
521. Sheffield JS, Sánchez PJ, Wendel GD Jr, et al.先天性梅毒的胎盘组织病理学。Obstet Gynecol 2002;100:126-33. PMID:12100814
522. Watts DH, Brown ZA, Money D, et al.妊娠晚期阿昔洛韦减少单纯疱疹病毒排放及剖宫产的双盲、随机、安慰剂对照试验。Am J Obstet Gynecol 2003;188:836-43. PMID:12634667 https://doi.org/10.1067/mob.2003.185
523. Scott LL, Hollier LM, McIntire D, Sanchez PJ, Jackson GL, Wendel GD Jr.阿昔洛韦抑制疗法预防分娩时复发性生殖器疱疹。Infect Dis Obstet Gynecol 2002;10:71-7. PMID:12530483 https://doi.org/10.1155/S1064744902000054
524. Pinninti SG, Angara R, Feja KN, et al.母亲产前抗病毒抑制治疗后的新生儿疱疹疾病：多中心病例系列。J Pediatr 2012;161:134-8.e1-3. PMID:22336576 https://doi.org/10.1016/j.jpeds.2011.12.053
525. ACOG Committee on Practice Bulletins.ACOG Practice Bulletin.妇产科医师临床管理指南。第82号 2007年6月。妊娠期疱疹的管理。Obstet Gynecol 2007;109:1489-98. PMID:17569194 https://doi.org/10.1097/01.AOG.0000263902.31953.3e
526. Winer RL, Hughes JP, Feng Q, et al.新近性活跃年轻女性中新发、型别特异性人乳头瘤病毒感染的早期自然史。Cancer Epidemiol Biomarkers Prev 2011;20:699-707. PMID:21173170 https://doi.org/10.1158/1055-9965.EPI-10-1108
527. Ahmed N, Pillay A, Lawler M, Bobat R, Archary M.腹股沟肉芽肿致儿童淋巴结炎、乳突炎及脑膜炎。Lancet 2015;385:2644. PMID:26122163 https://doi.org/10.1016/ S0140-6736(15) 60992-8
528. Arora AK, Kumaran MS, Narang T, Saikia UN, Handa S.腹股沟肉芽肿与鳞状细胞癌：关系之谜!Int J STD AIDS 2017;28:411-4. PMID:27535727 https://doi.org/10.1177/0956462416665996
529. Liverani CA, Lattuada D, Mangano S, et al.年轻孕妇的肥厚性腹股沟肉芽肿。J Pediatr Adolesc Gynecol 2012;25:e81-3. PMID:22840941 https://doi.org/10.1016/j.jpag.2011.10.002
530. Magalhães BM, Veasey JV, Mayor SAS, Lellis RF.性虐待儿童受害者的腹股沟肉芽肿：对多西环素治疗的反应。An Bras Dermatol 2018;93:592-4. https://doi.org/10.1590/ abd1806-4841.20187948
531. Marfatia YS, Menon DS, Jose S, Patel BK.艾滋病患者中不愈合的生殖器溃疡：诊断困境!Indian J Sex Transm Dis AIDS 2016;37:197-200. PMID:27890958 https://doi.org/10.4103/0253-7184.192130
532. Narang T, Kanwar AJ.腹股沟肉芽肿所致生殖器象皮病：被遗忘但尚未消失。Int J STD AIDS 2012;23:835-6. PMID:23155109 https://doi.org/10.1258/ijsa.2012.012096
533. Pilani A, Vora R, Anjaneyan G.模拟阴茎鳞状细胞癌的腹股沟肉芽肿。Indian J Sex Transm Dis AIDS 2014;35:56-8. PMID:24958990 https://doi.org/10.4103/0253-7184.132433
534. Ramdial PK, Sing Y, Ramburan A, et al.表现为外耳道息肉的婴儿腹股沟肉芽肿：一个诊断陷阱。Am J Dermatopathol 2012;34:818-21. PMID:23169417 https://doi.org/10.1097/DAD.0b013e3182540ccb
535. Wahal SP, Tuli D.腹股沟肉芽肿：Pap试验中的偶然发现。J Cytol 2013;30:217-8. PMID:24130421 https://doi.org/10.4103/0970-9371.117638
536. Bowden FJ; National Donovanosis Eradication Advisory Committee.澳大利亚的腹股沟肉芽肿：正在消失。Sex Transm Infect 2005;81:365-6. PMID:16199732 https://doi.org/10.1136/ sti.2004.013227
537. Bright A.国家法定报告疾病监测系统监测报告：澳大利亚原住民和托雷斯海峡岛民中的性传播感染。Commun Dis Intell Q Rep 2015;39:E584-9. PMID:26779731
538. O'Farrell N.腹股沟肉芽肿.性传播感染 2002; 78:452-7. PMID:12473810
539. Mabey D, Peeling RW.性病性淋巴肉芽肿。Sex Transm Infect 2002;78:90-2. PMID:12081191 https://doi.org/10.1136/ sti.78.2.90
540. White JA.性病性淋巴肉芽肿的表现和处理。Curr Opin Infect Dis 2009;22:57-66. PMID:19532081 https://doi.org/10.1097/QCO.0b013e328320a8ae
541. de Vries HJ, Zingoni A, White JA, Ross JD, Kreuter A.2013年欧洲性传播病原体所致直肠炎、直肠结肠炎和小肠炎管理指南。Int J STD AIDS 2014;25:465-74. PMID:24352129 https://doi.org/10.1177/0956462413516100
542. Ward H, Martin I, Macdonald N, et al.英国的性病性淋巴肉芽肿。Clin Infect Dis 2007;44:26-32. PMID:17143811 https://doi.org/10.1086/509922
543. Martin-Iguacel R, Llibre JM, Nielsen H, et al.性病性淋巴肉芽肿性直肠结肠炎：工业化国家男男性行为人群中的一种隐匿性地方病。Eur J Clin Microbiol Infect Dis 2010;29:917-25. PMID:20509036 https://doi.org/10.1007/ s10096-010-0959-2
544. de Voux A, Kent JB, Macomber K, et al.现场笔记：男男性行为人群中的性病性淋巴肉芽肿病例聚集--密歇根州，2015年8月-2016年4月。MMWR Morb Mortal Wkly Rep 2016;65:920-1. PMID:27583686 https://doi.org/10.15585/ mmwr.mm6534a6
545. Pallawela SN, Sullivan AK, Macdonald N, et al.直肠性病性淋巴肉芽肿感染的临床预测因素：英国多中心病例对照研究结果。Sex Transm Infect 2014;90:269-74. PMID:24687130 https://doi.org/10.1136/sextrans-2013-051401
546. de Vrieze NH, de Vries HJ.男男性行为人群中的性病性淋巴肉芽肿。流行病学和临床综述。Expert Rev Anti Infect Ther 2014;12:697-704. PMID:24655220 https://doi.org/10.1586/14787210.2014.901169
547. Koper NE, van der Sande MA, Gotz HM, Koedijk FD; Dutch STI Clinics.荷兰男男性行为人群中的性病性淋巴肉芽肿：检测率的地区差异导致发病率被低估，2006-2012年。Euro Surveill 2013;18:20561. PMID:23987831 https://doi.org/10.2807/1560-7917.ES2013.18.34.20561
548. Haar K, Dudareva-Vizule S, Wisplinghoff H, et al.德国接受咽部和直肠感染筛查的男性中的性病性淋巴肉芽肿。Emerg Infect Dis 2013;19:488-92. PMID:23621949 https://doi.org/10.3201/eid1903.121028
549. Riera-Monroig J, Fuertes de Vega I.表现为舌部溃疡的性病性淋巴肉芽肿。Sex Transm Infect 2019;95:169-70. PMID:30554142 https://doi.org/10.1136/sextrans-2018-053787
550. Andrada MT, Dhar JK, Wilde H.口腔性病性淋巴肉芽肿和颈部淋巴结病。病例报告。Mil Med 1974;139:99-101. PMID:4204816 https://doi.org/10.1093/milmed/139.2.99
551. Ilyas S, Richmond D, Burns G, et al.口唇性病性淋巴肉芽肿，密歇根州，美国。Emerg Infect Dis 2019;25:2112-4. PMID:31625852 https://doi.org/10.3201/eid2511.190819

552. Kersh EN, Pillay A, de Voux A, Chen C. Laboratory processes for confirmation of lymphogranuloma venereum infection during a 2015 investigation of a cluster of cases in the United States. Sex Transm Dis 2017;44:691–4. PMID:28876314 https://doi.org/10.1097/OLQ.0000000000000667
553. CDC. Recommendations for the laboratory-based detection of *Chlamydia trachomatis* and *Neisseria gonorrhoeae*—2014. MMWR Recomm Rep 2014;63(No. RR-2). PMID:24622331
554. Pathela P, Jamison K, Kornblum J, Quinlan T, Halse TA, Schillinger JA. Lymphogranuloma venereum: an increasingly common anorectal infection among men who have sex with men attending New York City sexual health clinics. Sex Transm Dis 2019;46:e14–7. PMID:30278027 https://doi.org/10.1097/OLQ.0000000000000921
555. Cohen S, Brosnan H, Kohn R, et al. P494 Diagnosis and management of lymphogranuloma venereum (LGV) in a municipal STD clinic, San Francisco, 2016–18. Sex Transm Infect 2019;95(Suppl 1):A229.
556. Leeyaphan C, Ong JJ, Chow EP, et al. Systematic review and meta-analysis of doxycycline efficacy for rectal lymphogranuloma venereum in men who have sex with men. Emerg Infect Dis 2016;22:1778–84. PMID:27513890 https://doi.org/10.3201/eid2210.160986
557. Cabello Úbeda A, Fernández Roblas R, García Delgado R, et al. Anorectal lymphogranuloma venereum in Madrid: a persistent emerging problem in men who have sex with men. Sex Transm Dis 2016;43:414–9. PMID:27322040 https://doi.org/10.1097/OLQ.0000000000000459
558. Simons R, Candfield S, French P, White JA. Observed treatment responses to short-course doxycycline therapy for rectal lymphogranuloma venereum in men who have sex with men. Sex Transm Dis 2018;45:406–8. PMID:29465660 https://doi.org/10.1097/OLQ.0000000000000772
559. Vall-Mayans M, Isaksson J, Caballero E, Sallés B, Herrmann B. Bubonic lymphogranuloma venereum with multidrug treatment failure. Int J STD AIDS 2014;25:306–8. PMID:24216037 https://doi.org/10.1177/0956462413501158
560. Blanco JL, Fuertes I, Bosch J, et al. Effective treatment of lymphogranuloma venereum (LGV) with 1g azithromycin administered weekly for 3 weeks in HIV-infected population. Presented at the Conference on Retroviruses and Opportunist Infections, Seattle, WA; February 23–26, 2015.
561. Kong FY, Rupasinghe TW, Simpson JA, et al. Pharmacokinetics of a single 1g dose of azithromycin in rectal tissue in men. PLoS One 2017;12:e0174372. PMID:28350806 https://doi.org/10.1371/journal.pone.0174372
562. Elgalib A, Alexander S, Tong CY, White JA. Seven days of doxycycline is an effective treatment for asymptomatic rectal *Chlamydia trachomatis* infection. Int J STD AIDS 2011;22:474–7. PMID:21764781 https://doi.org/10.1258/ijsa.2011.011134
563. Wormser GP, Wormser RP, Strle F, Myers R, Cunha BA. How safe is doxycycline for young children or for pregnant or breastfeeding women? Diagn Microbiol Infect Dis 2019;93:238–42. PMID:30442509 https://doi.org/10.1016/j.diagmicrobio.2018.09.015
564. Towns JM, Leslie DE, Denham I, Azzato F, Fairley CK, Chen M. Painful and multiple anogenital lesions are common in men with *Treponema pallidum* PCR-positive primary syphilis without herpes simplex virus coinfection: a cross-sectional clinic-based study. Sex Transm Infect 2016;92:110–5. PMID:26378262 https://doi.org/10.1136/sextrans-2015-052219
565. Theel ES, Katz SS, Pillay A. Molecular and direct detection tests for *Treponema pallidum* subspecies *pallidum*: a review of the literature, 1964–2017. Clin Infect Dis 2020;71(Suppl 1):S4–12. PMID:32578865 https://doi.org/10.1093/cid/ciaa176
566. Tuddenham S, Katz SS, Ghanem KG. Syphilis laboratory guidelines: performance characteristics of nontreponemal antibody tests. Clin Infect Dis 2020;71(Suppl 1):S21–42. PMID:32578862 https://doi.org/10.1093/cid/ciaa306
567. Park IU, Tran A, Pereira L, Fakile Y. Sensitivity and specificity of treponemal-specific tests for the diagnosis of syphilis. Clin Infect Dis 2020;71(Suppl 1):S13–20. PMID:32578866 https://doi.org/10.1093/cid/ciaa349
568. Bristow CC, Klausner JD, Tran A. Clinical test performance of a rapid point-of-care syphilis treponemal antibody test: a systematic review and meta-analysis. Clin Infect Dis 2020;71(Suppl 1):S52–7. PMID:32578863 https://doi.org/10.1093/cid/ciaa350
569. Nandwani R, Evans DT. Are you sure it's syphilis? A review of false positive serology. Int J STD AIDS 1995;6:241–8. PMID:7548285 https://doi.org/10.1177/095646249500600404
570. Romanowski B, Sutherland R, Fick GH, Mooney D, Love EJ. Serologic response to treatment of infectious syphilis. Ann Intern Med 1991;114:1005–9. PMID:2029095 https://doi.org/10.7326/0003-4819-114-12-1005
571. CDC. Syphilis testing algorithms using treponemal tests for initial screening—four laboratories, New York City, 2005–2006. MMWR Morb Mortal Wkly Rep 2008;57:872–5. PMID:18701877
572. CDC. Discordant results from reverse sequence syphilis screening—five laboratories, United States, 2006–2010. MMWR Morb Mortal Wkly Rep 2011;60:133–7. PMID:21307823
573. Ortiz-Lopez N, Diez M, Diaz O, Simon F, Diaz A. Epidemiological surveillance of congenital syphilis in Spain, 2000–2010. Pediatr Infect Dis J 2012;31:988–90. PMID:22572752 https://doi.org/10.1097/INF.0b013e31825d3152
574. Ortiz DA, Shukla MR, Loeffelholz MJ. The traditional or reverse algorithm for diagnosis of syphilis: pros and cons. Clin Infect Dis 2020;71(Suppl 1):S43–51. PMID:32578864 https://doi.org/10.1093/cid/ciaa307
575. Berry GJ, Loeffelholz MJ. Use of treponemal screening assay strength of signal to avoid unnecessary confirmatory testing. Sex Transm Dis 2016;43:737–40. PMID:27835625 https://doi.org/10.1097/OLQ.0000000000000524
576. Park IU, Chow JM, Bolan G, Stanley M, Shieh J, Schapiro JM. Screening for syphilis with the treponemal immunoassay: analysis of discordant serology results and implications for clinical management. J Infect Dis 2011;204:1297–304. PMID:21930610 https://doi.org/10.1093/infdis/jir524
577. Loeffelholz MJ, Wen T, Patel JA. Analysis of bioplex syphilis IgG quantitative results in different patient populations. Clin Vaccine Immunol 2011;18:2005–6. PMID:21880852 https://doi.org/10.1128/CVI.05335-11
578. Fakile YF, Jost H, Hoover KW, et al. Correlation of treponemal immunoassay signal strength values with reactivity of confirmatory treponemal testing. J Clin Microbiol 2017;56:e01165-17. PMID:29046410 https://doi.org/10.1128/JCM.01165-17
579. Wong EH, Klausner JD, Caguin-Grygiel G, et al. Evaluation of an IgM/IgG sensitive enzyme immunoassay and the utility of index values for the screening of syphilis infection in a high-risk population. Sex Transm Dis 2011;38:528–32. PMID:21233789 https://doi.org/10.1097/OLQ.0b013e318205491a
580. Dai S, Chi P, Lin Y, et al. Improved reverse screening algorithm for *Treponema pallidum* antibody using signal-to-cutoff ratios from chemiluminescence microparticle immunoassay. Sex Transm Dis 2014;41:29–34. PMID:24326578 https://doi.org/10.1097/OLQ.0000000000000066
581. Li Z, Feng Z, Liu P, Yan C. Screening for antibodies against *Treponema pallidum* with chemiluminescent microparticle immunoassay: analysis of discordant serology results and clinical characterization. Ann Clin Biochem 2016;53:588–92. PMID:26680646 https://doi.org/10.1177/0004563215623806
582. Yen-Lieberman B, Daniel J, Means C, Waletzky J, Daly TM. Identification of false-positive syphilis antibody results using a semiquantitative algorithm. Clin Vaccine Immunol 2011;18:1038–40. PMID:21508162 https://doi.org/10.1128/CVI.05066-11

552. Kersh EN, Pillay A, de Voux A, Chen C.2015年美国病例聚集调查期间性病性淋巴肉芽肿感染确认的实验室流程。Sex Transm Dis 2017;44:691-4. PMID:28876314 https://doi.org/10.1097/ OLQ.0000000000000667
553. CDC.实验室检测沙眼衣原体和淋病奈瑟菌的建议--2014年。MMWR Recomm Rep 2014;63(No.RR-2).PMID:24622331
554. Pathela P, Jamison K, Kornblum J, Quinlan T, Halse TA, Schillinger JA. 性病性淋巴肉芽肿：纽约市性健康诊所就诊的男男性行为人群中日益常见的肛门直肠感染。Sex Transm Dis 2019;46:e14-7. PMID:30278027 https://doi.org/10.1097/OLQ.0000000000000921
555. Cohen S, Brosnan H, Kohn R, et al.P494 旧金山市立STD诊所中性病性淋巴肉芽肿(LGV)的诊断和管理，2016-18年。Sex Transm Infect 2019;95(Suppl 1): A229.
556. Leeyaphan C, Ong JJ, Chow EP, et al.多西环素治疗男男性行为人群直肠性病性淋巴肉芽肿疗效的系统综述和荟萃分析。Emerg Infect Dis 2016;22:1778-84. PMID:27513890 https://doi.org/10.3201/eid2210.160986
557. Cabello Úbeda A, Fernández Roblas R, García Delgado R, et al.马德里的肛门直肠性病性淋巴肉芽肿：男男性行为人群中持续存在的新发问题。Sex Transm Dis 2016;43:414-9. PMID:27322040 https://doi.org/10.1097/ OLQ.0000000000000459
558. Simons R, Candfield S, French P, White JA.男男性行为人群直肠性病性淋巴肉芽肿短程多西环素治疗的观察疗效。Sex Transm Dis 2018;45:406-8. PMID:29465660 https://doi.org/10.1097/ OLQ.0000000000000772
559. Vall-Mayans M, Isaksson J, Caballero E, Sallés B, Herrmann B.多药治疗失败的腹股沟淋巴结炎型性病性淋巴肉芽肿。Int J STD AIDS 2014;25:306-8. PMID:24216037 https://doi.org/10.1177/0956462413501158
560. Blanco JL, Fuertes I, Bosch J, et al.1g阿奇霉素每周一次连用3周有效治疗HIV感染人群中的性病性淋巴肉芽肿(LGV)。发表于逆转录病毒和机会性感染会议，华盛顿州西雅图；2015年2月23-26日。
561. Kong FY, Rupasinghe TW, Simpson JA, et al.男性直肠组织中单次1g剂量阿奇霉素的药代动力学。PLoS One 2017;12:e0174372. PMID:28350806 https://doi.org/10.1371/journal.pone.0174372
562. Elgalib A, Alexander S, Tong CY, White JA.多西环素7天是治疗无症状直肠沙眼衣原体感染的有效方法。Int J STD AIDS 2011;22:474-7. PMID:21764781 https:// doi.org/10.1258/ijsa.2011.011134
563. Wormser GP, Wormser RP, Strle F, Myers R, Cunha BA.多西环素对幼儿或妊娠期或哺乳期妇女有多安全?Diagn Microbiol Infect Dis 2019;93:238-42. PMID:30442509 https://doi.org/10.1016/j.diagmicrobio.2018.09.015
564. Towns JM, Leslie DE, Denham I, Azzato F, Fairley CK, Chen M.在无单纯疱疹病毒合并感染的梅毒螺旋体PCR阳性一期梅毒男性中，疼痛性和多发性肛门生殖器皮损常见：一项基于门诊的横断面研究。Sex Transm Infect 2016;92:110-5. PMID:26378262 https://doi.org/10.1136/ sextrans-2015-052219
565. Theel ES, Katz SS, Pillay A.梅毒螺旋体苍白亚种的分子和直接检测试验：文献综述，1964-2017。Clin Infect Dis 2020;71(Suppl 1): S4-12. PMID:32578865 https://doi.org/10.1093/cid/ciaa176
566. Tuddenham S, Katz SS, Ghanem KG.梅毒实验室指南：非密螺旋体抗体试验的性能特征。Clin Infect Dis 2020;71(Suppl 1): S21-42. PMID:32578862 https://doi.org/10.1093/cid/ciaa306
567. Park IU, Tran A, Pereira L, Fakile Y.密螺旋体特异性试验诊断梅毒的敏感性和特异性。Clin Infect Dis 2020;71(Suppl 1): S13-20. PMID:32578866 https://doi.org/10.1093/ cid/ciaa349
568. Bristow CC, Klausner JD, Tran A.快速即时梅毒密螺旋体抗体检测的临床检测性能：系统综述和荟萃分析。Clin Infect Dis 2020;71(Suppl 1): S52-7. PMID:32578863 https://doi.org/10.1093/cid/ciaa350
569. Nandwani R, Evans DT.你确定是梅毒吗?假阳性血清学综述。Int J STD AIDS 1995;6:241-8. PMID:7548285 https:// doi.org/10.1177/095646249500600404
570. Romanowski B, Sutherland R, Fick GH, Mooney D, Love EJ.传染性梅毒治疗的血清学反应。Ann Intern Med 1991;114:1005-9. PMID:2029095 https://doi.org/10.7326/0003-4819-114-12-1005
571. CDC.使用密螺旋体试验进行初筛的梅毒检测算法--四个实验室，纽约市，2005-2006。MMWR Morb Mortal Wkly Rep 2008;57:872-5. PMID:18701877
572. CDC.反向序列梅毒筛查的不一致结果--五个实验室，美国，2006-2010。MMWR Morb Mortal Wkly Rep 2011;60:133-7. PMID:21307823
573. Ortiz-Lopez N, Diez M, Diaz O, Simon F, Diaz A.西班牙先天性梅毒的流行病学监测，2000-2010。Pediatr Infect Dis J 2012;31:988-90. PMID:22572752 https://doi.org/10.1097/ INF.0b013e31825d3152
574. Ortiz DA, Shukla MR, Loeffelholz MJ.梅毒诊断的传统或反向算法：优缺点。Clin Infect Dis 2020;71(Suppl 1): S43-51. PMID:32578864 https://doi.org/10.1093/ cid/ciaa307
575. Berry GJ, Loeffelholz MJ.使用密螺旋体筛查试验信号强度以避免不必要的确认试验。Sex Transm Dis 2016;43:737-40. PMID:27835625 https://doi.org/10.1097/ OLQ.0000000000000524
576. Park IU, Chow JM, Bolan G, Stanley M, Shieh J, Schapiro JM.使用密螺旋体免疫测定筛查梅毒：不一致血清学结果分析及对临床管理的意义。J Infect Dis 2011;204:1297-304. PMID:21930610 https:// doi.org/10.1093/infdis/jir524
577. Loeffelholz MJ, Wen T, Patel JA.不同患者人群中bioplex梅毒IgG定量结果分析。Clin Vaccine Immunol 2011;18:2005-6. PMID:21880852 https://doi.org/10.1128/ CVI.05335-11
578. Fakile YF, Jost H, Hoover KW, et al.密螺旋体免疫测定信号强度值与确认性密螺旋体试验反应性的相关性。J Clin Microbiol 2017;56:e01165-17. PMID:29046410 https://doi.org/10.1128/JCM.01165-17
579. Wong EH, Klausner JD, Caguin-Grygiel G, et al.IgM/IgG敏感酶免疫测定评估及指数值在高风险人群梅毒感染筛查中的效用。Sex Transm Dis 2011;38:528-32. PMID:21233789 https:// doi.org/10.1097/ OLQ.0b013e318205491a
580. Dai S, Chi P, Lin Y, et al.使用化学发光微粒子免疫测定的信号与临界值比值改进梅毒螺旋体抗体反向筛查算法。Sex Transm Dis 2014;41:29-34. PMID:24326578 https://doi.org/10.1097/ OLQ.0000000000000066
581. Li Z, Feng Z, Liu P, Yan C.使用化学发光微粒子免疫测定筛查梅毒螺旋体抗体：不一致血清学结果分析及临床特征。Ann Clin Biochem 2016;53:588-92. PMID:26680646 https:// doi.org/10.1177/0004563215623806
582. Yen-Lieberman B, Daniel J, Means C, Waletzky J, Daly TM.使用半定量算法识别假阳性梅毒抗体结果。Clin Vaccine Immunol 2011;18:1038-40. PMID:21508162 https://doi.org/10.1128/CVI.05066-11

583. Yimtae K, Srirompotong S, Lertsukprasert K. Otosyphilis: a review of 85 cases. Otolaryngol Head Neck Surg 2007;136:67–71. PMID:17210336 https://doi.org/10.1016/j.otohns.2006.08.026
584. Gleich LL, Linstrom CJ, Kimmelman CP. Otosyphilis: a diagnostic and therapeutic dilemma. Laryngoscope 1992;102:1255–9. PMID:1307698 https://doi.org/10.1288/00005537-199211000-00010
585. Lukehart SA, Hook EW 3rd, Baker-Zander SA, Collier AC, Critchlow CW, Handsfield HH. Invasion of the central nervous system by *Treponema pallidum*: implications for diagnosis and treatment. Ann Intern Med 1988;109:855–62. PMID:3056164 https://doi.org/10.7326/0003-4819-109-11-855
586. Harding AS, Ghanem KG. The performance of cerebrospinal fluid treponemal-specific antibody tests in neurosyphilis: a systematic review. Sex Transm Dis 2012;39:291–7. PMID:22421696 https://doi.org/10.1097/OLQ.0b013e31824c0e62
587. Jaffe HW, Larsen SA, Peters M, Jove DF, Lopez B, Schroeter AL. Tests for treponemal antibody in CSF. Arch Intern Med 1978;138:252–5. PMID:343742 https://doi.org/10.1001/archinte.1978.03630260050016
588. Marra CM, Maxwell CL, Smith SL, et al. Cerebrospinal fluid abnormalities in patients with syphilis: association with clinical and laboratory features. J Infect Dis 2004;189:369–76. PMID:14745693 https://doi.org/10.1086/381227
589. CDC. Inadvertent use of Bicillin C-R to treat syphilis infection—Los Angeles, California, 1999–2004. MMWR Morb Mortal Wkly Rep 2005;54:217–9. PMID:15758893
590. Butler T. The Jarisch-Herxheimer reaction after antibiotic treatment of spirochetal infections: a review of recent cases and our understanding of pathogenesis. Am J Trop Med Hyg 2017;96:46–52. PMID:28077740 https://doi.org/10.4269/ajtmh.16-0434
591. Rolfs RT, Joesoef MR, Hendershot EF, et al.; The Syphilis and HIV Study Group. A randomized trial of enhanced therapy for early syphilis in patients with and without human immunodeficiency virus infection. N Engl J Med 1997;337:307–14. PMID:9235493 https://doi.org/10.1056/NEJM199707313370504
592. Yang CJ, Lee NY, Chen TC, et al. One dose versus three weekly doses of benzathine penicillin G for patients co-infected with HIV and early syphilis: a multicenter, prospective observational study. PLoS One 2014;9:e109667. PMID:25286091 https://doi.org/10.1371/journal.pone.0109667
593. Ganesan A, Mesner O, Okulicz JF, et al.; Infectious Disease Clinical Research Program HIV/STI Working Group. A single dose of benzathine penicillin G is as effective as multiple doses of benzathine penicillin G for the treatment of HIV-infected persons with early syphilis. Clin Infect Dis 2015;60:653–60. PMID:25389249 https://doi.org/10.1093/cid/ciu888
594. Ghanem KG, Erbelding EJ, Wiener ZS, Rompalo AM. Serological response to syphilis treatment in HIV-positive and HIV-negative patients attending sexually transmitted diseases clinics. Sex Transm Infect 2007;83:97–101. PMID:16943224 https://doi.org/10.1136/sti.2006.021402
595. Seña AC, Wolff M, Martin DH, et al. Predictors of serological cure and serofast state after treatment in HIV-negative persons with early syphilis. Clin Infect Dis 2011;53:1092–9. PMID:21998287 https://doi.org/10.1093/cid/cir671
596. Zhang RL, Wang QQ, Zhang JP, Yang LJ. Molecular subtyping of *Treponema pallidum* and associated factors of serofast status in early syphilis patients: identified novel genotype and cytokine marker. PLoS One 2017;12:e0175477. PMID:28410389 https://doi.org/10.1371/journal.pone.0175477
597. Seña AC, Zhang XH, Li T, et al. A systematic review of syphilis serological treatment outcomes in HIV-infected and HIV-uninfected persons: rethinking the significance of serological non-responsiveness and the serofast state after therapy. BMC Infect Dis 2015;15:479. PMID:26511465 https://doi.org/10.1186/s12879-015-1209-0
598. Tong ML, Lin LR, Liu GL, et al. Factors associated with serological cure and the serofast state of HIV-negative patients with primary, secondary, latent, and tertiary syphilis. PLoS One 2013;8:e70102. PMID:23894598 https://doi.org/10.1371/journal.pone.0070102
599. Seña AC, Wolff M, Behets F, et al. Response to therapy following retreatment of serofast early syphilis patients with benzathine penicillin. Clin Infect Dis 2013;56:420–2. PMID:23118269 https://doi.org/10.1093/cid/cis918
600. Ghanem KG, Erbelding EJ, Cheng WW, Rompalo AM. Doxycycline compared with benzathine penicillin for the treatment of early syphilis. Clin Infect Dis 2006;42:e45–9. PMID:16477545 https://doi.org/10.1086/500406
601. Wong T, Singh AE, De P. Primary syphilis: serological treatment response to doxycycline/tetracycline versus benzathine penicillin. Am J Med 2008;121:903–8. PMID:18823862 https://doi.org/10.1016/j.amjmed.2008.04.042
602. Hook EW 3rd, Martin DH, Stephens J, Smith BS, Smith K. A randomized, comparative pilot study of azithromycin versus benzathine penicillin G for treatment of early syphilis. Sex Transm Dis 2002;29:486–90. PMID:12172535 https://doi.org/10.1097/00007435-200208000-00010
603. Cao Y, Su X, Wang Q, et al. A multicenter study evaluating ceftriaxone and benzathine penicillin G as treatment agents for early syphilis in Jiangsu, China. Clin Infect Dis 2017;65:1683–8. PMID:29020150 https://doi.org/10.1093/cid/cix611
604. Riedner G, Rusizoka M, Todd J, et al. Single-dose azithromycin versus penicillin G benzathine for the treatment of early syphilis. N Engl J Med 2005;353:1236–44. PMID:16177249 https://doi.org/10.1056/NEJMoa044284
605. Hook EW 3rd, Behets F, Van Damme K, et al. A phase III equivalence trial of azithromycin versus benzathine penicillin for treatment of early syphilis. J Infect Dis 2010;201:1729–35. PMID:20402591 https://doi.org/10.1086/652239
606. Lukehart SA, Godornes C, Molini BJ, et al. Macrolide resistance in *Treponema pallidum* in the United States and Ireland. N Engl J Med 2004;351:154–8. PMID:15247355 https://doi.org/10.1056/NEJMoa040216
607. Mitchell SJ, Engelman J, Kent CK, Lukehart SA, Godornes C, Klausner JD. Azithromycin-resistant syphilis infection: San Francisco, California, 2000–2004. Clin Infect Dis 2006;42:337–45. PMID:16392078 https://doi.org/10.1086/498899
608. A2058G Prevalence Workgroup. Prevalence of the 23S rRNA A2058G point mutation and molecular subtypes in *Treponema pallidum* in the United States, 2007 to 2009. Sex Transm Dis 2012;39:794–8. PMID:23001267
609. Rolfs RT, Joesoef MR, Hendershot EF, et al.; The Syphilis and HIV Study Group. A randomized trial of enhanced therapy for early syphilis in patients with and without human immunodeficiency virus infection. N Engl J Med 1997;337:307–14. PMID:9235493 https://doi.org/10.1056/NEJM199707313370504
610. Collart P, Poitevin M, Milovanovic A, Herlin A, Durel J. Kinetic study of serum penicillin concentrations after single doses of benzathine and benethamine penicillins in young and old people. Br J Vener Dis 1980;56:355–62. PMID:7448577 https://doi.org/10.1136/sti.56.6.355
611. Hagdrup HK, Lange Wantzin G, Secher L, Rosdahl VT. Penicillin concentrations in serum following weekly injections of benzathine penicillin G. Chemotherapy 1986;32:99–101. PMID:3698728 https://doi.org/10.1159/000238397
612. Frentz G, Nielsen PB, Espersen F, Czartoryski A, Aastrup H. Penicillin concentrations in blood and spinal fluid after a single intramuscular injection of penicillin G benzathine. Eur J Clin Microbiol 1984;3:147–9. PMID:6723638 https://doi.org/10.1007/BF02014334

583. Yimtae K, Srirompotong S, Lertsukprasert K. 耳梅毒：85例病例回顾。Otolaryngol Head Neck Surg 2007;136:67-71. PMID:17210336 https://doi.org/10.1016/j.otohns.2006.08.026
584. Gleich LL, Linstrom CJ, Kimmelman CP.耳梅毒：诊断和治疗困境。Laryngoscope 1992;102:1255-9. PMID:1307698 https://doi.org/10.1288/00005537-199211000-00010
585. Lukehart SA, Hook EW 3rd, Baker-Zander SA, Collier AC, Critchlow CW, Handsfield HH.梅毒螺旋体侵入中枢神经系统：对诊断和治疗的意义。Ann Intern Med 1988;109:855-62. PMID:3056164 https://doi.org/10.7326/0003-4819-109-11-855
586. Harding AS, Ghanem KG.脑脊液密螺旋体特异性抗体试验在神经梅毒中的性能：系统综述。Sex Transm Dis 2012;39:291-7. PMID:22421696 https://doi.org/10.1097/OLQ.0b013e31824c0e62
587. Jaffe HW, Larsen SA, Peters M, Jove DF, Lopez B, Schroeter AL.脑脊液中密螺旋体抗体检测。Arch Intern Med 1978;138:252-5. PMID:343742 https://doi.org/10.1001/ archinte.1978.03630260050016
588. Marra CM, Maxwell CL, Smith SL, et al.梅毒患者的脑脊液异常：与临床和实验室特征的关联。J Infect Dis 2004;189:369-76. PMID:14745693 https://doi.org/10.1086/381227
589. CDC.意外使用Bicillin C-R治疗梅毒感染--加利福尼亚州洛杉矶，1999-2004。MMWR Morb Mortal Wkly Rep 2005;54:217-9. PMID:15758893
590. Butler T.螺旋体感染抗生素治疗后的Jarisch-Herxheimer反应：近期病例综述及对发病机制的理解。Am J Trop Med Hyg 2017;96:46-52. PMID:28077740 https://doi.org/10.4269/ajtmh.16-0434
591. Rolfs RT, Joesoef MR, Hendershot EF, et al.; The Syphilis and HIV Study Group.增强治疗早期梅毒在伴或不伴人类免疫缺陷病毒感染患者中的随机试验。N Engl J Med 1997;337:307-14. PMID:9235493 https://doi.org/10.1056/NEJM199707313370504
592. Yang CJ, Lee NY, Chen TC, et al.苄星青霉素G单次剂量与三次每周剂量治疗HIV合并早期梅毒患者：一项多中心、前瞻性观察研究。PLoS One 2014;9:e109667. PMID:25286091 https://doi.org/10.1371/journal.pone.0109667
593. Ganesan A, Mesner O, Okulicz JF, et al.; Infectious Disease Clinical Research Program HIV/STI Working Group.单剂苄星青霉素G治疗HIV感染者早期梅毒与多剂苄星青霉素G同样有效。Clin Infect Dis 2015;60:653-60. PMID:25389249 https:// doi.org/10.1093/cid/ciu888
594. Ghanem KG, Erbelding EJ, Wiener ZS, Rompalo AM.在性传播疾病门诊就诊的HIV阳性和HIV阴性患者对梅毒治疗的血清学反应。Sex Transm Infect 2007;83:97-101. PMID:16943224 https://doi.org/10.1136/ sti.2006.021402
595. Seña AC, Wolff M, Martin DH, et al.HIV阴性早期梅毒患者治疗后血清学治愈和血清固定状态的预测因素。Clin Infect Dis 2011;53:1092-9. PMID:21998287 https:// doi.org/10.1093/cid/cir671
596. Zhang RL, Wang QQ, Zhang JP, Yang LJ.梅毒螺旋体的分子亚型分型及早期梅毒患者血清固定状态的相关因素：发现新基因型和细胞因子标志物。PLoS One 2017;12:e0175477. PMID:28410389 https://doi.org/10.1371/journal.pone.0175477
597. Seña AC, Zhang XH, Li T, et al.HIV感染者和HIV未感染者梅毒血清学治疗结局的系统评价：重新思考血清学无反应性和治疗后血清固定状态的意义。BMC Infect Dis 2015;15:479. PMID:26511465 https://doi.org/10.1186/s12879-015-1209-0
598. Tong ML, Lin LR, Liu GL, et al.HIV阴性一期、二期、潜伏期和晚期梅毒患者血清学治愈及血清固定状态的相关因素。PLoS One 2013;8:e70102. PMID:23894598 https://doi.org/10.1371/journal.pone.0070102
599. Seña AC, Wolff M, Behets F, et al.血清固定早期梅毒患者使用苄星青霉素再治疗后的治疗反应。Clin Infect Dis 2013;56:420-2. PMID:23118269 https://doi.org/10.1093/cid/cis918
600. Ghanem KG, Erbelding EJ, Cheng WW, Rompalo AM.多西环素与苄星青霉素治疗早期梅毒的比较。Clin Infect Dis 2006;42:e45-9. PMID:16477545 https:// doi.org/10.1086/500406
601. Wong T, Singh AE, De P.一期梅毒：多西环素/四环素与苄星青霉素的血清学治疗反应。Am J Med 2008;121:903-8. PMID:18823862 https://doi.org/10.1016/j.amjmed.2008.04.042
602. Hook EW 3rd, Martin DH, Stephens J, Smith BS, Smith K.阿奇霉素与苄星青霉素G治疗早期梅毒的随机对照初步研究。Sex Transm Dis 2002;29:486-90. PMID:12172535 https://doi.org/10.1097/00007435-200208000-00010
603. Cao Y, Su X, Wang Q, et al.在中国江苏开展的多中心研究：评估头孢曲松和苄星青霉素G作为早期梅毒治疗药物。Clin Infect Dis 2017;65:1683-8. PMID:29020150 https://doi.org/10.1093/cid/cix611
604. Riedner G, Rusizoka M, Todd J, et al.单剂阿奇霉素与苄星青霉素G治疗早期梅毒的比较。N Engl J Med 2005;353:1236-44. PMID:16177249 https://doi.org/10.1056/ NEJMoa044284
605. Hook EW 3rd, Behets F, Van Damme K, et al.阿奇霉素与苄星青霉素治疗早期梅毒的III期等效性试验。J Infect Dis 2010;201:1729-35. PMID:20402591 https://doi.org/10.1086/652239
606. Lukehart SA, Godornes C, Molini BJ, et al.美国和爱尔兰梅毒螺旋体的大环内酯类耐药性。N Engl J Med 2004;351:154-8. PMID:15247355 https://doi.org/10.1056/ NEJMoa040216
607. Mitchell SJ, Engelman J, Kent CK, Lukehart SA, Godornes C, Klausner JD.阿奇霉素耐药梅毒感染：加利福尼亚州旧金山，2000-2004年。Clin Infect Dis 2006;42:337-45. PMID:16392078 https://doi.org/10.1086/498899
608. A2058G 流行率工作组。2007 至 2009 年美国梅毒螺旋体中 23S rRNA A2058G 点突变及分子亚型的流行率。Sex Transm Dis 2012;39:794-8。PMID:23001267
609. Rolfs RT, Joesoef MR, Hendershot EF, et al. ； 梅毒与 HIV 研究组。早期梅毒增强治疗在合并与不合并人类免疫缺陷病毒感染患者中的随机试验。N Engl J Med 1997;337:307-14. PMID:9235493 https://doi.org/10.1056/NEJM199707313370504
610. Collart P, Poitevin M, Milovanovic A, Herlin A, Durel J.年轻人和老年人单剂苄星青霉素和苯乙胺青霉素后血清青霉素浓度的动力学研究。Br J Vener Dis 1980;56:355-62. PMID:7448577 https:// doi.org/10.1136/ sti.56.6.355
611. Hagdrup HK, Lange Wantzin G, Secher L, Rosdahl VT.每周注射苄星青霉素G后血清中的青霉素浓度。Chemotherapy 1986;32:99-101. PMID:3698728 https:// doi.org/10.1159/000238397
612. Frentz G, Nielsen PB, Espersen F, Czartoryski A, Aastrup H.单次肌内注射苄星青霉素G后血液和脊髓液中的青霉素浓度。Eur J Clin Microbiol 1984;3:147-9. PMID:6723638 https://doi.org/10.1007/BF02014334

613. Nathan L, Bawdon RE, Sidawi JE, Stettler RW, McIntire DM, Wendel GD Jr. Penicillin levels following the administration of benzathine penicillin G in pregnancy. Obstet Gynecol 1993;82:338–42. PMID:8355931
614. Marra CM, Maxwell CL, Tantalo LC, Sahi SK, Lukehart SA. Normalization of serum rapid plasma reagin titer predicts normalization of cerebrospinal fluid and clinical abnormalities after treatment of neurosyphilis. Clin Infect Dis 2008;47:893–9. PMID:18715154 https://doi.org/10.1086/591534
615. Xiao Y, Tong ML, Lin LR, et al. Serological response predicts normalization of cerebrospinal fluid abnormalities at six months after treatment in HIV-negative neurosyphilis patients. Sci Rep 2017;7:9911. PMID:28855625 https://doi.org/10.1038/s41598-017-10387-x
616. Hook EW 3rd, Baker-Zander SA, Moskovitz BL, Lukehart SA, Handsfield HH. Ceftriaxone therapy for asymptomatic neurosyphilis. Case report and Western blot analysis of serum and cerebrospinal fluid IgG response to therapy. Sex Transm Dis 1986;13(Suppl):185–8. PMID:3764632 https://doi.org/10.1097/00007435-198607000-00018
617. Shann S, Wilson J. Treatment of neurosyphilis with ceftriaxone. Sex Transm Infect 2003;79:415–6. PMID:14573840 https://doi.org/10.1136/sti.79.5.415
618. Ahmed KA, Fox SJ, Frigas E, Park MA. Clinical outcome in the use of cephalosporins in pediatric patients with a history of penicillin allergy. Int Arch Allergy Immunol 2012;158:405–10. PMID:22487723 https://doi.org/10.1159/000333553
619. Park MA, Koch CA, Klemawesch P, Joshi A, Li JT. Increased adverse drug reactions to cephalosporins in penicillin allergy patients with positive penicillin skin test. Int Arch Allergy Immunol 2010;153:268–73. PMID:20484925 https://doi.org/10.1159/000314367
620. Novalbos A, Sastre J, Cuesta J, et al. Lack of allergic cross-reactivity to cephalosporins among patients allergic to penicillins. Clin Exp Allergy 2001;31:438–43. PMID:11260156 https://doi.org/10.1046/j.1365-2222.2001.00992.x
621. Pichichero ME, Casey JR. Safe use of selected cephalosporins in penicillin-allergic patients: a meta-analysis. Otolaryngol Head Neck Surg 2007;136:340–7. PMID:17321857 https://doi.org/10.1016/j.otohns.2006.10.007
622. Kingston AA, Vujevich J, Shapiro M, et al. Seronegative secondary syphilis in 2 patients coinfected with human immunodeficiency virus. Arch Dermatol 2005;141:431–3. PMID:15837859 https://doi.org/10.1001/archderm.141.4.431
623. CDC. Symptomatic early neurosyphilis among HIV-positive men who have sex with men—four cities, United States, January 2002–June 2004. MMWR Morb Mortal Wkly Rep 2007;56:625–8. PMID:17597693
624. Ghanem KG, Moore RD, Rompalo AM, Erbelding EJ, Zenilman JM, Gebo KA. Neurosyphilis in a clinical cohort of HIV-1-infected patients. AIDS 2008;22:1145–51. PMID:18525260 https://doi.org/10.1097/QAD.0b013e32830184df
625. Ghanem KG, Moore RD, Rompalo AM, Erbelding EJ, Zenilman JM, Gebo KA. Antiretroviral therapy is associated with reduced serologic failure rates for syphilis among HIV-infected patients. Clin Infect Dis 2008;47:258–65. PMID:18532887 https://doi.org/10.1086/589295
626. Tomkins A, Ahmad S, Cousins DE, Thng CM, Vilar FJ, Higgins SP. Screening for asymptomatic neurosyphilis in HIV patients after treatment of early syphilis: an observational study. Sex Transm Infect 2018;94:337–9. PMID:28196838 https://doi.org/10.1136/sextrans-2016-052938
627. Yang CJ, Chang SY, Hung CC. Sensitivity and specificity of lumbar puncture in HIV-infected patients with syphilis and no neurologic symptoms. Clin Infect Dis 2009;49:162–3, author reply 162–3. PMID:19500029 https://doi.org/10.1086/599616
628. Marra CM, Boutin P, McArthur JC, et al. A pilot study evaluating ceftriaxone and penicillin G as treatment agents for neurosyphilis in human immunodeficiency virus-infected individuals. Clin Infect Dis 2000;30:540–4. PMID:10722441 https://doi.org/10.1086/313725
629. Dowell ME, Ross PG, Musher DM, Cate TR, Baughn RE. Response of latent syphilis or neurosyphilis to ceftriaxone therapy in persons infected with human immunodeficiency virus. Am J Med 1992;93:481–8. PMID:1442850 https://doi.org/10.1016/0002-9343(92)90574-U
630. Smith NH, Musher DM, Huang DB, et al. Response of HIV-infected patients with asymptomatic syphilis to intensive intramuscular therapy with ceftriaxone or procaine penicillin. Int J STD AIDS 2004;15:328–32. PMID:15117503 https://doi.org/10.1177/095646240401500511
631. Ahmed KA, Fox SJ, Frigas E, Park MA. Clinical outcome in the use of cephalosporins in pediatric patients with a history of penicillin allergy. Int Arch Allergy Immunol 2012;158:405–10. PMID:22487723 https://doi.org/10.1159/000333553
632. Trivedi S, Williams C, Torrone E, Kidd S. National trends and reported risk factors among pregnant women with syphilis in the United States, 2012–2016. Obstet Gynecol 2019;133:27–32. PMID:30531570 https://doi.org/10.1097/AOG.0000000000003000
633. Biswas HH, Chew Ng RA, Murray EL, et al. Characteristics associated with delivery of an infant with congenital syphilis and missed opportunities for prevention—California, 2012 to 2014. Sex Transm Dis 2018;45:435–41. PMID:29465666 https://doi.org/10.1097/OLQ.0000000000000782
634. Slutsker JS, Hennessy RR, Schillinger JA. Factors contributing to congenital syphilis cases—New York City, 2010–2016. MMWR Morb Mortal Wkly Rep 2018;67:1088–93. PMID:30286056 https://doi.org/10.15585/mmwr.mm6739a3
635. DiOrio D, Kroeger K, Ross A. Social vulnerability in congenital syphilis case mothers: qualitative assessment of cases in Indiana, 2014 to 2016. Sex Transm Dis 2018;45:447–51. PMID:29465662 https://doi.org/10.1097/OLQ.0000000000000783
636. Kimball A, Torrone E, Miele K, et al. Missed opportunities for prevention of congenital syphilis—United States, 2018. MMWR Morb Mortal Wkly Rep 2020;69:661–5. PMID:32497029 https://doi.org/10.15585/mmwr.mm6922a1
637. Park IU, Chow JM, Bolan G, Stanley M, Shieh J, Schapiro JM. Screening for syphilis with the treponemal immunoassay: analysis of discordant serology results and implications for clinical management. J Infect Dis 2011;204:1297–304. PMID:21930610 https://doi.org/10.1093/infdis/jir524
638. Mmeje O, Chow JM, Davidson L, Shieh J, Schapiro JM, Park IU. Discordant syphilis immunoassays in pregnancy: perinatal outcomes and implications for clinical management. Clin Infect Dis 2015;61:1049–53. PMID:26063719 https://doi.org/10.1093/cid/civ445
639. Alexander JM, Sheffield JS, Sanchez PJ, Mayfield J, Wendel GD Jr. Efficacy of treatment for syphilis in pregnancy. Obstet Gynecol 1999;93:5–8. PMID:9916946
640. Walker GJ. Antibiotics for syphilis diagnosed during pregnancy. Cochrane Database Syst Rev 2001;(3):CD001143. PMID:11686978
641. Wendel GD Jr, Sheffield JS, Hollier LM, Hill JB, Ramsey PS, Sánchez PJ. Treatment of syphilis in pregnancy and prevention of congenital syphilis. Clin Infect Dis 2002;35(Suppl 2):S200–9. PMID:12353207 https://doi.org/10.1086/342108
642. Zhu L, Qin M, Du L, Xie RH, Wong T, Wen SW. Maternal and congenital syphilis in Shanghai, China, 2002 to 2006. Int J Infect Dis 2010;14(Suppl 3):e45–8. PMID:20137991 https://doi.org/10.1016/j.ijid.2009.09.009
643. Hawkes S, Matin N, Broutet N, Low N. Effectiveness of interventions to improve screening for syphilis in pregnancy: a systematic review and meta-analysis. Lancet Infect Dis 2011;11:684–91. PMID:21683653 https://doi.org/10.1016/S1473-3099(11)70104-9
644. Hollier LM, Harstad TW, Sanchez PJ, Twickler DM, Wendel GD Jr. Fetal syphilis: clinical and laboratory characteristics. Obstet Gynecol 2001;97:947–53. PMID:11384701

613. Nathan L, Bawdon RE, Sidawi JE, Stettler RW, McIntire DM, Wendel GD Jr.妊娠期给予苄星青霉素G后的青霉素水平。Obstet Gynecol 1993;82:338-42. PMID:8355931
614. Marra CM, Maxwell CL, Tantalo LC, Sahi SK, Lukehart SA.血清快速血浆反应素滴度正常化预示神经梅毒治疗后脑脊液和临床异常的正常化。Clin Infect Dis 2008;47:893-9. PMID:18715154 https://doi.org/10.1086/591534
615. Xiao Y, Tong ML, Lin LR, et al.血清学反应预示 HIV 阴性神经梅毒患者治疗后六个月脑脊液异常的正常化。Sci Rep 2017;7:9911. PMID:28855625 https://doi.org/10.1038/s41598-017-10387-x
616. Hook EW 3rd, Baker-Zander SA, Moskovitz BL, Lukehart SA, Handsfield HH.头孢曲松治疗无症状神经梅毒。病例报告及血清和脑脊液 IgG 治疗反应的 Western blot 分析。Sex Transm Dis 1986;13(Suppl): 185-8. PMID:3764632 https://doi.org/10.1097/00007435-198607000-00018
617. Shann S, Wilson J.头孢曲松治疗神经梅毒。Sex Transm Infect 2003;79:415-6. PMID:14573840 https://doi.org/10.1136/sti.79.5.415
618. Ahmed KA, Fox SJ, Frigas E, Park MA.有青霉素过敏史的儿科患者使用头孢菌素的临床结局。Int Arch Allergy Immunol 2012;158:405-10. PMID:22487723 https://doi.org/10.1159/000333553
619. Park MA, Koch CA, Klemawesch P, Joshi A, Li JT.青霉素皮肤试验阳性的青霉素过敏患者对头孢菌素的不良药物反应增加。Int Arch Allergy Immunol 2010;153:268-73. PMID:20484925 https://doi.org/10.1159/000314367
620. Novalbos A, Sastre J, Cuesta J, et al.青霉素过敏患者对头孢菌素缺乏过敏性交叉反应。Clin Exp Allergy 2001;31:438-43. PMID:11260156 https://doi.org/10.1046/j.1365-2222.2001.00992.x
621. Pichichero ME, Casey JR.青霉素过敏患者安全使用特定头孢菌素：一项荟萃分析。Otolaryngol Head Neck Surg 2007;136:340-7. PMID:17321857 https://doi.org/10.1016/j.otohns.2006.10.007
622. Kingston AA, Vujevich J, Shapiro M, et al.2 例合并人类免疫缺陷病毒感染患者的血清阴性二期梅毒。Arch Dermatol 2005;141:431-3. PMID:15837859 https://doi.org/10.1001/archderm.141.4.431
623. CDC.HIV 阳性男男性行为人群中的症状性早期神经梅毒--美国四个城市，2002 年 1 月至 2004 年 6 月。MMWR Morb Mortal Wkly Rep 2007;56:625-8. PMID:17597693
624. Ghanem KG, Moore RD, Rompalo AM, Erbelding EJ, Zenilman JM, Gebo KA.HIV-1 感染患者临床队列中的神经梅毒。AIDS 2008;22:1145-51. PMID:18525260 https://doi.org/10.1097/ QAD.0b013e32830184df
625. Ghanem KG, Moore RD, Rompalo AM, Erbelding EJ, Zenilman JM, Gebo KA.抗逆转录病毒治疗与 HIV 感染患者梅毒血清学失败率降低相关。Clin Infect Dis 2008;47:258-65. PMID:18532887 https://doi.org/10.1086/589295
626. Tomkins A, Ahmad S, Cousins DE, Thng CM, Vilar FJ, Higgins SP.早期梅毒治疗后对 HIV 患者无症状神经梅毒的筛查：一项观察性研究。Sex Transm Infect 2018;94:337-9. PMID:28196838 https://doi.org/10.1136/sextrans-2016-052938
627. Yang CJ, Chang SY, Hung CC.腰椎穿刺在无神经系统症状的 HIV 感染梅毒患者中的敏感性和特异性。Clin Infect Dis 2009;49:162-3， 作者回复 162-3. PMID:19500029 https://doi.org/10.1086/599616
628. Marra CM, Boutin P, McArthur JC, et al.一项评估头孢曲松和青霉素G作为人类免疫缺陷病毒感染个体神经梅毒治疗药物的初步研究。Clin Infect Dis 2000;30:540-4. PMID:10722441 https://doi.org/10.1086/313725
629. Dowell ME, Ross PG, Musher DM, Cate TR, Baughn RE.人类免疫缺陷病毒感染者的潜伏梅毒或神经梅毒对头孢曲松治疗的反应。Am J Med 1992;93:481-8. PMID:1442850 https:// doi.org/10.1016/0002-9343(92) 90574-U
630. Smith NH, Musher DM, Huang DB, et al.HIV 感染的无症状梅毒患者对头孢曲松或普鲁卡因青霉素强化肌内治疗的反应。Int J STD AIDS 2004;15:328-32. PMID:15117503 https:// doi.org/10.1177/095646240401500511
631. Ahmed KA, Fox SJ, Frigas E, Park MA.有青霉素过敏史的儿科患者使用头孢菌素的临床结局。Int Arch Allergy Immunol 2012;158:405-10. PMID:22487723 https://doi.org/10.1159/000333553
632. Trivedi S, Williams C, Torrone E, Kidd S.2012-2016 年美国妊娠期梅毒妇女的全国趋势和报告的危险因素。Obstet Gynecol 2019;133:27-32. PMID:30531570 https://doi.org/10.1097/AOG.0000000000003000
633. Biswas HH, Chew Ng RA, Murray EL, et al.与分娩先天性梅毒婴儿相关的特征及错失的预防机会--加利福尼亚州，2012 至 2014 年。Sex Transm Dis 2018;45:435-41. PMID:29465666 https:// doi.org/10.1097/ OLQ.0000000000000782
634. Slutsker JS, Hennessy RR, Schillinger JA.导致先天性梅毒病例的因素--纽约市，2010-2016 年。MMWR Morb Mortal Wkly Rep 2018;67:1088-93. PMID:30286056 https://doi.org/10.15585/mmwr.mm6739a3
635. DiOrio D, Kroeger K, Ross A.先天性梅毒病例母亲的社会脆弱性：对印第安纳州 2014 至 2016 年病例的定性评估。Sex Transm Dis 2018;45:447-51. PMID:29465662 https:// doi.org/10.1097/ OLQ.0000000000000783
636. Kimball A, Torrone E, Miele K, et al.错失的先天性梅毒预防机会--美国，2018 年。MMWR Morb Mortal Wkly Rep 2020;69:661-5. PMID:32497029 https:// doi.org/10.15585/mmwr.mm6922a1
637. Park IU, Chow JM, Bolan G, Stanley M, Shieh J, Schapiro JM.使用密螺旋体免疫测定筛查梅毒：不一致血清学结果分析及对临床管理的意义。J Infect Dis 2011;204:1297-304. PMID:21930610 https:// doi.org/10.1093/infdis/jir524
638. Mmeje O, Chow JM, Davidson L, Shieh J, Schapiro JM, Park IU.妊娠期梅毒免疫检测不一致：围产期结局及对临床管理的意义。Clin Infect Dis 2015;61:1049-53. PMID:26063719 https:// doi.org/10.1093/cid/ civ445
639. Alexander JM, Sheffield JS, Sanchez PJ, Mayfield J, Wendel GD Jr. 妊娠期梅毒治疗的疗效。Obstet Gynecol 1999;93:5-8. PMID:9916946
640. Walker GJ.妊娠期诊断梅毒的抗生素治疗。Cochrane Database Syst Rev 2001;(3): CD001143. PMID:11686978
641. Wendel GD Jr, Sheffield JS, Hollier LM, Hill JB, Ramsey PS, Sánchez PJ.妊娠期梅毒的治疗及先天性梅毒的预防。Clin Infect Dis 2002;35(Suppl 2): S200-9. PMID:12353207 https://doi.org/10.1086/342108
642. Zhu L, Qin M, Du L, Xie RH, Wong T, Wen SW.中国上海2002至2006年孕产妇梅毒与先天性梅毒。Int J Infect Dis 2010;14(Suppl 3): e45-8. PMID:20137991 https://doi.org/10.1016/j.ijid.2009.09.009
643. Hawkes S, Matin N, Broutet N, Low N.改善妊娠期梅毒筛查干预措施的有效性：系统评价与meta分析。Lancet Infect Dis 2011;11:684-91. PMID:21683653 https://doi.org/10.1016/S1473-3099(11) 70104-9
644. Hollier LM, Harstad TW, Sanchez PJ, Twickler DM, Wendel GD Jr. 胎儿梅毒：临床与实验室特征。Obstet Gynecol 2001;97:947-53. PMID:11384701

645. Rac MW, Bryant SN, McIntire DD, et al. Progression of ultrasound findings of fetal syphilis after maternal treatment. Am J Obstet Gynecol 2014;211:426.e1–6. PMID:24907700 https://doi.org/10.1016/j.ajog.2014.05.049
646. Zhou P, Gu Z, Xu J, Wang X, Liao K. A study evaluating ceftriaxone as a treatment agent for primary and secondary syphilis in pregnancy. Sex Transm Dis 2005;32:495–8. PMID:16041252 https://doi.org/10.1097/01.olq.0000170443.70739.cd
647. Katanami Y, Hashimoto T, Takaya S, et al. Amoxicillin and ceftriaxone as treatment alternatives to penicillin for maternal syphilis. Emerg Infect Dis 2017;23:827–9. PMID:28418316 https://doi.org/10.3201/eid2305.161936
648. Kestenbaum LA, Ebberson J, Zorc JJ, Hodinka RL, Shah SS. Defining cerebrospinal fluid white blood cell count reference values in neonates and young infants. Pediatrics 2010;125:257–64. PMID:20064869 https://doi.org/10.1542/peds.2009-1181
649. Shah SS, Ebberson J, Kestenbaum LA, Hodinka RL, Zorc JJ. Age-specific reference values for cerebrospinal fluid protein concentration in neonates and young infants. J Hosp Med 2011;6:22–7. PMID:20629018 https://doi.org/10.1002/jhm.711
650. Thomson J, Sucharew H, Cruz AT, et al.; Pediatric Emergency Medicine Collaborative Research Committee (PEM CRC) HSV Study Group. Cerebrospinal fluid reference values for young infants undergoing lumbar puncture. Pediatrics 2018;141:e20173405. PMID:29437883 https://doi.org/10.1542/peds.2017-3405
651. Kimberlin DW, Brady MT, Jackson MA, Long SS, eds. Red book: 2018 report of the Committee on Infectious Diseases. 31st ed. Itasca, IL: American Academy of Pediatrics; 2018.
652. Macy E, Contreras R. Adverse reactions associated with oral and parenteral use of cephalosporins: a retrospective population-based analysis. J Allergy Clin Immunol 2015;135:745–52.e5. PMID:25262461 https://doi.org/10.1016/j.jaci.2014.07.062
653. Macy E, Vyles D. Who needs penicillin allergy testing? Ann Allergy Asthma Immunol 2018;121:523–9. PMID:30092265 https://doi.org/10.1016/j.anai.2018.07.041
654. Annè S, Reisman RE. Risk of administering cephalosporin antibiotics to patients with histories of penicillin allergy. Ann Allergy Asthma Immunol 1995;74:167–70. PMID:7697478
655. Albin S, Agarwal S. Prevalence and characteristics of reported penicillin allergy in an urban outpatient adult population. Allergy Asthma Proc 2014;35:489–94. PMID:25584917 https://doi.org/10.2500/aap.2014.35.3791
656. Blumenthal KG, Peter JG, Trubiano JA, Phillips EJ. Antibiotic allergy. Lancet 2019;393:183–98. PMID:30558872 https://doi.org/10.1016/S0140-6736(18)32218-9
657. Macy E, Poon K-Y T. Self-reported antibiotic allergy incidence and prevalence: age and sex effects. Am J Med 2009;122:778.e1–7. PMID:19635279 https://doi.org/10.1016/j.amjmed.2009.01.034
658. Shenoy ES, Macy E, Rowe T, Blumenthal KG. Evaluation and management of penicillin allergy: a review. JAMA 2019;321:188–99. PMID:30644987 https://doi.org/10.1001/jama.2018.19283
659. Gadde J, Spence M, Wheeler B, Adkinson NF Jr. Clinical experience with penicillin skin testing in a large inner-city STD clinic. JAMA 1993;270:2456–63. PMID:8230623 https://doi.org/10.1001/jama.1993.03510200062033
660. Macy E, Ngor EW. Safely diagnosing clinically significant penicillin allergy using only penicilloyl-poly-lysine, penicillin, and oral amoxicillin. J Allergy Clin Immunol Pract 2013;1:258–63. PMID:24565482 https://doi.org/10.1016/j.jaip.2013.02.002
661. Jares EJ, Sánchez-Borges M, Cardona-Villa R, et al.; Latin America Drug Allergy Interest Group. Multinational experience with hypersensitivity drug reactions in Latin America. Ann Allergy Asthma Immunol 2014;113:282–9. PMID:25065979 https://doi.org/10.1016/j.anai.2014.06.019
662. Macy E, Contreras R. Health care use and serious infection prevalence associated with penicillin "allergy" in hospitalized patients: A cohort study. J Allergy Clin Immunol 2014;133:790–6. PMID:24188976 https://doi.org/10.1016/j.jaci.2013.09.021
663. Blumenthal KG, Lu N, Zhang Y, Li Y, Walensky RP, Choi HK. Risk of meticillin resistant *Staphylococcus aureus* and *Clostridium difficile* in patients with a documented penicillin allergy: population based matched cohort study. BMJ 2018;361:k2400. PMID:29950489 https://doi.org/10.1136/bmj.k2400
664. Blumenthal KG, Ryan EE, Li Y, Lee H, Kuhlen JL, Shenoy ES. The impact of a reported penicillin allergy on surgical site infection risk. Clin Infect Dis 2018;66:329–36. PMID:29361015 https://doi.org/10.1093/cid/cix794
665. Tucker MH, Lomas CM, Ramchandar N, Waldram JD. Amoxicillin challenge without penicillin skin testing in evaluation of penicillin allergy in a cohort of Marine recruits. J Allergy Clin Immunol Pract 2017;5:813–5. PMID:28341170 https://doi.org/10.1016/j.jaip.2017.01.023
666. Goldberg A, Confino-Cohen R. Skin testing and oral penicillin challenge in patients with a history of remote penicillin allergy. Ann Allergy Asthma Immunol 2008;100:37–43. PMID:18254480 https://doi.org/10.1016/S1081-1206(10)60402-4
667. Iammatteo M, Alvarez Arango S, Ferastraoaru D, et al. Safety and outcomes of oral graded challenges to amoxicillin without prior skin testing. J Allergy Clin Immunol Pract 2019;7:236–43. PMID:29802906 https://doi.org/10.1016/j.jaip.2018.05.008
668. Cook DJ, Barbara DW, Singh KE, Dearani JA. Penicillin skin testing in cardiac surgery. J Thorac Cardiovasc Surg 2014;147:1931–5. PMID:24530197 https://doi.org/10.1016/j.jtcvs.2014.01.019
669. McDanel DL, Azar AE, Dowden AM, et al. Screening for beta-lactam allergy in joint arthroplasty patients to improve surgical prophylaxis practice. J Arthroplasty 2017;32(9s):S101–8. PMID:28236547 https://doi.org/10.1016/j.arth.2017.01.012
670. Trubiano JA, Thursky KA, Stewardson AJ, et al. Impact of an integrated antibiotic allergy testing program on antimicrobial stewardship: a multicenter evaluation. Clin Infect Dis 2017;65:166–74. PMID:28520865 https://doi.org/10.1093/cid/cix244
671. Siew LQC, Li PH, Watts TJ, et al. Identifying low-risk beta-lactam allergy patients in a UK tertiary centre. J Allergy Clin Immunol Pract 2019;7:2173–2181.e1. PMID:30922992 https://doi.org/10.1016/j.jaip.2019.03.015
672. Chen JR, Tarver SA, Alvarez KS, Tran T, Khan DA. A proactive approach to penicillin allergy testing in hospitalized patients. J Allergy Clin Immunol Pract 2017;5:686–93. PMID:27888034 https://doi.org/10.1016/j.jaip.2016.09.045
673. Leis JA, Palmay L, Ho G, et al. Point-of-care β-lactam allergy skin testing by antimicrobial stewardship programs: a pragmatic multicenter prospective evaluation. Clin Infect Dis 2017;65:1059–65. PMID:28575226 https://doi.org/10.1093/cid/cix512
674. Banks TA, Tucker M, Macy E. Evaluating penicillin allergies without skin testing. Curr Allergy Asthma Rep 2019;19:27. PMID:30903298 https://doi.org/10.1007/s11882-019-0854-6
675. Pham MN, Ho HE, Desai M. Penicillin desensitization: treatment of syphilis in pregnancy in penicillin-allergic patients. Ann Allergy Asthma Immunol 2017;118:537–41. PMID:28477786 https://doi.org/10.1016/j.anai.2017.03.013
676. Sogn DD, Evans R 3rd, Shepherd GM, et al. Results of the National Institute of Allergy and Infectious Diseases Collaborative Clinical Trial to test the predictive value of skin testing with major and minor penicillin derivatives in hospitalized adults. Arch Intern Med 1992;152:1025–32. PMID:1580706 https://doi.org/10.1001/archinte.1992.00400170105020

645. Rac MW, Bryant SN, McIntire DD, et al.母亲治疗后胎儿梅毒超声表现的进展。Am J Obstet Gynecol 2014;211:426.e1-6. PMID:24907700 https://doi.org/10.1016/j.ajog.2014.05.049
646. Zhou P, Gu Z, Xu J, Wang X, Liao K.一项评估头孢曲松作为妊娠期一、二期梅毒治疗药物的研究。Sex Transm Dis 2005;32:495-8. PMID:16041252 https://doi.org/10.1097/01.olq.0000170443.70739.cd
647. Katanami Y, Hashimoto T, Takaya S, et al.阿莫西林与头孢曲松作为孕产妇梅毒青霉素替代治疗。Emerg Infect Dis 2017;23:827-9. PMID:28418316 https://doi.org/10.3201/ eid2305.161936
648. Kestenbaum LA, Ebberson J, Zorc JJ, Hodinka RL, Shah SS.新生儿与小婴儿脑脊液白细胞计数参考值的界定。Pediatrics 2010;125:257-64. PMID:20064869 https://doi.org/10.1542/peds.2009-1181
649. Shah SS, Ebberson J, Kestenbaum LA, Hodinka RL, Zorc JJ.新生儿与小婴儿脑脊液蛋白浓度的年龄特异性参考值。J Hosp Med 2011;6:22-7. PMID:20629018 https://doi.org/10.1002/jhm.711
650. Thomson J, Sucharew H, Cruz AT, et al.; Pediatric Emergency Medicine Collaborative Research Committee(PEM CRC) HSV Study Group.接受腰椎穿刺的小婴儿脑脊液参考值。Pediatrics 2018;141:e20173405. PMID:29437883 https://doi.org/10.1542/peds.2017-3405
651. Kimberlin DW, Brady MT, Jackson MA, Long SS，编.红皮书：2018年传染病委员会报告.第31版.Itasca, IL： 美国儿科学会； 2018.
652. Macy E, Contreras R.口服与肠外使用头孢菌素相关的不良反应：一项基于人群的回顾性分析。J Allergy Clin Immunol 2015;135:745-52.e5. PMID:25262461 https://doi.org/10.1016/j.jaci.2014.07.062
653. Macy E, Vyles D.谁需要青霉素过敏检测?Ann Allergy Asthma Immunol 2018;121:523-9. PMID:30092265 https://doi.org/10.1016/j.anai.2018.07.041
654. Annè S, Reisman RE.对有青霉素过敏史患者使用头孢菌素类抗生素的风险。Ann Allergy Asthma Immunol 1995;74:167-70. PMID:7697478
655. Albin S, Agarwal S.城市门诊成人人群中报告青霉素过敏的患病率与特征。Allergy Asthma Proc 2014;35:489-94. PMID:25584917 https://doi.org/10.2500/ aap.2014.35.3791
656. Blumenthal KG, Peter JG, Trubiano JA, Phillips EJ. 抗生素过敏。Lancet 2019;393:183-98. PMID:30558872 https://doi.org/10.1016/S0140-6736(18)32218-9
657. Macy E, Poon K-Y T.自我报告的抗生素过敏发生率与患病率：年龄与性别影响。Am J Med 2009;122:778.e1-7. PMID:19635279 https://doi.org/10.1016/j.amjmed.2009.01.034
658. Shenoy ES, Macy E, Rowe T, Blumenthal KG.青霉素过敏的评估与管理：综述。JAMA 2019;321:188-99. PMID:30644987 https://doi.org/10.1001/
659. jama.2018.19283
Gadde J, Spence M, Wheeler B, Adkinson NF Jr.大型市中心STD诊所青霉素皮肤试验的临床经验。JAMA 1993;270:2456-63. PMID:8230623 https://
660. doi.org/10.1001/ jama.1993.03510200062033
Macy E, Ngor EW.仅使用penicilloyl-poly-lysine、青霉素和口服阿莫西林安全诊断临床显著青霉素过敏。J Allergy Clin Immunol Pract 2013;1:258-63.
661. PMID:24565482 https://doi.org/10.1016/j.jaip.2013.02.002
Jares EJ, Sánchez-Borges M, Cardona-Villa R, et al.; Latin America Drug Allergy Interest Group.拉丁美洲药物超敏反应的多国经验。Ann Allergy Asthma Immunol 2014;113:282-9. PMID:25065979 https://doi.org/10.1016/j.anai.2014.06.019
662. Macy E, Contreras R.住院患者中青霉素"过敏"相关的医疗资源使用与严重感染患病率：一项队列研究。J Allergy Clin Immunol 2014;133:790-6. PMID:24188976 https://doi.org/10.1016/j.jaci.2013.09.021
663. Blumenthal KG, Lu N, Zhang Y, Li Y, Walensky RP, Choi HK.有记录青霉素过敏患者中耐甲氧西林*Staphylococcus aureus*与*Clostridium difficile*的风险：基于人群的匹配队列研究。BMJ 2018;361:k2400. PMID:29950489 https://doi.org/10.1136/bmj.k2400
664. Blumenthal KG, Ryan EE, Li Y, Lee H, Kuhlen JL, Shenoy ES.报告青霉素过敏对手术部位感染风险的影响。Clin Infect Dis 2018;66:329-36. PMID:29361015 https://doi.org/10.1093/cid/cix794
665. Tucker MH, Lomas CM, Ramchandar N, Waldram JD.在一组海军陆战队新兵中评估青霉素过敏时不做青霉素皮肤试验直接进行阿莫西林激发试验。J Allergy Clin Immunol Pract 2017;5:813-5. PMID:28341170 https://doi.org/10.1016/j.jaip.2017.01.023
666. Goldberg A, Confino-Cohen R.对有远期青霉素过敏史患者进行皮肤试验和口服青霉素激发试验。Ann Allergy Asthma Immunol 2008;100:37-43. PMID:18254480 https:// doi.org/10.1016/S1081-1206(10) 60402-4
667. Iammatteo M, Alvarez Arango S, Ferastraoaru D, et al.无预先皮肤试验口服梯度阿莫西林激发试验的安全性与结局。J Allergy Clin Immunol Pract 2019;7:236-43. PMID:29802906 https://doi.org/10.1016/j.jaip.2018.05.008
668. Cook DJ, Barbara DW, Singh KE, Dearani JA.心脏手术中的青霉素皮肤试验。J Thorac Cardiovasc Surg 2014;147:1931-5. PMID:24530197 https://doi.org/10.1016/j.jtcvs.2014.01.019
669. McDanel DL, Azar AE, Dowden AM, et al.关节置换术患者β-内酰胺类过敏筛查以改善手术预防用药实践。J arthroplasty 2017;32(9s):
670. S101-8. PMID:28236547 https:// doi.org/10.1016/j.arth.2017.01.012
Trubiano JA, Thursky KA, Stewardson AJ, et al.综合性抗生素过敏检测项目对抗菌药物管理的影响：一项多中心评估。Clin Infect Dis
671. 2017;65:166-74. PMID:28520865 https://doi.org/10.1093/cid/cix244
Siew LQC, Li PH, Watts TJ, et al.在英国一家三级中心识别低风险β-内酰胺过敏患者。J Allergy Clin Immunol Pract 2019;7:2173-2181.e1.
672. PMID:30922992 https://doi.org/10.1016/j.jaip.2019.03.015
Chen JR, Tarver SA, Alvarez KS, Tran T, Khan DA.住院患者青霉素过敏检测的主动干预方法。J Allergy Clin Immunol Pract 2017;5:686-93.
673. PMID:27888034 https://doi.org/10.1016/j.jaip.2016.09.045
Leis JA, Palmay L, Ho G, et al.由抗菌药物管理项目开展的床旁β-内酰胺过敏皮肤试验：一项实用性多中心前瞻性评估。Clin Infect Dis
674. 2017;65:1059-65. PMID:28575226 https://doi.org/10.1093/cid/cix512
675. Banks TA, Tucker M, Macy E.不进行皮肤试验评估青霉素过敏。Curr Allergy Asthma Rep 2019;19:27. PMID:30903298 https:// doi.org/10.1007/s11882-019-0854-6
Pham MN, Ho HE, Desai M.青霉素脱敏：青霉素过敏患者妊娠期梅
676. 毒的治疗。Ann Allergy Asthma Immunol 2017;118:537-41. PMID:28477786 https://doi.org/10.1016/j.anai.2017.03.013
Sogn DD, Evans R 3rd, Shepherd GM, et al.美国国家过敏和传染病研究所合作临床试验结果：检验主要和次要青霉素衍生物皮肤试验对住院成人的预测价值。Arch Intern Med 1992;152:1025-32. PMID:1580706 https://doi.org/10.1001/ archinte.1992.00400170105020

677. Solensky R, Jacobs J, Lester M, et al. Penicillin allergy evaluation: a prospective, multicenter, open-label evaluation of a comprehensive penicillin skin test kit. J Allergy Clin Immunol Pract 2019;7:1876–85. e3. PMID:30878711 https://doi.org/10.1016/j.jaip.2019.02.040
678. Heil EL, Bork JT, Schmalzle SA, et al. Implementation of an infectious disease fellow-managed penicillin allergy skin testing service. Open Forum Infect Dis 2016;3:ofw155. PMID:27704011 https://doi.org/10.1093/ofid/ofw155
679. du Plessis T, Walls G, Jordan A, Holland DJ. Implementation of a pharmacist-led penicillin allergy de-labelling service in a public hospital. J Antimicrob Chemother 2019;74:1438–46. PMID:30753497 https://doi.org/10.1093/jac/dky575
680. Macy E, Blumenthal KG. Are cephalosporins safe for use in penicillin allergy without prior allergy evaluation? J Allergy Clin Immunol Pract 2018;6:82–9. PMID:28958745 https://doi.org/10.1016/j.jaip.2017.07.033
681. Zagursky RJ, Pichichero ME. Cross-reactivity in β-lactam allergy. J Allergy Clin Immunol Pract 2018;6:72–81.e1. PMID:29017833 https://doi.org/10.1016/j.jaip.2017.08.027
682. Blumenthal KG, Shenoy ES, Varughese CA, Hurwitz S, Hooper DC, Banerji A. Impact of a clinical guideline for prescribing antibiotics to inpatients reporting penicillin or cephalosporin allergy. Ann Allergy Asthma Immunol 2015;115:294–300.e2. PMID:26070805 https://doi.org/10.1016/j.anai.2015.05.011
683. Kuruvilla M, Wolf F, Sexton M, Wiley Z, Thomas J. Perioperative use of cefazolin without preliminary skin testing in patients with reported penicillin allergy. Surgery 2019;165:486–96. PMID:30001827 https://doi.org/10.1016/j.surg.2018.05.054
684. Lee P, Shanson D. Results of a UK survey of fatal anaphylaxis after oral amoxicillin. J Antimicrob Chemother 2007;60:1172–3. PMID:17761735 https://doi.org/10.1093/jac/dkm315
685. Blumenthal KG, Shenoy ES, Wolfson AR, et al. Addressing inpatient beta-lactam allergies: a multihospital implementation. J Allergy Clin Immunol Pract 2017;5:616–25.e7. PMID:28483315 https://doi.org/10.1016/j.jaip.2017.02.019
686. Mustafa SS, Conn K, Ramsey A. Comparing direct challenge to penicillin skin testing for the outpatient evaluation of penicillin allergy: a randomized controlled trial. J Allergy Clin Immunol Pract 2019;7:2163–70. PMID:31170542 https://doi.org/10.1016/j.jaip.2019.05.037
687. Chastain DB, Hutzley VJ, Parekh J, Alegro JVG. Antimicrobial desensitization: a review of published protocols. Pharmacy (Basel) 2019;7:112. PMID:31405062 https://doi.org/10.3390/pharmacy7030112
688. Wendel GD Jr, Stark BJ, Jamison RB, Molina RD, Sullivan TJ. Penicillin allergy and desensitization in serious infections during pregnancy. N Engl J Med 1985;312:1229–32. PMID:3921835 https://doi.org/10.1056/NEJM198505093121905
689. Borish L, Tamir R, Rosenwasser LJ. Intravenous desensitization to beta-lactam antibiotics. J Allergy Clin Immunol 1987;80:314–9. PMID:3040836 https://doi.org/10.1016/0091-6749(87)90037-6
690. Legere HJ 3rd, Palis RI, Rodriguez Bouza T, Uluer AZ, Castells MC. A safe protocol for rapid desensitization in patients with cystic fibrosis and antibiotic hypersensitivity. J Cyst Fibros 2009;8:418–24. PMID:19740711 https://doi.org/10.1016/j.jcf.2009.08.002
691. Manhart LE, Holmes KK, Hughes JP, Houston LS, Totten PA. *Mycoplasma genitalium* among young adults in the United States: an emerging sexually transmitted infection. Am J Public Health 2007;97:1118–25. PMID:17463380 https://doi.org/10.2105/AJPH.2005.074062
692. Ross JDC, Jensen JS. *Mycoplasma genitalium* as a sexually transmitted infection: implications for screening, testing, and treatment. Sex Transm Infect 2006;82:269–71. PMID:16877571 https://doi.org/10.1136/sti.2005.017368
693. Taylor-Robinson D, Gilroy CB, Thomas BJ, Hay PE. *Mycoplasma genitalium* in chronic non-gonococcal urethritis. Int J STD AIDS 2004;15:21–5. PMID:14769166 https://doi.org/10.1258/095646204322637209
694. Dupin N, Bijaoui G, Schwarzinger M, et al. Detection and quantification of *Mycoplasma genitalium* in male patients with urethritis. Clin Infect Dis 2003;37:602–5. PMID:12905147 https://doi.org/10.1086/376990
695. Krieger JN, Riley DE, Roberts MC, Berger RE. Prokaryotic DNA sequences in patients with chronic idiopathic prostatitis. J Clin Microbiol 1996;34:3120–8. PMID:8940458 https://doi.org/10.1128/JCM.34.12.3120-3128.1996
696. le Roux MC, Hoosen AA. Quantitative real-time polymerase chain reaction for the diagnosis of *Mycoplasma genitalium* infection in South African men with and without symptoms of urethritis. Sex Transm Dis 2017;44:17–20. PMID:27898565 https://doi.org/10.1097/OLQ.0000000000000540
697. Bachmann LH, Kirkcaldy RD, Geisler WM, et al.; the MAGNUM Laboratory Working Group. Prevalence of *Mycoplasma genitalium* infection, antimicrobial resistance mutations and symptom resolution following treatment of urethritis. Clin Infect Dis 2020;71:e624–32. PMID:32185385 https://doi.org/10.1093/cid/ciaa293
698. Nye MB, Schwebke JR, Body BA. Comparison of APTIMA *Trichomonas vaginalis* transcription-mediated amplification to wet mount microscopy, culture, and polymerase chain reaction for diagnosis of trichomoniasis in men and women. Am J Obstet Gynecol 2009;200:188.e1–7. PMID:19185101 https://doi.org/10.1016/j.ajog.2008.10.005
699. Bradshaw CS, Tabrizi SN, Read TR, et al. Etiologies of nongonococcal urethritis: bacteria, viruses, and the association with orogenital exposure. J Infect Dis 2006;193:336–45. PMID:16388480 https://doi.org/10.1086/499434
700. Dombrowski JC, Harrington RD, Golden MR. Evidence for the long-term stability of HIV transmission-associated sexual behavior after HIV diagnosis. Sex Transm Dis 2013;40:41–5. PMID:23254116 https://doi.org/10.1097/OLQ.0b013e3182753327
701. Rane VS, Fairley CK, Weerakoon A, et al. Characteristics of acute nongonococcal urethritis in men differ by sexual preference. J Clin Microbiol 2014;52:2971–6. PMID:24899041 https://doi.org/10.1128/JCM.00899-14
702. Pond MJ, Nori AV, Witney AA, Lopeman RC, Butcher PD, Sadiq ST. High prevalence of antibiotic-resistant *Mycoplasma genitalium* in nongonococcal urethritis: the need for routine testing and the inadequacy of current treatment options. Clin Infect Dis 2014;58:631–7. PMID:24280088 https://doi.org/10.1093/cid/cit752
703. Khatib N, Bradbury C, Chalker V, et al. Prevalence of *Trichomonas vaginalis, Mycoplasma genitalium* and *Ureaplasma urealyticum* in men with urethritis attending an urban sexual health clinic. Int J STD AIDS 2015;26:388–92. PMID:24925897 https://doi.org/10.1177/0956462414539464
704. Cox C, McKenna JP, Watt AP, Coyle PV. *Ureaplasma parvum* and *Mycoplasma genitalium* are found to be significantly associated with microscopy-confirmed urethritis in a routine genitourinary medicine setting. Int J STD AIDS 2016;27:861–7. PMID:26378187 https://doi.org/10.1177/0956462415597620
705. Li Y, Su X, Le W, et al. *Mycoplasma genitalium* in symptomatic male urethritis: macrolide use is associated with increased resistance. Clin Infect Dis 2020;70:805–10. PMID:30972419 https://doi.org/10.1093/cid/ciz294
706. Ito S, Hanaoka N, Shimuta K, et al. Male non-gonococcal urethritis: from microbiological etiologies to demographic and clinical features. Int J Urol 2016;23:325–31. PMID:26845624 https://doi.org/10.1111/iju.13044

677. Solensky R, Jacobs J, Lester M, et al.青霉素过敏评估：综合性青霉素皮肤试验试剂盒的前瞻性、多中心、开放标签评估。J Allergy Clin Immunol Pract 2019;7:1876-85. e3. PMID:30878711 https://doi.org/10.1016/j.jaip.2019.02.040
678. Heil EL, Bork JT, Schmalzle SA, et al.由感染病专科进修医师管理的青霉素过敏皮肤试验服务的实施。Open Forum Infect Dis 2016;3:ofw155. PMID:27704011 https://doi.org/10.1093/ofid/ofw155
679. du Plessis T, Walls G, Jordan A, Holland DJ.在公立医院实施由药师主导的青霉素过敏去标签服务。J Antimicrob Chemother 2019;74:1438-46. PMID:30753497 https:// doi.org/10.1093/jac/dky575
680. Macy E, Blumenthal KG.未经预先过敏评估，头孢菌素用于青霉素过敏患者是否安全?J Allergy Clin Immunol Pract 2018;6:82-9. PMID:28958745 https://doi.org/10.1016/j.jaip.2017.07.033
681. Zagursky RJ, Pichichero ME.β-内酰胺过敏的交叉反应性。J Allergy Clin Immunol Pract 2018;6:72-81.e1. PMID:29017833 https://doi.org/10.1016/j.jaip.2017.08.027
682. Blumenthal KG, Shenoy ES, Varughese CA, Hurwitz S, Hooper DC, Banerji A.针对报告青霉素或头孢菌素过敏的住院患者开具抗生素临床指南的影响。Ann Allergy Asthma Immunol 2015;115:294-300.e2. PMID:26070805 https:// doi.org/10.1016/j.anai.2015.05.011
683. Kuruvilla M, Wolf F, Sexton M, Wiley Z, Thomas J.对报告青霉素过敏的患者围手术期不使用预先皮肤试验而使用头孢唑林。Surgery 2019;165:486-96. PMID:30001827 https:// doi.org/10.1016/j.surg.2018.05.054
684. Lee P, Shanson D.英国一项口服阿莫西林后致死性过敏反应调查的结果。J Antimicrob Chemother 2007;60:1172-3. PMID:17761735 https:// doi.org/10.1093/jac/dkm315
685. Blumenthal KG, Shenoy ES, Wolfson AR, et al.处理住院患者β-内酰胺过敏：多医院实施经验。J Allergy Clin Immunol Pract 2017;5:616-25.e7. PMID:28483315 https://doi.org/10.1016/j.jaip.2017.02.019
686. Mustafa SS, Conn K, Ramsey A.比较直接激发试验与青霉素皮肤试验用于门诊青霉素过敏评估：一项随机对照试验。J Allergy Clin Immunol Pract 2019;7:2163-70. PMID:31170542 https://doi.org/10.1016/j.jaip.2019.05.037
687. Chastain DB, Hutzley VJ, Parekh J, Alegro JVG.抗菌药物脱敏：已发表方案的综述。Pharmacy(Basel) 2019;7:112. PMID:31405062 https:// doi.org/10.3390/ pharmacy7030112
688. Wendel GD Jr, Stark BJ, Jamison RB, Molina RD, Sullivan TJ.妊娠期严重感染中的青霉素过敏与脱敏。N Engl J Med 1985;312:1229-32. PMID:3921835 https:// doi.org/10.1056/NEJM198505093121905
689. Borish L, Tamir R, Rosenwasser LJ.β-内酰胺类抗生素的静脉脱敏。J Allergy Clin Immunol 1987;80:314-9. PMID:3040836 https:// doi.org/10.1016/0091-6749(87) 90037-6
690. Legere HJ 3rd, Palis RI, Rodriguez Bouza T, Uluer AZ, Castells MC.囊性纤维化合并抗生素超敏反应患者快速脱敏的安全方案。J Cyst Fibros 2009;8:418-24. PMID:19740711 https://doi.org/10.1016/j.jcf.2009.08.002
691. Manhart LE, Holmes KK, Hughes JP, Houston LS, Totten PA.美国年轻成人中的生殖支原体：一种新出现的性传播感染。Am J Public Health 2007;97:1118-25. PMID:17463380 https://doi.org/10.2105/AJPH.2005.074062
692. Ross JDC, Jensen JS.生殖支原体作为一种性传播感染：对筛查、检测和治疗的意义。Sex Transm Infect 2006;82:269-71. PMID:16877571 https:// doi.org/10.1136/ sti.2005.017368
693. Taylor-Robinson D, Gilroy CB, Thomas BJ, Hay PE.慢性非淋球菌性尿道炎中的生殖支原体。Int J STD AIDS 2004;15:21-5. PMID:14769166 https://doi.org/10.1258/095646204322637209
694. Dupin N, Bijaoui G, Schwarzinger M, et al.男性尿道炎患者中生殖支原体的检测与定量。Clin Infect Dis 2003;37:602-5. PMID:12905147 https:// doi.org/10.1086/376990
695. Krieger JN, Riley DE, Roberts MC, Berger RE.慢性特发性前列腺炎患者中的原核DNA序列。J Clin Microbiol 1996;34:3120-8. PMID:8940458 https://doi.org/10.1128/ JCM.34.12.3120-3128.1996
696. le Roux MC, Hoosen AA.定量实时聚合酶链反应诊断南非有和无尿道炎症状男性中的生殖支原体感染。Sex Transm Dis 2017;44:17-20. PMID:27898565 https://doi.org/10.1097/ OLQ.0000000000000540
697. Bachmann LH, Kirkcaldy RD, Geisler WM, et al.; the MAGNUM Laboratory Working Group.生殖支原体感染、抗菌药物耐药突变及尿道炎治疗后症状缓解的患病率。Clin Infect Dis 2020;71:e624-32. PMID:32185385 https://doi.org/10.1093/cid/ciaa293
698. Nye MB, Schwebke JR, Body BA.APTIMA 阴道毛滴虫转录介导扩增法与湿片显微镜检查、培养和聚合酶链反应诊断男女滴虫感染的比较。Am J Obstet Gynecol 2009;200:188.e1-7. PMID:19185101 https://doi.org/10.1016/j.ajog.2008.10.005
699. Bradshaw CS, Tabrizi SN, Read TR, et al.非淋球菌性尿道炎的病因：细菌、病毒及与口交暴露的关联。J Infect Dis 2006;193:336-45. PMID:16388480 https:// doi.org/10.1086/499434
700. Dombrowski JC, Harrington RD, Golden MR.HIV诊断后与HIV传播相关的性行为长期稳定性的证据。Sex Transm Dis 2013; 40:41-5. PMID:23254116 https:// doi.org/10.1097/OLQ.0b013e3182753327
701. Rane VS, Fairley CK, Weerakoon A, et al.男性急性非淋菌性尿道炎的特征因性取向而异。J Clin Microbiol 2014;52:2971-6. PMID:24899041 https://doi.org/10.1128/JCM.00899-14
702. Pond MJ, Nori AV, Witney AA, Lopeman RC, Butcher PD, Sadiq ST. 非淋球菌性尿道炎中抗生素耐药生殖支原体的高患病率：常规检测的必要性及当前治疗方案的不足。Clin Infect Dis 2014;58:631-7. PMID:24280088 https://doi.org/10.1093/cid/cit752
703. Khatib N, Bradbury C, Chalker V ， 等。就诊于城市性健康诊所的尿道炎男性中阴道毛滴虫、生殖支原体和解脲脲原体的患病率。Int J STD AIDS 2015;26:388-92. PMID:24925897 https://doi.org/10.1177/0956462414539464
704. Cox C, McKenna JP, Watt AP, Coyle PV. 在常规泌尿生殖医学环境中发现微小脲原体和生殖支原体与显微镜确认的尿道炎显著相关。IntJSTDAIDS 2016;27:861-7. PMID:26378187 https:// doi.org/10.1177/0956462415597620
705. Li Y, Su X, Le W ， 等。有症状男性尿道炎中的生殖支原体：大环内酯类使用与耐药性增加相关。Clin Infect Dis 2020;70:805-10. PMID:30972419 https://doi. org/10.1093/cid/ciz294
706. Ito S, Hanaoka N, Shimuta K, et al.男性非淋菌性尿道炎：从微生物病因学到人口学与临床特征。Int J Urol 2016;23:325-31. PMID:26845624 https://doi.org/10.1111/ iju.13044

707. Horner P, Donders G, Cusini M, Gomberg M, Jensen JS, Unemo M. Should we be testing for urogenital *Mycoplasma hominis, Ureaplasma parvum* and *Ureaplasma urealyticum* in men and women?—A position statement from the European STI Guidelines Editorial Board. J Eur Acad Dermatol Venereol 2018;32:1845–51. PMID:29924422 https://doi.org/10.1111/jdv.15146
708. van der Veer C, van Rooijen MS, Himschoot M, de Vries HJ, Bruisten SM. *Trichomonas vaginalis* and *Mycoplasma genitalium*: age-specific prevalence and disease burden in men attending a sexually transmitted infections clinic in Amsterdam, the Netherlands. Sex Transm Infect 2016;92:83–5. PMID:26283740 https://doi.org/10.1136/sextrans-2015-052118
709. Seike K, Maeda S, Kubota Y, Tamaki M, Yasuda M, Deguchi T. Prevalence and morbidity of urethral *Trichomonas vaginalis* in Japanese men with or without urethritis. Sex Transm Infect 2013;89:528–30. PMID:23349337 https://doi.org/10.1136/sextrans-2012-050702
710. Napierala M, Munson E, Wenten D, et al. Detection of *Mycoplasma genitalium* from male primary urine specimens: an epidemiologic dichotomy with *Trichomonas vaginalis.* Diagn Microbiol Infect Dis 2015;82:194–8. PMID:25934156 https://doi.org/10.1016/j.diagmicrobio.2015.03.016
711. Sviben M, Missoni EM, Meštrović T, Vojnović G, Galinović GM. Epidemiology and laboratory characteristics of *Trichomonas vaginalis* infection in Croatian men with and without urethritis syndrome: a case-control study. Sex Transm Infect 2015;91:360–4. PMID:25568091 https://doi.org/10.1136/sextrans-2014-051771
712. Rietmeijer CA, Mungati M, Machiha A, et al. The etiology of male urethral discharge in Zimbabwe: results from the Zimbabwe STI Etiology Study. Sex Transm Dis 2018;45:56–60. PMID:29240635 https://doi.org/10.1097/OLQ.0000000000000696
713. Bazan JA, Peterson AS, Kirkcaldy RD, et al. Notes from the field: increase in *Neisseria meningitidis*-associated urethritis among men at two sentinel clinics—Columbus, Ohio, and Oakland County, Michigan, 2015. MMWR Morb Mortal Wkly Rep 2016;65:550–2. PMID:27254649 https://doi.org/10.15585/mmwr.mm6521a5
714. Jannic A, Mammeri H, Larcher L, et al. Orogenital transmission of *Neisseria meningitidis* causing acute urethritis in men who have sex with men. Emerg Infect Dis 2019;25:175–6. PMID:30561300 https://doi.org/10.3201/eid2501.171102
715. Hayakawa K, Itoda I, Shimuta K, Takahashi H, Ohnishi M. Urethritis caused by novel *Neisseria meningitidis* serogroup W in man who has sex with men, Japan. Emerg Infect Dis 2014;20:1585–7. PMID:25154021 https://doi.org/10.3201/eid2009.140349
716. Bazan JA, Tzeng YL, Stephens DS, et al. Repeat episodes of symptomatic urethritis due to a uropathogenic meningococcal clade. Sex Transm Dis 2020;47:e1–4. PMID:31651709 https://doi.org/10.1097/OLQ.0000000000001079
717. Ong JJ, Morton AN, Henzell HR, et al. Clinical characteristics of herpes simplex virus urethritis compared with chlamydial urethritis among men. Sex Transm Dis 2017;44:121–5. PMID:28079748 https://doi.org/10.1097/OLQ.0000000000000547
718. Avolio M, De Rosa R, Modolo ML, Stano P, Camporese A. When should adenoviral non-gonococcal urethritis be suspected? Two case reports. New Microbiol 2014;37:109–12. PMID:24531179
719. You C, Hamasuna R, Ogawa M, et al. The first report: an analysis of bacterial flora of the first voided urine specimens of patients with male urethritis using the 16S ribosomal RNA gene-based clone library method. Microb Pathog 2016;95:95–100. PMID:27013259 https://doi.org/10.1016/j.micpath.2016.02.022
720. Deguchi T, Ito S, Hatazaki K, et al. Antimicrobial susceptibility of *Haemophilus influenzae* strains isolated from the urethra of men with acute urethritis and/or epididymitis. J Infect Chemother 2017;23:804–7. PMID:28619239 https://doi.org/10.1016/j.jiac.2017.05.009
721. Ito S, Hatazaki K, Shimuta K, et al. *Haemophilus influenzae* isolated from men with acute urethritis: its pathogenic roles, responses to antimicrobial chemotherapies, and antimicrobial susceptibilities. Sex Transm Dis 2017;44:205–10. PMID:28282645 https://doi.org/10.1097/OLQ.0000000000000573
722. Horie K, Ito S, Hatazaki K, et al. '*Haemophilus quentini*' in the urethra of men complaining of urethritis symptoms. J Infect Chemother 2018;24:71–4. PMID:28889986 https://doi.org/10.1016/j.jiac.2017.08.007
723. Frølund M, Falk L, Ahrens P, Jensen JS. Detection of ureaplasmas and bacterial vaginosis associated bacteria and their association with non-gonococcal urethritis in men. PLoS One 2019;14:e0214425. PMID:30946763 https://doi.org/10.1371/journal.pone.0214425
724. Deza G, Martin-Ezquerra G, Gómez J, Villar-García J, Supervia A, Pujol RM. Isolation of *Haemophilus influenzae* and *Haemophilus parainfluenzae* in urethral exudates from men with acute urethritis: a descriptive study of 52 cases. Sex Transm Infect 2016;92:29–31. PMID:26139207 https://doi.org/10.1136/sextrans-2015-052135
725. Magdaleno-Tapial J, Valenzuela-Oñate C, Giacaman-von der Weth MM, et al. *Haemophilus* species isolated in urethral exudates as a possible causative agent in acute urethritis: a study of 38 cases. Actas Dermosifiliogr 2019;110:38–42. PMID:30390917 https://doi.org/10.1016/j.adengl.2018.11.011
726. Abdolrasouli A, Roushan A. *Corynebacterium propinquum* associated with acute, nongonococcal urethritis. Sex Transm Dis 2013;40:829–31. PMID:24275738 https://doi.org/10.1097/OLQ.0000000000000027
727. Ongrádi J, Stercz B, Kövesdi V, Nagy K, Chatlynne L. Isolation of *Kurthia gibsonii* from non-gonorrheal urethritis: implications for the pathomechanism upon surveying the literature. Acta Microbiol Immunol Hung 2014;61:79–87. PMID:24631755 https://doi.org/10.1556/AMicr.61.2014.1.8
728. Gherardi G, Di Bonaventura G, Pompilio A, Savini V. *Corynebacterium glucuronolyticum* causing genitourinary tract infection: case report and review of the literature. IDCases 2015;2:56–8. PMID:26793456 https://doi.org/10.1016/j.idcr.2015.03.001
729. Meštrović T. A microbial game of whack-a-mole: clinical case series of the urethral uncloaking phenomenon caused by *Corynebacterium glucuronolyticum* in men treated for *Chlamydia trachomatis* urethritis. Infection 2019;47:121–4. PMID:30168068 https://doi.org/10.1007/s15010-018-1211-8
730. Frikh M, El Yaagoubi I, Lemnouer A, Elouennass M. Urethritis due to *corynebacterium striatum*: an emerging germ. Tunis Med 2015;93:43–4. PMID:25955369
731. Babaeer AA, Nader C, Iacoviello V, Tomera K. Necrotizing urethritis due to *Aerococcus urinae*. Case Rep Urol 2015;2015:136147. PMID:26171271 https://doi.org/10.1155/2015/136147
732. Grandolfo M, Vestita M, Bonamonte D, Filoni A. Acute urethritis and balonoposthitis associated to *Neisseria elongata*. Sex Transm Dis 2016;43:778–9. PMID:27832027 https://doi.org/10.1097/OLQ.0000000000000532
733. Frølund M, Lidbrink P, Wikström A, Cowan S, Ahrens P, Jensen JS. Urethritis-associated pathogens in urine from men with non-gonococcal urethritis: a case-control study. Acta Derm Venereol 2016;96:689–94. PMID:26658669 https://doi.org/10.2340/00015555-2314
734. Chambers LC, Morgan JL, Lowens MS, et al. Cross-sectional study of urethral exposures at last sexual episode associated with non-gonococcal urethritis among STD clinic patients. Sex Transm Infect 2019;95:212–8. PMID:30181326 https://doi.org/10.1136/sextrans-2018-053634
735. Manhart LE, Khosropour CM, Liu C, et al. Bacterial vaginosis-associated bacteria in men: association of *Leptotrichia/Sneathia* spp. with nongonococcal urethritis. Sex Transm Dis 2013;40:944–9. PMID:24220356 https://doi.org/10.1097/OLQ.0000000000000054

707. Horner P, Donders G, Cusini M, Gomberg M, Jensen JS, Unemo M.男性和女性是否应检测泌尿生殖道人型支原体、微小脲原体和解脲脲原体?--欧洲STI指南编辑委员会立场声明。J Eur Acad Dermatol Venereol 2018;32:1845-51. PMID:29924422 https:// doi.org/10.1111/jdv.15146
708. van der Veer C, van Rooijen MS, Himschoot M, de Vries HJ, Bruisten SM.阴道毛滴虫和生殖支原体：荷兰阿姆斯特丹一家性传播感染门诊就诊男性的年龄别患病率与疾病负担。Sex Transm Infect 2016;92:83-5. PMID:26283740 https://doi.org/10.1136/ sextrans-2015-052118
709. Seike K, Maeda S, Kubota Y, Tamaki M, Yasuda M, Deguchi T.伴或不伴尿道炎的日本男性中尿道阴道毛滴虫的患病率与发病率。Sex Transm Infect 2013;89:528-30. PMID:23349337 https://doi.org/10.1136/sextrans-2012-050702
710. Napierala M, Munson E, Wenten D, et al.从男性初段尿标本中检测生殖支原体：与阴道毛滴虫的流行病学二分现象。Diagn Microbiol Infect Dis 2015;82:194-8. PMID:25934156 https://doi.org/10.1016/j.diagmicrobio.2015.03.016
711. Sviben M, Missoni EM, Meštrović T, Vojnović G, Galinović GM.伴和不伴尿道炎综合征的克罗地亚男性中阴道毛滴虫感染的流行病学与实验室特征：病例对照研究。Sex Transm Infect 2015;91:360-4. PMID:25568091 https://doi.org/10.1136/sextrans-2014-051771
712. Rietmeijer CA, Mungati M, Machiha A, et al.津巴布韦男性尿道分泌物的病因学：津巴布韦STI病因学研究结果。Sex Transm Dis 2018;45:56-60. PMID:29240635 https://doi.org/10.1097/OLQ.0000000000000696
713. Bazan JA, Peterson AS, Kirkcaldy RD, et al.现场笔记：脑膜炎奈瑟菌相关尿道炎在男性中增加--俄亥俄州哥伦布市和密歇根州奥克兰县两家哨点诊所，2015年。MMWR Morb Mortal Wkly Rep 2016;65:550-2. PMID:27254649 https://doi.org/10.15585/mmwr.mm6521a5
714. Jannic A, Mammeri H, Larcher L, et al.脑膜炎奈瑟菌经口交传播导致男男性行为人群急性尿道炎。Emerg Infect Dis 2019;25:175-6. PMID:30561300 https://doi.org/10.3201/eid2501.171102
715. Hayakawa K, Itoda I, Shimuta K, Takahashi H, Ohnishi M.日本一名男男性行为者由新型脑膜炎奈瑟菌W血清群引起的尿道炎。Emerg Infect Dis 2014;20:1585-7. PMID:25154021 https://doi.org/10.3201/eid2009.140349
716. Bazan JA, Tzeng YL, Stephens DS, et al.由尿路致病性脑膜炎球菌分支引起的症状性尿道炎反复发作。Sex Transm Dis 2020;47:e1-4. PMID:31651709 https://doi.org/10.1097/ OLQ.0000000000001079
717. Ong JJ, Morton AN, Henzell HR, et al.男性单纯疱疹病毒尿道炎与衣原体尿道炎的临床特征比较。Sex Transm Dis 2017;44:121-5. PMID:28079748 https:// doi.org/10.1097/OLQ.0000000000000547
718. Avolio M, De Rosa R, Modolo ML, Stano P, Camporese A.何时应怀疑腺病毒性非淋球菌性尿道炎?两例病例报告。New Microbiol 2014;37:109-12. PMID:24531179
719. You C, Hamasuna R, Ogawa M, et al.首次报告：使用基于16S核糖体RNA基因的克隆文库方法分析男性尿道炎患者初段尿标本的细菌菌群。Microb Pathog 2016;95:95-100. PMID:27013259 https://doi.org/10.1016/j.micpath.2016.02.022
720. Deguchi T, Ito S, Hatazaki K, et al.从急性尿道炎和/或附睾炎男性尿道分离的流感嗜血杆菌菌株的抗菌药物敏感性。J Infect Chemother 2017;23:804-7. PMID:28619239 https://doi.org/10.1016/j.jiac.2017.05.009
721. Ito S, Hatazaki K, Shimuta K, et al.从急性尿道炎男性分离的流感嗜血杆菌：其致病作用、对抗菌化学治疗的应答及抗菌药物敏感性。Sex Transm Dis 2017;44:205-10. PMID:28282645 https:// doi.org/10.1097/OLQ.0000000000000573
722. Horie K, Ito S, Hatazaki K, et al.主诉尿道炎症状男性尿道中的"昆廷嗜血杆菌"。J Infect Chemother 2018;24:71-4. PMID:28889986 https://doi.org/10.1016/j.jiac.2017.08.007
723. Frølund M, Falk L, Ahrens P, Jensen JS.腺原体及细菌性阴道病相关细菌的检测及其与男性非淋球菌性尿道炎的相关性。PLoS One 2019;14:e0214425. PMID:30946763 https://doi.org/10.1371/journal.pone.0214425
724. Deza G, Martin-Ezquerra G, Gómez J, Villar-García J, Supervia A, Pujol RM.从急性尿道炎男性尿道分泌物中分离流感嗜血杆菌和副流感嗜血杆菌:52例描述性研究。Sex Transm Infect 2016;92:29-31. PMID:26139207 https://doi.org/10.1136/sextrans-2015-052135
725. Magdaleno-Tapial J, Valenzuela-Oñate C, Giacaman-von der Weth MM, et al.尿道分泌物中分离的嗜血杆菌属作为急性尿道炎可能致病因子：38例研究。Actas Dermosifiliogr 2019;110:38-42. PMID:30390917 https://doi.org/10.1016/j.adengl.2018.11.011
726. Abdolrasouli A, Roushan A.邻近棒状杆菌与急性非淋球菌性尿道炎相关。Sex Transm Dis 2013;40:829-31. PMID:24275738 https:// doi.org/10.1097/OLQ.0000000000000027
727. Ongrádi J, Stercz B, Kövesdi V, Nagy K, Chatlynne L.从非淋球菌性尿道炎中分离吉氏库特菌：结合文献综述对病理机制的启示。Acta Microbiol Immunol Hung 2014;61:79-87. PMID:24631755 https:// doi.org/10.1556/AMicr.61.2014.1.8
728. Gherardi G, Di Bonaventura G, Pompilio A, Savini V.解葡萄糖醛酸棒状杆菌引起泌尿生殖道感染：病例报告及文献综述。IDCases 2015;2:56-8. PMID:26793456 https://doi.org/10.1016/j.idcr.2015.03.001
729. Meštrović T.一场微生物的打地鼠游戏：接受沙眼衣原体尿道炎治疗的男性中由解葡萄糖醛酸棒状杆菌引起的尿道病原体显露现象的临床病例系列。Infection 2019;47:121-4. PMID:30168068 https:// doi.org/10.1007/ s15010-018-1211-8
730. Frikh M, El Yaagoubi I, Lemnouer A, Elouennass M.由纹带棒状杆菌引起的尿道炎：一种新发病原体。Tunis Med 2015;93:43-4. PMID:25955369
731. Babaeer AA, Nader C, Iacoviello V, Tomera K.由尿气球菌引起的坏死性尿道炎。Case Rep Urol 2015;2015:136147. PMID:26171271 https://doi.org/10.1155/2015/136147
732. Grandolfo M, Vestita M, Bonamonte D, Filoni A.与长奈瑟菌相关的急性尿道炎和龟头包皮炎。Sex Transm Dis 2016;43:778-9. PMID:27832027 https://doi.org/10.1097/ OLQ.0000000000000532
733. Frølund M, Lidbrink P, Wikström A, Cowan S, Ahrens P, Jensen JS. 非淋球菌性尿道炎男性尿液中的尿道炎相关病原体：病例对照研究。Acta Derm Venereol 2016;96:689-94. PMID:26658669 https:// doi.org/10.2340/00015555-2314
734. Chambers LC, Morgan JL, Lowens MS, et al.STD门诊患者中与末次性行为时尿道暴露相关的非淋球菌性尿道炎横断面研究。Sex Transm Infect 2019;95:212-8. PMID:30181326 https:// doi.org/10.1136/sextrans-2018-053634
735. Manhart LE, Khosropour CM, Liu C, et al.男性中细菌性阴道病相关细菌：纤毛菌/斯尼斯菌属与非淋球菌性尿道炎的相关性。Sex Transm Dis 2013;40:944-9. PMID:24220356 https://doi.org/10.1097/ OLQ.0000000000000054

736. Ashraf J, Radford AR, Turner A, Subramaniam R. Preliminary experience with instillation of triamcinolone acetonide into the urethra for idiopathic urethritis: a prospective pilot study. J Laparoendosc Adv Surg Tech A 2017;27:1217–21. PMID:29023188 https://doi.org/10.1089/lap.2017.0064
737. Taylor SN, DiCarlo RP, Martin DH. Comparison of methylene blue/gentian violet stain to Gram's stain for the rapid diagnosis of gonococcal urethritis in men. Sex Transm Dis 2011;38:995–6. PMID:21992973 https://doi.org/10.1097/OLQ.0b013e318225f7c2
738. Rietmeijer CA, Mettenbrink CJ. Recalibrating the Gram stain diagnosis of male urethritis in the era of nucleic acid amplification testing. Sex Transm Dis 2012;39:18–20. PMID:22183839 https://doi.org/10.1097/OLQ.0b013e3182354da3
739. Geisler WM, Yu S, Hook EW 3rd. Chlamydial and gonococcal infection in men without polymorphonuclear leukocytes on Gram stain: implications for diagnostic approach and management. Sex Transm Dis 2005;32:630–4. PMID:16205305 https://doi.org/10.1097/01.olq.0000175390.45315.a1
740. Gottesman T, Yossepowitch O, Samra Z, Rosenberg S, Dan M. Prevalence of *Mycoplasma genitalium* in men with urethritis and in high risk asymptomatic males in Tel Aviv: a prospective study. Int J STD AIDS 2017;28:127–32. PMID:26826161 https://doi.org/10.1177/0956462416630675
741. Kim HJ, Park JK, Park SC, et al. The prevalence of causative organisms of community-acquired urethritis in an age group at high risk for sexually transmitted infections in Korean soldiers. J R Army Med Corps 2017;163:20–2. PMID:26607860 https://doi.org/10.1136/jramc-2015-000488
742. Libois A, Hallin M, Crucitti T, Delforge M, De Wit S. Prevalence of *Mycoplasma genitalium* in men with urethritis in a large public hospital in Brussels, Belgium: an observational, cross-sectional study. PLoS One 2018;13:e0196217. PMID:29698421 https://doi.org/10.1371/journal.pone.0196217
743. Bachmann LH, Manhart LE, Martin DH, et al. Advances in the understanding and treatment of male urethritis. Clin Infect Dis 2015;61(Suppl 8):S763–9. PMID:26602615 https://doi.org/10.1093/cid/civ755
744. Samaraweera GR, Garcia K, Druce J, et al. Characteristics of adenovirus urethritis among heterosexual men and men who have sex with men: a review of clinical cases. Sex Transm Infect 2016;92:172–4. PMID:26574571 https://doi.org/10.1136/sextrans-2015-052243
745. Horner P, Blee K, O'Mahony C, Muir P, Evans C, Radcliffe K; Clinical Effectiveness Group of the British Association for Sexual Health and HIV. 2015 UK National Guideline on the management of non-gonococcal urethritis. Int J STD AIDS 2016;27:85–96. PMID:26002319 https://doi.org/10.1177/0956462415586675
746. Sarier M, Sepin N, Duman I, et al. Microscopy of Gram-stained urethral smear in the diagnosis of urethritis: which threshold value should be selected? Andrologia 2018;50:e13143. PMID:30238498 https://doi.org/10.1111/and.13143
747. Sarier M, Kukul E. Classification of non-gonococcal urethritis: a review. Int Urol Nephrol 2019;51:901–7. PMID:30953260 https://doi.org/10.1007/s11255-019-02140-2
748. Kong FY, Tabrizi SN, Law M, et al. Azithromycin versus doxycycline for the treatment of genital chlamydia infection: a meta-analysis of randomized controlled trials. Clin Infect Dis 2014;59:193–205. PMID:24729507 https://doi.org/10.1093/cid/ciu220
749. Páez-Canro C, Alzate JP, González LM, Rubio-Romero JA, Lethaby A, Gaitán HG. Antibiotics for treating urogenital *Chlamydia trachomatis* infection in men and non-pregnant women. Cochrane Database Syst Rev 2019;1:CD010871. PMID:30682211 https://doi.org/10.1002/14651858.CD010871.pub2
750. McIver R, Jalocon D, McNulty A, et al. Men who have sex with men with *Mycoplasma genitalium*-positive nongonococcal urethritis are more likely to have macrolide resistant strains than men with only female partners: a prospective study. Sex Transm Dis 2019;46:513–7. PMID:31295218 https://doi.org/10.1097/OLQ.0000000000001009
751. Lau A, Bradshaw CS, Lewis D, et al. The efficacy of azithromycin for the treatment of genital *Mycoplasma genitalium*: a systematic review and meta-analysis. Clin Infect Dis 2015;61:1389–99. PMID:26240201 https://doi.org/10.1093/cid/civ644
752. Horner P. *Mycoplasma genitalium* nongonococcal urethritis is likely to increase in men who have sex with men who practice unsafe sex: what should we do? Sex Transm Dis 2019;46:518–20. PMID:31295219 https://doi.org/10.1097/OLQ.0000000000001030
753. Hosenfeld CB, Workowski KA, Berman S, et al. Repeat infection with Chlamydia and gonorrhea among females: a systematic review of the literature. Sex Transm Dis 2009;36:478–89. PMID:19617871 https://doi.org/10.1097/OLQ.0b013e3181a2a933
754. Fung M, Scott KC, Kent CK, Klausner JD. Chlamydial and gonococcal reinfection among men: a systematic review of data to evaluate the need for retesting. Sex Transm Infect 2007;83:304–9. PMID:17166889 https://doi.org/10.1136/sti.2006.024059
755. Kissinger PJ, White S, Manhart LE, et al. Azithromycin treatment failure for *Chlamydia trachomatis* among heterosexual men with nongonococcal urethritis. Sex Transm Dis 2016;43:599–602. PMID:27631353 https://doi.org/10.1097/OLQ.0000000000000489
756. Schwebke JR, Rompalo A, Taylor S, et al. Re-evaluating the treatment of nongonococcal urethritis: emphasizing emerging pathogens—a randomized clinical trial. Clin Infect Dis 2011;52:163–70. PMID:21288838 https://doi.org/10.1093/cid/ciq074
757. Manhart LE, Khosropour CM, Gillespie CW, Lowens MS, Golden MR, Totten PA. O02.3 Treatment outcomes for persistent *Mycoplasma genitalium*-associated NGU: evidence of moxifloxacin treatment failures. Sex Transm Infect 2013;89(Suppl 1):A29. https://doi.org/10.1136/sextrans-2013-051184.0091
758. Romano SS, Jensen JS, Lowens MS, et al. Long duration of asymptomatic *Mycoplasma genitalium* infection after syndromic treatment for nongonococcal urethritis. Clin Infect Dis 2019;69:113–20. PMID:30281079 https://doi.org/10.1093/cid/ciy843
759. Read TRH, Fairley CK, Murray GL, et al. Outcomes of resistance-guided sequential treatment of *Mycoplasma genitalium* infections: a prospective evaluation. Clin Infect Dis 2019;68:554–60. PMID:29873691 https://doi.org/10.1093/cid/ciy477
760. Dowe G, Smikle M, King SD, Baum M, Chout R, Williams Y. Symptomatic and asymptomatic chlamydial non-gonococcal urethritis in Jamaica: the potential for HIV transmission. Int J STD AIDS 2000;11:187–90. PMID:10726944 https://doi.org/10.1258/0956462001915507
761. Lusk MJ, Garden FL, Rawlinson WD, Naing ZW, Cumming RG, Konecny P. Cervicitis aetiology and case definition: a study in Australian women attending sexually transmitted infection clinics. Sex Transm Infect 2016;92:175–81. PMID:26586777 https://doi.org/10.1136/sextrans-2015-052332
762. Lusk MJ, Konecny P. Cervicitis: a review. Curr Opin Infect Dis 2008;21:49–55. PMID:18192786
763. Marrazzo JM, Martin DH. Management of women with cervicitis. Clin Infect Dis 2007;44(Suppl 3):S102–10. PMID:17342663 https://doi.org/10.1086/511423
764. Manavi K, Young H, Clutterbuck D. Sensitivity of microscopy for the rapid diagnosis of gonorrhoea in men and women and the role of gonorrhoea serovars. Int J STD AIDS 2003;14:390–4. PMID:12816666 https://doi.org/10.1258/095646203765371277
765. Lillis RA, Martin DH, Nsuami MJ. *Mycoplasma genitalium* infections in women attending a sexually transmitted disease clinic in New Orleans. Clin Infect Dis 2019;69:459–65. PMID:30351348 https://doi.org/10.1093/cid/ciy922

736. Ashraf J, Radford AR, Turner A, Subramaniam R.尿道内灌注曲安奈德治疗特发性尿道炎的初步经验：一项前瞻性先导研究。J Laparoendosc Adv Surg Tech A 2017;27:1217-21. PMID:29023188 https://doi.org/10.1089/lap.2017.0064
737. Taylor SN, DiCarlo RP, Martin DH.亚甲蓝/龙胆紫染色与革兰染色在男性淋球菌性尿道炎快速诊断中的比较。Sex Transm Dis 2011;38:995-6. PMID:21992973 https://doi.org/10.1097/OLQ.0b013e318225f7c2
738. Rietmeijer CA, Mettenbrink CJ.在核酸扩增检测时代重新校准男性尿道炎的革兰染色诊断。Sex Transm Dis 2012;39:18-20. PMID:22183839 https://doi.org/10.1097/ OLQ.0b013e3182354da3
739. Geisler WM, Yu S, Hook EW 3rd.革兰染色未见多形核白细胞的男性衣原体和淋球菌感染：对诊断方法和管理的影响。Sex Transm Dis 2005;32:630-4. PMID:16205305 https://doi.org/10.1097/01.olq.0000175390.45315.a1
740. Gottesman T, Yossepowitch O, Samra Z, Rosenberg S, Dan M.特拉维夫男性尿道炎患者及高危无症状男性中生殖支原体的患病率：一项前瞻性研究。Int J STD AIDS 2017;28:127-32. PMID:26826161 https://doi.org/10.1177/0956462416630675
741. Kim HJ, Park JK, Park SC, et al.韩国士兵中性传播感染高危年龄组社区获得性尿道炎病原体的患病率。J R Army Med Corps 2017;163:20-2. PMID:26607860 https://doi.org/10.1136/ jramc-2015-000488
742. Libois A, Hallin M, Crucitti T, Delforge M, De Wit S.比利时布鲁塞尔一家大型公立医院尿道炎男性中生殖支原体的患病率：一项观察性横断面研究。PLoS One 2018;13:e0196217. PMID:29698421 https://doi.org/10.1371/journal.pone.0196217
743. Bachmann LH, Manhart LE, Martin DH, et al.男性尿道炎认识和治疗的进展。Clin Infect Dis 2015;61(Suppl 8): S763-9. PMID:26602615 https://doi.org/10.1093/ cid/civ755
744. Samaraweera GR, Garcia K, Druce J, et al.异性恋男性和男男性行为人群中腺病毒尿道炎的特征：临床病例回顾。Sex Transm Infect 2016;92:172-4. PMID:26574571 https://doi.org/10.1136/sextrans-2015-052243
745. Horner P, Blee K, O'Mahony C, Muir P, Evans C, Radcliffe K； 英国性健康与HIV协会临床有效性组。2015英国国家非淋球菌性尿道炎管理指南。Int J STD AIDS 2016;27:85-96. PMID:26002319 https://doi.org/10.1177/0956462415586675
746. Sarier M, Sepin N, Duman I, et al.革兰染色尿道涂片显微镜检查诊断尿道炎：应选择哪个阈值?Andrologia 2018;50:e13143. PMID:30238498 https://doi.org/10.1111/and.13143
747. Sarier M, Kukul E.非淋球菌性尿道炎的分类：综述。Int Urol Nephrol 2019;51:901-7. PMID:30953260 https://doi.org/10.1007/s11255-019-02140-2
748. Kong FY, Tabrizi SN, Law M, et al.阿奇霉素与多西环素治疗生殖道衣原体感染：随机对照试验的荟萃分析。Clin Infect Dis 2014;59:193-205. PMID:24729507 https://doi.org/10.1093/cid/ciu220
749. Páez-Canro C, Alzate JP, González LM, Rubio-Romero JA, Lethaby A, Gaitán HG.抗生素治疗男性和非妊娠女性泌尿生殖道沙眼衣原体感染。Cochrane Database Syst Rev 2019;1:CD010871. PMID:30682211 https://doi.org/10.1002/14651858.CD010871.pub2
750. McIver R, Jalocon D, McNulty A, et al.男男性行为人群中生殖支原体阳性的非淋球菌性尿道炎患者比仅有女性性伴的男性更可能携带大环内酯类耐药菌株：一项前瞻性研究。Sex Transm Dis 2019;46:513-7. PMID:31295218 https://doi.org/10.1097/OLQ.0000000000001009
751. Lau A, Bradshaw CS, Lewis D, et al.阿奇霉素治疗生殖道生殖支原体感染的有效性：系统综述与荟萃分析。Clin Infect Dis 2015;61:1389-99. PMID:26240201 https://doi.org/10.1093/cid/civ644
752. Horner P.生殖支原体非淋球菌性尿道炎在实施不安全性行为的男男性行为人群中可能增加：我们应当如何应对?Sex Transm Dis 2019;46:518-20. PMID:31295219 https://doi.org/10.1097/OLQ.0000000000001030
753. Hosenfeld CB, Workowski KA, Berman S, et al.女性衣原体和淋病重复感染：文献系统综述。Sex Transm Dis 2009;36:478-89. PMID:19617871 https:// doi.org/10.1097/OLQ.0b013e3181a2a933
754. Fung M, Scott KC, Kent CK, Klausner JD.男性衣原体和淋球菌再感染：评估复检必要性的数据系统综述。Sex Transm Infect 2007;83:304-9. PMID:17166889 https://doi.org/10.1136/sti.2006.024059
755. Kissinger PJ, White S, Manhart LE, et al.异性恋男性非淋球菌性尿道炎患者中沙眼衣原体的阿奇霉素治疗失败。Sex Transm Dis 2016;43:599-602. PMID:27631353 https://doi.org/10.1097/OLQ.0000000000000489
756. Schwebke JR, Rompalo A, Taylor S, et al.重新评估非淋球菌性尿道炎的治疗：强调新发病原体--一项随机临床试验。Clin Infect Dis 2011;52:163-70. PMID:21288838 https://doi.org/10.1093/cid/ciq074
757. Manhart LE, Khosropour CM, Gillespie CW, Lowens MS, Golden MR, Totten PA.O02.3 持续性生殖支原体相关NGU的治疗结局：莫西沙星治疗失败的证据。Sex Transm Infect 2013;89(Suppl 1): A29. https://doi.org/10.1136/sextrans-2013-051184.0091
758. Romano SS, Jensen JS, Lowens MS, et al.非淋球菌性尿道炎综合征治疗后无症状生殖支原体感染的长期持续时间。Clin Infect Dis 2019;69:113-20. PMID:30281079 https://doi.org/10.1093/cid/ciy843
759. Read TRH, Fairley CK, Murray GL, et al.耐药指导的生殖支原体感染序贯治疗的结局：一项前瞻性评估。Clin Infect Dis 2019;68:554-60. PMID:29873691 https://doi.org/10.1093/cid/ciy477
760. Dowe G, Smikle M, King SD, Baum M, Chout R, Williams Y.牙买加有症状和无症状衣原体非淋球菌性尿道炎：HIV传播的潜在风险。Int J STD AIDS 2000;11:187-90. PMID:10726944 https:// doi.org/10.1258/0956462001915507
761. Lusk MJ, Garden FL, Rawlinson WD, Naing ZW, Cumming RG, Konecny P.宫颈炎病因学和病例定义：一项在性传播感染门诊就诊的澳大利亚女性中的研究。Sex Transm Infect 2016;92:175-81. PMID:26586777 https://doi.org/10.1136/ sextrans-2015-052332
762. Lusk MJ, Konecny P.宫颈炎：综述。Curr Opin Infect Dis 2008;21:49-55. PMID:18192786
763. Marrazzo JM, Martin DH.女性宫颈炎的管理。Clin Infect Dis 2007;44(Suppl 3): S102-10. PMID:17342663 https://doi.org/10.1086/511423
764. Manavi K, Young H, Clutterbuck D.显微镜检查快速诊断男性和女性淋病的敏感性及淋病血清型的作用。Int J STD AIDS 2003;14:390-4. PMID:12816666 https://doi.org/10.1258/095646203765371277
765. Lillis RA, Martin DH, Nsuami MJ.生殖支原体感染在New Orleans一家性传播疾病门诊就诊的女性中的情况。Clin Infect Dis 2019;69:459-65. PMID:30351348 https:// doi.org/10.1093/cid/ciy922

766. Lis R, Rowhani-Rahbar A, Manhart LE. *Mycoplasma genitalium* infection and female reproductive tract disease: a meta-analysis. Clin Infect Dis 2015;61:418–26. PMID:25900174 https://doi.org/10.1093/cid/civ312
767. Oliphant J, Azariah S. Cervicitis: limited clinical utility for the detection of *Mycoplasma genitalium* in a cross-sectional study of women attending a New Zealand sexual health clinic. Sex Health 2013;10:263–7. PMID:23702105 https://doi.org/10.1071/SH12168
768. Sethi S, Rajkumari N, Dhaliwal L, Roy A. P3.294 Association of *Mycoplasma genitalium* with cervicitis in North Indian women attending gynecologic clinics. Sex Transm Infect 2013;89(Suppl 1):A240–1. https://doi.org/10.1136/sextrans-2013-051184.0749
769. Taylor SN, Lensing S, Schwebke J, et al. Prevalence and treatment outcome of cervicitis of unknown etiology. Sex Transm Dis 2013;40:379–85. PMID:23588127 https://doi.org/10.1097/OLQ.0b013e31828bfcb1
770. Mobley VL, Hobbs MM, Lau K, Weinbaum BS, Getman DK, Seña AC. *Mycoplasma genitalium* infection in women attending a sexually transmitted infection clinic: diagnostic specimen type, coinfections, and predictors. Sex Transm Dis 2012;39:706–9. PMID:22902666 https://doi.org/10.1097/OLQ.0b013e318255de03
771. Marrazzo JM, Wiesenfeld HC, Murray PJ, et al. Risk factors for cervicitis among women with bacterial vaginosis. J Infect Dis 2006;193:617–24. PMID:16453256 https://doi.org/10.1086/500149
772. Gaydos C, Maldeis NE, Hardick A, Hardick J, Quinn TC. *Mycoplasma genitalium* as a contributor to the multiple etiologies of cervicitis in women attending sexually transmitted disease clinics. Sex Transm Dis 2009;36:598–606. PMID:19704398 https://doi.org/10.1097/OLQ.0b013e3181b01948
773. Clark LR, Atendido M. Group B streptococcal vaginitis in postpubertal adolescent girls. J Adolesc Health 2005;36:437–40. PMID:15837348 https://doi.org/10.1016/j.jadohealth.2004.03.009
774. Hester EE, Middleman AB. A clinical conundrum: chronic cervicitis. J Pediatr Adolesc Gynecol 2019;32:342–4. PMID:30582974 https://doi.org/10.1016/j.jpag.2018.12.004
775. Liu L, Cao G, Zhao Z, Zhao F, Huang Y. High bacterial loads of *Ureaplasma* may be associated with non-specific cervicitis. Scand J Infect Dis 2014;46:637–41. PMID:25017795 https://doi.org/10.3109/00365548.2014.922696
776. Leli C, Mencacci A, Latino MA, et al. Prevalence of cervical colonization by *Ureaplasma parvum, Ureaplasma urealyticum, Mycoplasma hominis* and *Mycoplasma genitalium* in childbearing age women by a commercially available multiplex real-time PCR: an Italian observational multicentre study. J Microbiol Immunol Infect 2018;51:220–5. PMID:28711440 https://doi.org/10.1016/j.jmii.2017.05.004
777. Manhart LE. Has the time come to systematically test for *Mycoplasma genitalium?* Sex Transm Dis 2009;36:607–8. PMID:19734818 https://doi.org/10.1097/OLQ.0b013e3181b9d825
778. Liu HL, Chen CM, Pai LW, Hwu YJ, Lee HM, Chung YC. Comorbidity profiles among women with postcoital bleeding: a nationwide health insurance database. Arch Gynecol Obstet 2017;295:935–41. PMID:28246983 https://doi.org/10.1007/s00404-017-4327-7
779. Coleman JS, Hitti J, Bukusi EA, et al. Infectious correlates of HIV-1 shedding in the female upper and lower genital tracts. AIDS 2007;21:755–9. PMID:17413697 https://doi.org/10.1097/QAD.0b013e328012b838
780. Johnson LF, Lewis DA. The effect of genital tract infections on HIV-1 shedding in the genital tract: a systematic review and meta-analysis. Sex Transm Dis 2008;35:946–59. PMID:18685546 https://doi.org/10.1097/OLQ.0b013e3181812d15
781. McClelland RS, Wang CC, Mandaliya K, et al. Treatment of cervicitis is associated with decreased cervical shedding of HIV-1. AIDS 2001;15:105–10. PMID:11192850 https://doi.org/10.1097/00002030-200101050-00015
782. Gatski M, Martin DH, Theall K, et al. *Mycoplasma genitalium* infection among HIV-positive women: prevalence, risk factors and association with vaginal shedding. Int J STD AIDS 2011;22:155–9. PMID:21464453 https://doi.org/10.1258/ijsa.2010.010320
783. Gitau RW, Graham SM, Masese LN, et al. Effect of acquisition and treatment of cervical infections on HIV-1 shedding in women on antiretroviral therapy. AIDS 2010;24:2733–7. PMID:20871388 https://doi.org/10.1097/QAD.0b013e32833f9f43
784. Kreisel KM, Weston EJ, St Cyr SB, Spicknall IH. Estimates of the prevalence and incidence of chlamydia and gonorrhea among US men and women, 2018. Sex Transm Dis 2021;48:222–31. PMID:33492094 https://doi.org/10.1097/OLQ.0000000000001382
785. Aghaizu A, Reid F, Kerry S, et al. Frequency and risk factors for incident and redetected *Chlamydia trachomatis* infection in sexually active, young, multi-ethnic women: a community based cohort study. Sex Transm Infect 2014;90:524–8. PMID:25100744 https://doi.org/10.1136/sextrans-2014-051607
786. Scholes D, Satterwhite CL, Yu O, Fine D, Weinstock H, Berman S. Long-term trends in *Chlamydia trachomatis* infections and related outcomes in a U.S. managed care population. Sex Transm Dis 2012;39:81–8. PMID:22249294 https://doi.org/10.1097/OLQ.0b013e31823e3009
787. Kamwendo F, Forslin L, Bodin L, Danielsson D. Decreasing incidences of gonorrhea- and chlamydia-associated acute pelvic inflammatory disease. A 25-year study from an urban area of central Sweden. Sex Transm Dis 1996;23:384–91. PMID:8885069 https://doi.org/10.1097/00007435-199609000-00007
788. Rietmeijer CA, Hopkins E, Geisler WM, Orr DP, Kent CK. *Chlamydia trachomatis* positivity rates among men tested in selected venues in the United States: a review of the recent literature. Sex Transm Dis 2008;35(Suppl):S8–18. PMID:18449072 https://doi.org/10.1097/OLQ.0b013e31816938ba
789. Gift TL, Blake DR, Gaydos CA, Marrazzo JM. The cost-effectiveness of screening men for *Chlamydia trachomatis*: a review of the literature. Sex Transm Dis 2008;35(Suppl):S51–60. PMID:18520977 https://doi.org/10.1097/OLQ.0b013e3181723dba
790. Gift TL, Gaydos CA, Kent CK, et al. The program cost and cost-effectiveness of screening men for *Chlamydia* to prevent pelvic inflammatory disease in women. Sex Transm Dis 2008;35(Suppl):S66–75. PMID:18830137 https://doi.org/10.1097/OLQ.0b013e31818b64ac
791. Gopalappa C, Huang YL, Gift TL, Owusu-Edusei K, Taylor M, Gales V. Cost-effectiveness of screening men in Maricopa County jails for chlamydia and gonorrhea to avert infections in women. Sex Transm Dis 2013;40:776–83. PMID:24275727 https://doi.org/10.1097/OLQ.0000000000000023
792. Masek BJ, Arora N, Quinn N, et al. Performance of three nucleic acid amplification tests for detection of *Chlamydia trachomatis* and *Neisseria gonorrhoeae* by use of self-collected vaginal swabs obtained via an Internet-based screening program. J Clin Microbiol 2009;47:1663–7. PMID:19386838 https://doi.org/10.1128/JCM.02387-08
793. Knox J, Tabrizi SN, Miller P, et al. Evaluation of self-collected samples in contrast to practitioner-collected samples for detection of *Chlamydia trachomatis, Neisseria gonorrhoeae*, and *Trichomonas vaginalis* by polymerase chain reaction among women living in remote areas. Sex Transm Dis 2002;29:647–54. PMID:12438900 https://doi.org/10.1097/00007435-200211000-00006
794. Schachter J, Chernesky MA, Willis DE, et al. Vaginal swabs are the specimens of choice when screening for *Chlamydia trachomatis* and *Neisseria gonorrhoeae*: results from a multicenter evaluation of the APTIMA assays for both infections. Sex Transm Dis 2005;32:725–8. PMID:16314767 https://doi.org/10.1097/01.olq.0000190092.59482.96
795. Doshi JS, Power J, Allen E. Acceptability of chlamydia screening using self-taken vaginal swabs. Int J STD AIDS 2008;19:507–9. PMID:18663033 https://doi.org/10.1258/ijsa.2008.008056

766. Lis R, Rowhani-Rahbar A, Manhart LE.生殖支原体感染与女性生殖道疾病：一项meta分析。Clin Infect Dis 2015;61:418-26. PMID:25900174 https://doi.org/10.1093/ cid/civ312
767. Oliphant J, Azariah S.宫颈炎：在新西兰性健康诊所就诊女性的横断面研究中，对生殖支原体检测的临床实用性有限。Sex Health 2013;10:263-7. PMID:23702105 https://doi.org/10.1071/SH12168
768. Sethi S, Rajkumari N, Dhaliwal L, Roy A.P3.294 在北印度妇科诊所就诊女性中生殖支原体与宫颈炎的关联。Sex Transm Infect 2013;89(Suppl 1): A240-1. https://doi.org/10.1136/sextrans-2013-051184.0749
769. Taylor SN, Lensing S, Schwebke J, et al.不明原因宫颈炎的患病率和治疗结局。Sex Transm Dis 2013;40:379-85. PMID:23588127 https://doi.org/10.1097/ OLQ.0b013e31828bfcb1
770. Mobley VL, Hobbs MM, Lau K, Weinbaum BS, Getman DK, Seña AC.在性传播感染诊所就诊女性中的生殖支原体感染：诊断标本类型、合并感染和预测因素。Sex Transm Dis 2012;39:706-9. PMID:22902666 https://doi.org/10.1097/OLQ.0b013e318255de03
771. Marrazzo JM, Wiesenfeld HC, Murray PJ, et al.细菌性阴道病女性中宫颈炎的危险因素。J Infect Dis 2006;193:617-24. PMID:16453256 https://doi.org/10.1086/500149
772. Gaydos C, Maldeis NE, Hardick A, Hardick J, Quinn TC.生殖支原体作为在性传播疾病诊所就诊女性宫颈炎多种病因之一的贡献。Sex Transm Dis 2009;36:598-606. PMID:19704398 https://doi.org/10.1097/OLQ.0b013e3181b01948
773. Clark LR, Atendido M.青春期后少女的B组链球菌性阴道炎。J Adolesc Health 2005;36:437-40. PMID:15837348 https://doi.org/10.1016/j.jadohealth.2004.03.009
774. Hester EE, Middleman AB.一个临床难题：慢性宫颈炎。J Pediatr Adolesc Gynecol 2019;32:342-4. PMID:30582974 https:// doi.org/10.1016/j.jpag.2018.12.004
775. Liu L, Cao G, Zhao Z, Zhao F, Huang Y.高细菌载量的脲原体可能与非特异性宫颈炎相关。Scand J Infect Dis 2014;46:637-41. PMID:25017795 https:// doi.org/10.31 09/00365548.2014.922696
776. Leli C, Mencacci A, Latino MA, et al.使用市售多重实时PCR检测育龄女性宫颈定植的微小脲原体、解脲脲原体、人型支原体和生殖支原体的患病率：一项意大利观察性多中心研究。J Microbiol Immunol Infect 2018;51:220-5. PMID:28711440 https://doi.org/10.1016/j.jmii.2017.05.004
777. Manhart LE.系统检测生殖支原体的时机是否已经到来?Sex Transm Dis 2009;36:607-8. PMID:19734818 https:// doi.org/10.1097/OLQ.0b013e3181b9d825
778. Liu HL, Chen CM, Pai LW, Hwu YJ, Lee HM, Chung YC.性交后出血女性的合并症特征：一项全国健康保险数据库研究。Arch Gynecol Obstet 2017;295:935-41. PMID:28246983 https://doi.org/10.1007/s00404-017-4327-7
779. Coleman JS, Hitti J, Bukusi EA, et al.女性上、下生殖道HIV-1排出的感染相关因素。AIDS 2007;21:755-9. PMID:17413697 https://doi.org/10.1097/QAD.0b013e328012b838
780. Johnson LF, Lewis DA.生殖道感染对生殖道HIV-1排出的影响：系统综述和荟萃分析。Sex Transm Dis 2008;35:946-59. PMID:18685546 https://doi.org/10.1097/OLQ.0b013e3181812d15
781. McClelland RS, Wang CC, Mandaliya K, et al.宫颈炎的治疗与宫颈HIV-1排出减少相关。AIDS 2001;15:105-10. PMID:11192850 https://doi.org/10.1097/00002030-200101050-00015
782. Gatski M, Martin DH, Theall K, et al.生殖支原体感染在HIV阳性女性中的流行率、危险因素及与阴道排毒的相关性。Int J STD AIDS 2011;22:155-9. PMID:21464453 https://doi.org/10.1258/ijsa.2010.010320
783. Gitau RW, Graham SM, Masese LN, et al.宫颈感染的获得与治疗对接受抗逆转录病毒治疗女性HIV-1排毒的影响。AIDS 2010;24:2733-7. PMID:20871388 https://doi.org/10.1097/QAD.0b013e32833f9f43
784. Kreisel KM, Weston EJ, St Cyr SB, Spicknall IH.2018年美国男性和女性衣原体及淋病流行率与发病率估计。Sex Transm Dis 2021;48:222-31. PMID:33492094 https://doi.org/10.1097/OLQ.0000000000001382
785. Aghaizu A, Reid F, Kerry S, et al.性活跃年轻多族裔女性中新发及再检出沙眼衣原体感染的频率及危险因素：一项基于社区的队列研究。Sex Transm Infect 2014;90:524-8. PMID:25100744 https://doi.org/10.1136/sextrans-2014-051607
786. Scholes D, Satterwhite CL, Yu O, Fine D, Weinstock H, Berman S.美国管理式医疗人群中沙眼衣原体感染及相关结局的长期趋势。Sex Transm Dis 2012;39:81-8. PMID:22249294 https://doi.org/10.1097/OLQ.0b013e31823e3009
787. Kamwendo F, Forslin L, Bodin L, Danielsson D.淋病及衣原体相关急性盆腔炎性疾病发病率下降。瑞典中部城市地区25年研究。Sex Transm Dis 1996;23:384-91. PMID:8885069 https://doi.org/10.1097/00007435-199609000-00007
788. Rietmeijer CA, Hopkins E, Geisler WM, Orr DP, Kent CK.美国特定场所受检男性中沙眼衣原体阳性率：近期文献综述。Sex Transm Dis 2008;35(Suppl): S8-18. PMID:18449072 https://doi.org/10.1097/OLQ.0b013e31816938ba
789. Gift TL, Blake DR, Gaydos CA, Marrazzo JM.男性沙眼衣原体筛查的成本效益：文献综述。Sex Transm Dis 2008;35(Suppl): S51-60. PMID:18520977 https:// doi.org/10.1097/OLQ.0b013e3181723dba
790. Gift TL, Gaydos CA, Kent CK, et al.男性衣原体筛查以预防女性盆腔炎性疾病的项目成本与成本效益。Sex T ransm Dis 2008;35(Suppl): S66-75. PMID:18830137 https://doi.org/10.1097/OLQ.0b013e31818b64ac
791. 戈帕拉帕 C，黄 YL，吉夫特 TL，奥乌苏-埃杜塞 K，泰勒 M，盖尔斯V.在马里科帕县监狱对男性进行衣原体和淋病筛查以避免女性感染的成本效益。Sex Transm Dis 2013;40:776-83. PMID:24275727 https://doi.org/10.1097/ OLQ.0000000000000023
792. Masek BJ, Arora N, Quinn N, et al.通过基于互联网的筛查项目获取的自采阴道拭子检测沙眼衣原体和淋病奈瑟菌的三种核酸扩增检测的性能。J Clin Microbiol 2009;47:1663-7. PMID:19386838 https://doi.org/10.1128/JCM.02387-08
793. Knox J, Tabrizi SN, Miller P, et al.在偏远地区居住的女性中，自采样本与医务人员采集样本通过聚合酶链反应检测沙眼衣原体、淋病奈瑟菌和阴道毛滴虫的评估。Sex Transm Dis 2002;29:647-54. PMID:12438900 https://doi.org/10.1097/00007435-200211000-00006
794. Schachter J, Chernesky MA, Willis DE, et al.阴道拭子是筛查沙眼衣原体和淋病奈瑟菌时的首选标本：APTIMA检测两种感染的多中心评估结果。Sex Transm Dis 2005;32:725-8. PMID:16314767 https://doi.org/10.1097/01. olq.0000190092.59482.96
795. Doshi JS, Power J, Allen E.使用自采阴道拭子进行衣原体筛查的可接受性。Int J STD AIDS 2008;19:507-9. PMID:18663033 https://doi.org/10.1258/ijsa.2008.008056

796. Chernesky MA, Jang D, Portillo E, et al. Self-collected swabs of the urinary meatus diagnose more *Chlamydia trachomatis* and *Neisseria gonorrhoeae* infections than first catch urine from men. Sex Transm Infect 2013;89:102–4. PMID:23024224 https://doi.org/10.1136/sextrans-2012-050573

797. Dize L, Barnes P Jr, Barnes M, et al. Performance of self-collected penile-meatal swabs compared to clinician-collected urethral swabs for the detection of *Chlamydia trachomatis, Neisseria gonorrhoeae, Trichomonas vaginalis*, and *Mycoplasma genitalium* by nucleic acid amplification assays. Diagn Microbiol Infect Dis 2016;86:131–5. PMID:27497595 https://doi.org/10.1016/j.diagmicrobio.2016.07.018

798. Berry L, Stanley B. Comparison of self-collected meatal swabs with urine specimens for the diagnosis of *Chlamydia trachomatis* and *Neisseria gonorrhoeae* in men. J Med Microbiol 2017;66:134–6. PMID:28068218 https://doi.org/10.1099/jmm.0.000428

799. Chernesky M, Freund GG, Hook E 3rd, Leone P, D'Ascoli P, Martens M. Detection of *Chlamydia trachomatis* and *Neisseria gonorrhoeae* infections in North American women by testing SurePath liquid-based Pap specimens in APTIMA assays. J Clin Microbiol 2007;45:2434–8. PMID:17581931 https://doi.org/10.1128/JCM.00013-07

800. Schachter J, Moncada J, Liska S, Shayevich C, Klausner JD. Nucleic acid amplification tests in the diagnosis of chlamydial and gonococcal infections of the oropharynx and rectum in men who have sex with men. Sex Transm Dis 2008;35:637–42. PMID:18520976 https://doi.org/10.1097/OLQ.0b013e31817bdd7e

801. Mimiaga MJ, Mayer KH, Reisner SL, et al. Asymptomatic gonorrhea and chlamydial infections detected by nucleic acid amplification tests among Boston area men who have sex with men. Sex Transm Dis 2008;35:495–8. PMID:18354345 https://doi.org/10.1097/OLQ.0b013e31816471ae

802. Bachmann LH, Johnson RE, Cheng H, Markowitz LE, Papp JR, Hook EW 3rd. Nucleic acid amplification tests for diagnosis of *Neisseria gonorrhoeae* oropharyngeal infections. J Clin Microbiol 2009;47:902–7. PMID:19193848 https://doi.org/10.1128/JCM.01581-08

803. Bachmann LH, Johnson RE, Cheng H, et al. Nucleic acid amplification tests for diagnosis of *Neisseria gonorrhoeae* and *Chlamydia trachomatis* rectal infections. J Clin Microbiol 2010;48:1827–32. PMID:20335410 https://doi.org/10.1128/JCM.02398-09

804. Cosentino LA, Danby CS, Rabe LK, et al. Use of nucleic acid amplification testing for diagnosis of extragenital sexually transmitted infections. J Clin Microbiol 2017;55:2801–7. PMID:28679521 https://doi.org/10.1128/JCM.00616-17

805. Food and Drug Administration. Microbiology Devices Panel of the Medical Devices Advisory Committee meeting annoucement [Internet]. Silver Spring, MD: US Department of Agriculture, Food and Drug Administration; 2019. https://www.fda.gov/advisory-committees/advisory-committee-calendar/march-8-2019-microbiology-devices-panel-medical-devices-advisory-committee-meeting-announcement#event-materials

806. Sexton ME, Baker JJ, Nakagawa K, et al. How reliable is self-testing for gonorrhea and chlamydia among men who have sex with men? J Fam Pract 2013;62:70–8. PMID:23405376

807. Herbst de Cortina S, Bristow CC, Joseph Davey D, Klausner JD. A systematic review of point of care testing for *Chlamydia trachomatis, Neisseria gonorrhoeae*, and *Trichomonas vaginalis.* Infect Dis Obstet Gynecol 2016;2016:4386127. Epub May 26, 2016. PMID:27313440 https://doi.org/10.1155/2016/4386127

808. Rivard KR, Dumkow LE, Draper HM, Brandt KL, Whalen DW, Egwuatu NE. Impact of rapid diagnostic testing for chlamydia and gonorrhea on appropriate antimicrobial utilization in the emergency department. Diagn Microbiol Infect Dis 2017;87:175–9. PMID:27836225 https://doi.org/10.1016/j.diagmicrobio.2016.10.019

809. Wingrove I, McOwan A, Nwokolo N, Whitlock G. Diagnostics within the clinic to test for gonorrhoea and chlamydia reduces the time to treatment: a service evaluation. Sex Transm Infect 2014;90:474. PMID:25118322 https://doi.org/10.1136/sextrans-2014-051580

810. Geisler WM, Wang C, Morrison SG, Black CM, Bandea CI, Hook EW 3rd. The natural history of untreated *Chlamydia trachomatis* infection in the interval between screening and returning for treatment. Sex Transm Dis 2008;35:119–23. PMID:17898680 https://doi.org/10.1097/OLQ.0b013e318151497d

811. Dukers-Muijrers NHTM, Wolffs PFG, De Vries H, et al. Treatment effectiveness of azithromycin and doxycycline in uncomplicated rectal and vaginal *Chlamydia trachomatis* infections in women: a multicentre observational study (FemCure). Clin Infect Dis 2019;69:1946–54. PMID:30689759 https://doi.org/10.1093/cid/ciz050

812. Dombrowski JC, Wierzbicki MR, Newman LM, et al. Doxycycline versus azithromycin for the treatment of rectal chlamydia in men who have sex with men: a randomized controlled trial. Clin Infect Dis 2021;ciab153. PMID:33606009 https://doi.org/10.1093/cid/ciab153

813. Dukers-Muijrers NH, Schachter J, van Liere GA, Wolffs PF, Hoebe CJ. What is needed to guide testing for anorectal and pharyngeal *Chlamydia trachomatis* and *Neisseria gonorrhoeae* in women and men? Evidence and opinion. BMC Infect Dis 2015;15:533. PMID:26576538 https://doi.org/10.1186/s12879-015-1280-6

814. Marcus JL, Kohn RP, Barry PM, Philip SS, Bernstein KT. *Chlamydia trachomatis* and *Neisseria gonorrhoeae* transmission from the female oropharynx to the male urethra. Sex Transm Dis 2011;38:372–3. PMID:21183864 https://doi.org/10.1097/OLQ.0b013e3182029008

815. Manavi K, Hettiarachchi N, Hodson J. Comparison of doxycycline with azithromycin in treatment of pharyngeal chlamydia infection. Int J STD AIDS 2016;27:1303–8. PMID:26511655 https://doi.org/10.1177/0956462415614723

816. Rank RG, Yeruva L. An alternative scenario to explain rectal positivity in *Chlamydia*-infected individuals. Clin Infect Dis 2015;60:1585–6. PMID:25648236 https://doi.org/10.1093/cid/civ079

817. Geisler WM, Koltun WD, Abdelsayed N, et al. Safety and efficacy of WC2031 versus vibramycin for the treatment of uncomplicated urogenital *Chlamydia trachomatis* infection: a randomized, double-blind, double-dummy, active-controlled, multicenter trial. Clin Infect Dis 2012;55:82–8. PMID:22431798 https://doi.org/10.1093/cid/cis291

818. Renault CA, Israelski DM, Levy V, Fujikawa BK, Kellogg TA, Klausner JD. Time to clearance of *Chlamydia trachomatis* ribosomal RNA in women treated for chlamydial infection. Sex Health 2011;8:69–73. PMID:21371385 https://doi.org/10.1071/SH10030

819. Lazenby GB, Korte JE, Tillman S, Brown FK, Soper DE. A recommendation for timing of repeat *Chlamydia trachomatis* test following infection and treatment in pregnant and nonpregnant women. Int J STD AIDS 2017;28:902–9. PMID:27864473 https://doi.org/10.1177/0956462416680438

820. Dunne EF, Chapin JB, Rietmeijer CA, et al. Rate and predictors of repeat *Chlamydia trachomatis* infection among men. Sex Transm Dis 2008;35(Suppl):S40–4. PMID:18520978 https://doi.org/10.1097/OLQ.0b013e31817247b2

821. Kjaer HO, Dimcevski G, Hoff G, Olesen F, Ostergaard L. Recurrence of urogenital *Chlamydia trachomatis* infection evaluated by mailed samples obtained at home: 24 weeks' prospective follow up study. Sex Transm Infect 2000;76:169–72. PMID:10961191 https://doi.org/10.1136/sti.76.3.169

822. Whittington WL, Kent C, Kissinger P, et al. Determinants of persistent and recurrent *Chlamydia trachomatis* infection in young women: results of a multicenter cohort study. Sex Transm Dis 2001;28:117–23. PMID:11234786 https://doi.org/10.1097/00007435-200102000-00011

796. Chernesky MA, Jang D, Portillo E, et al.尿道口自采拭子比男性首段尿诊断出更多沙眼衣原体和淋病奈瑟菌感染。Sex Transm Infect 2013;89:102-4. PMID:23024224 https://doi.org/10.1136/ sextrans-2012-050573

797. Dize L, Barnes P Jr, Barnes M, et al.自采集阴茎头拭子与临床医生采集尿道拭子通过核酸扩增检测沙眼衣原体、淋病奈瑟菌、阴道毛滴虫和生殖支原体的性能比较。Diagn Microbiol Infect Dis 2016;86:131-5. PMID:27497595 https://doi.org/10.1016/j.diagmicrobio.2016.07.018

798. Berry L, Stanley B.自采集阴茎头拭子与尿液标本用于诊断男性沙眼衣原体和淋病奈瑟菌的比较。J Med Microbiol 2017;66:134-6. PMID:28068218 https://doi.org/10.1099/jmm.0.000428

799. 切尔内斯基 M，弗罗因德 GG，胡克 E 三世，莱昂内 P，达斯科利 P，马滕斯 M.通过 APTIMA 检测 SurePath 液基巴氏涂片标本检测北美女性沙眼衣原体和淋病奈瑟菌感染。J Clin Microbiol 2007;45:2434-8. PMID:17581931 https://doi.org/10.1128/JCM.00013-07

800. Schachter J, Moncada J, Liska S, Shayevich C, Klausner JD.核酸扩增检测在男男性行为人群口咽和直肠衣原体及淋球菌感染诊断中的应用。Sex Transm Dis 2008;35:637-42. PMID:18520976 https://doi.org/10.1097/OLQ.0b013e31817bdd7e

801. Mimiaga MJ, Mayer KH, Reisner SL, et al.波士顿地区男男性行为人群中通过核酸扩增检测发现的无症状淋病和衣原体感染。Sex Transm Dis 2008;35:495-8. PMID:18354345 https://doi.org/10.1097/OLQ.0b013e31816471ae

802. Bachmann LH, Johnson RE, Cheng H, Markowitz LE, Papp JR, Hook EW 3rd.用于诊断淋病奈瑟菌口咽感染的核酸扩增检测。J Clin Microbiol 2009;47:902-7. PMID:19193848 https://doi.org/10.1128/JCM.01581-08

803. Bachmann LH, Johnson RE, Cheng H, et al.用于诊断淋病奈瑟菌和沙眼衣原体直肠感染的核酸扩增检测。J Clin Microbiol 2010;48:1827-32. PMID:20335410 https://doi.org/10.1128/JCM.02398-09

804. Cosentino LA, Danby CS, Rabe LK, et al.使用核酸扩增检测诊断生殖器外性传播感染。J Clin Microbiol 2017;55:2801-7. PMID:28679521 https://doi.org/10.1128/JCM.00616-17

805. 美国食品药品监督管理局。微生物器械专家组医疗器械咨询委员会会议公告[互联网]。马里兰州银泉：美国农业部，食品药品监督管理局；2019。https://www.fda.gov/ advisory-committees/advisory-committee-calendar/march-8-2019-Microbiology-devices-panel-medical-devices-advisory-committee-meeting-announcement#event-materials

806. Sexton ME, Baker JJ, Nakagawa K, et al.男男性行为人群中淋病和衣原体自检的可靠性如何?J Fam Pract 2013;62:70-8. PMID:23405376

807. Herbst de Cortina S, Bristow CC, Joseph Davey D, Klausner JD.沙眼衣原体、淋病奈瑟菌和阴道毛滴虫即时检测的系统综述。Infect Dis Obstet Gynecol 2016;2016:4386127. Epub May 26, 2016. PMID:27313440 https://doi.org/10.1155/2016/4386127

808. Rivard KR, Dumkow LE, Draper HM, Brandt KL, Whalen DW, Egwuatu NE.衣原体和淋病快速诊断检测对急诊科合理抗菌药物使用的影响。Diagn Microbiol Infect Dis 2017;87:175-9. PMID:27836225 https://doi.org/10.1016/j.diagmicrobio.2016.10.019

809. Wingrove I, McOwan A, Nwokolo N, Whitlock G.诊所内检测淋病和衣原体的诊断措施缩短了治疗时间：一项服务评估。Sex Transm Infect 2014;90:474. PMID:25118322 https://doi.org/10.1136/ sextrans-2014-051580

810. Geisler WM, Wang C, Morrison SG, Black CM, Bandea CI, Hook EW 3rd.未经治疗的沙眼衣原体感染在筛查与返回治疗间期的自然史。Sex Transm Dis 2008;35:119-23. PMID:17898680 https://doi.org/10.1097/ OLQ.0b013e318151497d

811. Dukers-Muijrers NHTM, Wolffs PFG, De Vries H, et al.阿奇霉素和多西环素治疗女性无并发症直肠和阴道沙眼衣原体感染的治疗效果：一项多中心观察性研究(FemCure)。Clin Infect Dis 2019;69:1946-54. PMID:30689759 https://doi.org/10.1093/cid/ciz050

812. Dombrowski JC, Wierzbicki MR, Newman LM, et al.多西环素与阿奇霉素治疗男男性行为人群直肠衣原体感染：一项随机对照试验。Clin Infect Dis 2021;ciab153. PMID:33606009 https://doi.org/10.1093/cid/ciab153

813. Dukers-Muijrers NH, Schachter J, van Liere GA, Wolffs PF, Hoebe CJ.需要什么来指导女性和男性肛门直肠和咽部沙眼衣原体和淋病奈瑟菌的检测?证据与观点。BMC Infect Dis 2015;15:533. PMID:26576538 https://doi.org/10.1186/s12879-015-1280-6

814. Marcus JL, Kohn RP, Barry PM, Philip SS, Bernstein KT.沙眼衣原体和淋病奈瑟菌从女性口咽传播至男性尿道。Sex Transm Dis 2011;38:372-3. PMID:21183864 https://doi.org/10.1097/OLQ.0b013e3182029008

815. Manavi K, Hettiarachchi N, Hodson J.多西环素与阿奇霉素治疗咽部衣原体感染的比较。Int J STD AIDS 2016;27:1303-8. PMID:26511655 https://doi.org/10.1177/0956462415614723

816. Rank RG, Yeruva L.解释衣原体感染者直肠阳性的另一种情景。Clin Infect Dis 2015;60:1585-6. PMID:25648236 https://doi.org/10.1093/cid/civ079

817. Geisler WM, Koltun WD, Abdelsayed N, et al.WC2031与vibramycin治疗无并发症泌尿生殖道沙眼衣原体感染的安全性和疗效：一项随机、双盲、双模拟、活性对照、多中心试验。Clin Infect Dis 2012;55:82-8. PMID:22431798 https://doi.org/10.1093/cid/cis291

818. Renault CA, Israelski DM, Levy V, Fujikawa BK, Kellogg TA, Klausner JD.女性沙眼衣原体感染治疗后*Chlamydia trachomatis*核糖体RNA清除时间。Sex Health 2011;8:69-73. PMID:21371385 https://doi.org/10.1071/SH10030

819. Lazenby GB, Korte JE, Tillman S, Brown FK, Soper DE.关于妊娠及非妊娠女性感染和治疗后重复沙眼衣原体检测时机的建议。Int J STD AIDS 2017;28:902-9. PMID:27864473 https://doi.org/10.1177/0956462416680438

820. Dunne EF, Chapin JB, Rietmeijer CA, et al.男性中沙眼衣原体再感染的发生率及预测因素。Sex Transm Dis 2008;35(Suppl): S40-4. PMID:18520978 https://doi.org/10.1097/ OLQ.0b013e31817247b2

821. Kjaer HO, Dimcevski G, Hoff G, Olesen F, Ostergaard L.通过邮寄家庭自采样本评估泌尿生殖道沙眼衣原体感染的复发：24周前瞻性随访研究。Sex Transm Infect 2000;76:169-72. PMID:10961191 https://doi.org/10.1136/ sti.76.3.169

822. Whittington WL, Kent C, Kissinger P, et al.年轻女性持续性及复发性沙眼衣原体感染的决定因素：多中心队列研究结果。Sex Transm Dis 2001;28:117-23. PMID:11234786 https://doi.org/10.1097/00007435-200102000-00011

823. Kapil R, Press CG, Hwang ML, Brown L, Geisler WM. Investigating the epidemiology of repeat *Chlamydia trachomatis* detection after treatment by using *C. trachomatis* OmpA genotyping. J Clin Microbiol 2015;53:546–9. PMID:25472488 https://doi.org/10.1128/JCM.02483-14
824. Jacobson GF, Autry AM, Kirby RS, Liverman EM, Motley RU. A randomized controlled trial comparing amoxicillin and azithromycin for the treatment of *Chlamydia trachomatis* in pregnancy. Am J Obstet Gynecol 2001;184:1352–6. PMID:11408852 https://doi.org/10.1067/mob.2001.115050
825. Kacmar J, Cheh E, Montagno A, Peipert JF. A randomized trial of azithromycin versus amoxicillin for the treatment of *Chlamydia trachomatis* in pregnancy. Infect Dis Obstet Gynecol 2001;9:197–202. PMID:11916175 https://doi.org/10.1155/S1064744901000321
826. Rahangdale L, Guerry S, Bauer HM, et al. An observational cohort study of *Chlamydia trachomatis* treatment in pregnancy. Sex Transm Dis 2006;33:106–10. PMID:16432482 https://doi.org/10.1097/01.olq.0000187226.32145.ea
827. Aggarwal A, Spitzer RF, Caccia N, Stephens D, Johnstone J, Allen L. Repeat screening for sexually transmitted infection in adolescent obstetric patients. J Obstet Gynaecol Can 2010;32:956–61. PMID:21176304 https://doi.org/10.1016/S1701-2163(16)34683-7
828. Phillips Campbell R, Kintner J, Whittimore J, Schoborg RV. *Chlamydia muridarum* enters a viable but non-infectious state in amoxicillin-treated BALB/c mice. Microbes Infect 2012;14:1177–85. PMID:22943883 https://doi.org/10.1016/j.micinf.2012.07.017
829. Wyrick PB. *Chlamydia trachomatis* persistence in vitro: an overview. J Infect Dis 2010;201(Suppl 2):S88–95. PMID:20470046 https://doi.org/10.1086/652394
830. Fan H, Li L, Wijlaars L, Gilbert RE. Associations between use of macrolide antibiotics during pregnancy and adverse child outcomes: a systematic review and meta-analysis. PLoS One 2019;14:e0212212. PMID:30779772 https://doi.org/10.1371/journal.pone.0212212
831. Fan H, Gilbert R, O'Callaghan F, Li L. Associations between macrolide antibiotics prescribing during pregnancy and adverse child outcomes in the UK: population based cohort study. BMJ 2020;368:m331. Erratum in: BMJ 2020;368:m766. PMID:32075790 https://doi.org/10.1136/bmj.m331
832. Mallah N, Tohidinik HR, Etminan M, Figueiras A, Takkouche B. Prenatal exposure to macrolides and risk of congenital malformations: a meta-analysis. Drug Saf 2020;43:211–21. PMID:31721138 https://doi.org/10.1007/s40264-019-00884-5
833. Hammerschlag MR, Cummings C, Roblin PM, Williams TH, Delke I. Efficacy of neonatal ocular prophylaxis for the prevention of chlamydial and gonococcal conjunctivitis. N Engl J Med 1989;320:769–72. PMID:2922026 https://doi.org/10.1056/NEJM198903233201204
834. Zikic A, Schünemann H, Wi T, Lincetto O, Broutet N, Santesso N. Treatment of neonatal chlamydial conjunctivitis: a systematic review and meta-analysis. J Pediatric Infect Dis Soc 2018;7:e107–15. PMID:30007329 https://doi.org/10.1093/jpids/piy060
835. Hammerschlag MR, Chandler JW, Alexander ER, English M, Koutsky L. Longitudinal studies on chlamydial infections in the first year of life. Pediatr Infect Dis 1982;1:395–401. PMID:7163029 https://doi.org/10.1097/00006454-198211000-00007
836. Beem MO, Saxon E, Tipple MA. Treatment of chlamydial pneumonia of infancy. Pediatrics 1979;63:198–203. PMID:440807
837. Brownell AD, Shapiro RA, Hammerschlag MR. Caution is required when using non-Food and Drug Administration-cleared assays to diagnose sexually transmitted infections in children. J Pediatr 2019;206:280–2. PMID:30466791 https://doi.org/10.1016/j.jpeds.2018.10.038
838. Kreisel KM, Spicknall IH, Gargano JW, et al. Sexually transmitted infections among US women and men: prevalence and incidence estimates, 2018. Sex Transm Dis 2021;48:208–14. PMID:33492089 https://doi.org/10.1097/OLQ.0000000000001355
839. Lunny C, Taylor D, Hoang L, et al. Self-collected versus clinician-collected sampling for chlamydia and gonorrhea screening: a systemic review and meta-analysis. PLoS One 2015;10:e0132776. PMID:26168051 https://doi.org/10.1371/journal.pone.0132776
840. Schick V, Van Der Pol B, Dodge B, Baldwin A, Fortenberry JD. A mixed methods approach to assess the likelihood of testing for STI using self-collected samples among behaviourally bisexual women. Sex Transm Infect 2015;91:329–33. PMID:25637328 https://doi.org/10.1136/sextrans-2014-051842
841. Mustanski B, Feinstein BA, Madkins K, Sullivan P, Swann G. Prevalence and risk factors for rectal and urethral sexually transmitted infections from self-collected samples among young men who have sex with men participating in the Keep It Up! 2.0 randomized controlled trial. Sex Transm Dis 2017;44:483–8. PMID:28703727 https://doi.org/10.1097/OLQ.0000000000000636
842. Salow KR, Cohen AC, Bristow CC, McGrath MR, Klausner JD. Comparing mail-in self-collected specimens sent via United States Postal Service versus clinic-collected specimens for the detection of *Chlamydia trachomatis* and *Neisseria gonorrhoeae* in extra-genital sites. PLoS One 2017;12:e0189515. PMID:29240781 https://doi.org/10.1371/journal.pone.0189515
843. Drake C, Barenfanger J, Lawhorn J, Verhulst S. Comparison of Easy-Flow Copan Liquid Stuart's and Starplex Swab transport systems for recovery of fastidious aerobic bacteria. J Clin Microbiol 2005;43:1301–3. PMID:15750099 https://doi.org/10.1128/JCM.43.3.1301-1303.2005
844. Wade JJ, Graver MA. Survival of six auxotypes of *Neisseria gonorrhoeae* in transport media. J Clin Microbiol 2003;41:1720–1. PMID:12682168 https://doi.org/10.1128/JCM.41.4.1720-1721.2003
845. Arbique JC, Forward KR, LeBlanc J. Evaluation of four commercial transport media for the survival of *Neisseria gonorrhoeae*. Diagn Microbiol Infect Dis 2000;36:163–8. PMID:10729658 https://doi.org/10.1016/S0732-8893(99)00134-0
846. Hook EW 3rd, Kirkcaldy RD. A brief history of evolving diagnostics and therapy for gonorrhea: lessons learned. Clin Infect Dis 2018;67:1294–9. PMID:29659749 https://doi.org/10.1093/cid/ciy271
847. Unemo M, Shafer WM. Future treatment of gonorrhea—novel emerging drugs are essential and in progress? Expert Opin Emerg Drugs 2015;20:357–60. PMID:25907334 https://doi.org/10.1517/14728214.2015.1039981
848. Sánchez-Busó L, Golparian D, Corander J, et al. The impact of antimicrobials on gonococcal evolution. Nat Microbiol 2019;4:1941–50. PMID:31358980 https://doi.org/10.1038/s41564-019-0501-y
849. Schwarcz SK, Zenilman JM, Schnell D, et al. National surveillance of antimicrobial resistance in *Neisseria gonorrhoeae.* The Gonococcal Isolate Surveillance Project. JAMA 1990;264:1413–7. PMID:2144026 https://doi.org/10.1001/jama.1990.03450110059027
850. CDC. Update to CDC's sexually transmitted diseases treatment guidelines, 2006: fluoroquinolones no longer recommended for treatment of gonococcal infections. MMWR Morb Mortal Wkly Rep 2007;56:332–6. PMID:17431378
851. CDC. Sexually transmitted disease surveillance 2013. Atlanta, GA: US Department of Health and Human Services, CDC; 2014. https://www.cdc.gov/std/stats/archive/Surv2013-Print.pdf
852. Muratani T, Akasaka S, Kobayashi T, et al. Outbreak of cefozopran (penicillin, oral cephems, and aztreonam)-resistant *Neisseria gonorrhoeae* in Japan. Antimicrob Agents Chemother 2001;45:3603–6. PMID:11709349 https://doi.org/10.1128/AAC.45.12.3603-3606.2001
853. Yokoi S, Deguchi T, Ozawa T, et al. Threat to cefixime treatment for gonorrhea. Emerg Infect Dis 2007;13:1275–7. PMID:17953118

823. Kapil R, Press CG, Hwang ML, Brown L, Geisler WM.通过*C.trachomatis* OmpA基因分型研究治疗后*Chlamydia trachomatis*再次检出感染的流行病学。J Clin Microbiol 2015;53:546-9. PMID:25472488 https://doi.org/10.1128/ JCM.02483-14
824. Jacobson GF, Autry AM, Kirby RS, Liverman EM, Motley RU.阿莫西林与阿奇霉素治疗妊娠期沙眼衣原体感染的随机对照试验。Am J Obstet Gynecol 2001;184:1352-6. PMID:11408852 https://doi.org/10.1067/mob.2001.115050
825. Kacmar J, Cheh E, Montagno A, Peipert JF.阿奇霉素与阿莫西林治疗妊娠期沙眼衣原体感染的随机试验。Infect Dis Obstet Gynecol 2001;9:197-202. PMID:11916175 https://doi.org/10.1155/S1064744901000321
826. Rahangdale L, Guerry S, Bauer HM, et al.妊娠期沙眼衣原体治疗的观察性队列研究。Sex Transm Dis 2006;33:106-10. PMID:16432482 https://doi.org/10.1097/01. olq.0000187226.32145.ea
827. Aggarwal A, Spitzer RF, Caccia N, Stephens D, Johnstone J, Allen L.青少年产科患者性传播感染的重复筛查。J Obstet Gynaecol Can 2010;32:956-61. PMID:21176304 https://doi.org/10.1016/S1701-2163(16) 34683-7
828. Phillips Campbell R, Kintner J, Whittimore J, Schoborg RV.*Chlamydia muridarum*在阿莫西林处理的BALB/c小鼠中进入可存活但非感染性状态。Microbes Infect 2012;14:1177-85. PMID:22943883 https://doi.org/10.1016/j.micinf.2012.07.017
829. Wyrick PB.沙眼衣原体体外持续存在：概述。J Infect Dis 2010;201(Suppl 2): S88-95. PMID:20470046 https://doi.org/10.1086/652394
830. Fan H, Li L, Wijlaars L, Gilbert RE.妊娠期使用大环内酯类抗生素与不良儿童结局之间的关联：系统综述与meta分析。PLoS One 2019;14:e0212212. PMID:30779772 https://doi.org/10.1371/journal.pone.0212212
831. Fan H, Gilbert R, O'Callaghan F, Li L.英国妊娠期处方大环内酯类抗生素与不良儿童结局之间的关联：基于人群的队列研究。BMJ 2020;368:m331. 勘误见：BMJ 2020;368:m766. PMID:32075790 https://doi.org/10.1136/bmj.m331
832. Mallah N, Tohidinik HR, Etminan M, Figueiras A, Takkouche B.产前暴露于大环内酯类药物与先天性畸形风险：meta分析。Drug Saf 2020;43:211-21. PMID:31721138 https:// doi.org/10.1007/s40264-019-00884-5
833. 哈默施拉格MR，卡明斯C，罗布林PM，威廉姆斯TH，德尔克I.新生儿眼部预防用于预防衣原体性和淋球菌性结膜炎的疗效。N Engl J Med 1989;320:769-72. PMID:2922026 https://doi.org/10.1056/NEJM198903233201204
834. Zikic A, Schünemann H, Wi T, Lincetto O, Broutet N, Santesso N.新生儿衣原体性结膜炎的治疗：系统综述与meta分析。J Pediatric Infect Dis Soc 2018;7:e107-15. PMID:30007329 https://doi.org/10.1093/jpids/piy060
835. 哈默施拉格 MR，钱德勒 JW，亚历山大 ER，英格利希 M，库茨基L.生命第一年衣原体感染的纵向研究。Pediatr Infect Dis 1982;1:395-401. PMID:7163029 https://doi.org/10.1097/00006454-198211000-00007
836. Beem MO, Saxon E, Tipple MA.婴儿期衣原体肺炎的治疗。Pediatrics 1979;63:198-203. PMID:440807
837. Brownell AD, Shapiro RA, Hammerschlag MR.使用未经美国食品药品监督管理局批准的检测方法诊断儿童性传播感染时需谨慎。J Pediatr 2019;206:280-2. PMID:30466791 https://doi.org/10.1016/j.jpeds.2018.10.038
838. Kreisel KM, Spicknall IH, Gargano JW, et al.美国女性和男性中的性传播感染：患病率和发病率估计，2018年。Sex Transm Dis 2021;48:208-14. PMID:33492089 https://doi.org/10.1097/OLQ.0000000000001355
839. Lunny C, Taylor D, Hoang L, et al.自采集与临床医生采集样本用于衣原体和淋病筛查：系统综述与meta分析。PLoS One 2015;10:e0132776. PMID:26168051 https://doi.org/10.1371/journal.pone.0132776
840. Schick V, Van Der Pol B, Dodge B, Baldwin A, Fortenberry JD.采用混合方法评估行为双性恋女性中使用自采集样本进行STI检测的可能性。Sex Transm Infect 2015;91:329-33. PMID:25637328 https://doi.org/10.1136/sextrans-2014-051842
841. Mustanski B, Feinstein BA, Madkins K, Sullivan P, Swann G.参与Keep It Up!2.0随机对照试验的男男性行为人群中自采集样本直肠和尿道性传播感染的患病率及危险因素。Sex Transm Dis 2017;44:483-8. PMID:28703727 https://doi.org/10.1097/OLQ.0000000000000636
842. Salow KR, Cohen AC, Bristow CC, McGrath MR, Klausner JD.比较通过美国邮政服务邮寄的自采集标本与临床采集标本在生殖器外部位检测沙眼衣原体和淋病奈瑟菌的效果。PLoS One 2017;12:e0189515. PMID:29240781 https://doi.org/10.1371/journal.pone.0189515
843. Drake C, Barenfanger J, Lawhorn J, Verhulst S.比较Easy-Flow Copan Liquid Stuart's和Starplex拭子运输系统用于苛养需氧菌的回收。J Clin Microbiol 2005;43:1301-3. PMID:15750099 https://doi.org/10.1128/ JCM.43.3.1301-1303.2005
844. Wade JJ, Graver MA.淋病奈瑟菌六种营养型的运输培养基存活情况。J Clin Microbiol 2003;41:1720-1. PMID:12682168 https://doi.org/10.1128/JCM.41.4.1720-1721.2003
845. Arbique JC, Forward KR, LeBlanc J.评估四种商业运输培养基对淋病奈瑟菌存活的影响。Diagn Microbiol Infect Dis 2000;36:163-8. PMID:10729658 https://doi.org/10.1016/S0732-8893(99) 00134-0
846. Hook EW 3rd, Kirkcaldy RD.淋病诊断和治疗演变简史：经验教训。Clin Infect Dis 2018;67:1294-9. PMID:29659749 https://doi.org/10.1093/cid/ciy271
847. Unemo M, Shafer WM.淋病的未来治疗--新型药物至关重要且正在研发中?Expert Opin Emerg Drugs 2015;20:357-60. PMID:25907334 https://doi.org/10.1517/147282 14.2015.1039981
848. Sánchez-Busó L, Golparian D, Corander J, et al.抗菌药物对淋球菌进化的影响。Nat Microbiol 2019;4:1941-50. PMID:31358980 https://doi.org/10.1038/s41564-019-0501-y
849. Schwarcz SK, Zenilman JM, Schnell D, et al.淋病奈瑟菌抗菌药物耐药的国家监测。淋球菌分离株监测项目。JAMA 1990;264:1413-7. PMID:2144026 https://doi.org/10.1001/jama.1990.03450110059027
850. CDC.CDC性传播疾病治疗指南2006年更新：不再推荐氟喹诺酮类药物治疗淋球菌感染。MMWR Morb Mortal Wkly Rep 2007;56:332-6. PMID:17431378
851. CDC.2013年性传播疾病监测。Atlanta, GA: US Department of Health and Human Services, CDC; 2014. https://www.cdc.gov/std/stats/archive/Surv2013-Print.pdf
852. Muratani T, Akasaka S, Kobayashi T, et al.日本头孢唑兰(青霉素、口服头孢烯类和氨曲南)耐药淋病奈瑟菌暴发。Antimicrob Agents Chemother 2001;45:3603-6. PMID:11709349 https://doi.org/10.1128/ AAC.45.12.3603-3606.2001
853. Yokoi S, Deguchi T, Ozawa T, et al.头孢克肟治疗淋病面临的威胁。Emerg Infect Dis 2007;13:1275-7. PMID:17953118

854. Lo JY, Ho KM, Leung AO, et al. Ceftibuten resistance and treatment failure of *Neisseria gonorrhoeae* infection. Antimicrob Agents Chemother 2008;52:3564–7. PMID:18663018 https://doi.org/10.1128/AAC.00198-08

855. Deguchi T, Yasuda M, Yokoi S, et al. Treatment of uncomplicated gonococcal urethritis by double-dosing of 200 mg cefixime at a 6-h interval. J Infect Chemother 2003;9:35–9. PMID:12673405 https://doi.org/10.1007/s10156-002-0204-8

856. Unemo M, Golparian D, Hestner A. Ceftriaxone treatment failure of pharyngeal gonorrhoea verified by international recommendations, Sweden, July 2010. Euro Surveill 2011;16:19792. PMID:21329645

857. Unemo M, Golparian D, Syversen G, Vestrheim DF, Moi H. Two cases of verified clinical failures using internationally recommended first-line cefixime for gonorrhoea treatment, Norway, 2010. Euro Surveill 2010;15:19721. PMID:21144442 https://doi.org/10.2807/ese.15.47.19721-en

858. Unemo M, Golparian D, Potočnik M, Jeverica S. Treatment failure of pharyngeal gonorrhoea with internationally recommended first-line ceftriaxone verified in Slovenia, September 2011. Euro Surveill 2012;17:20200. PMID:22748003

859. Ison CA, Hussey J, Sankar KN, Evans J, Alexander S. Gonorrhoea treatment failures to cefixime and azithromycin in England, 2010. Euro Surveill 2011;16:19833. PMID:21492528

860. Forsyth S, Penney P, Rooney G. Cefixime-resistant *Neisseria gonorrhoeae* in the UK: a time to reflect on practice and recommendations. Int J STD AIDS 2011;22:296–7. PMID:21571983 https://doi.org/10.1258/ijsa.2009.009191

861. Lewis DA, Sriruttan C, Müller EE, et al. Phenotypic and genetic characterization of the first two cases of extended-spectrum-cephalosporin-resistant *Neisseria gonorrhoeae* infection in South Africa and association with cefixime treatment failure. J Antimicrob Chemother 2013;68:1267–70. PMID:23416957 https://doi.org/10.1093/jac/dkt034

862. Ota KV, Fisman DN, Tamari IE, et al. Incidence and treatment outcomes of pharyngeal *Neisseria gonorrhoeae* and *Chlamydia trachomatis* infections in men who have sex with men: a 13-year retrospective cohort study. Clin Infect Dis 2009;48:1237–43. PMID:19323630 https://doi.org/10.1086/597586

863. Allen VG, Mitterni L, Seah C, et al. *Neisseria gonorrhoeae* treatment failure and susceptibility to cefixime in Toronto, Canada. JAMA 2013;309:163–70. PMID:23299608 https://doi.org/10.1001/jama.2012.176575

864. Chen MY, Stevens K, Tideman R, et al. Failure of 500 mg of ceftriaxone to eradicate pharyngeal gonorrhoea, Australia. J Antimicrob Chemother 2013;68:1445–7. PMID:23390207 https://doi.org/10.1093/jac/dkt017

865. Tapsall J, Read P, Carmody C, et al. Two cases of failed ceftriaxone treatment in pharyngeal gonorrhoea verified by molecular microbiological methods. J Med Microbiol 2009;58:683–7. PMID:19369534 https://doi.org/10.1099/jmm.0.007641-0

866. Ohnishi M, Saika T, Hoshina S, et al. Ceftriaxone-resistant *Neisseria gonorrhoeae*, Japan. Emerg Infect Dis 2011;17:148–9. PMID:21192886 https://doi.org/10.3201/eid1701.100397

867. Unemo M, Golparian D, Nicholas R, Ohnishi M, Gallay A, Sednaoui P. High-level cefixime- and ceftriaxone-resistant *Neisseria gonorrhoeae* in France: novel penA mosaic allele in a successful international clone causes treatment failure. Antimicrob Agents Chemother 2012;56:1273–80. PMID:22155830 https://doi.org/10.1128/AAC.05760-11

868. CDC. Update to CDC's sexually transmitted diseases treatment guidelines, 2010: oral cephalosporins no longer a recommended treatment for gonococcal infections. MMWR Morb Mortal Wkly Rep 2012;61:590–4. PMID:22874837

869. Wind CM, de Vries E, Schim van der Loeff MF, et al. Decreased azithromycin susceptibility of *Neisseria gonorrhoeae* isolates in patients recently treated with azithromycin. Clin Infect Dis 2017;65:37–45. PMID:28510723 https://doi.org/10.1093/cid/cix249

870. Kong FYS, Horner P, Unemo M, Hocking JS. Pharmacokinetic considerations regarding the treatment of bacterial sexually transmitted infections with azithromycin: a review. J Antimicrob Chemother 2019;74:1157–66. PMID:30649333 https://doi.org/10.1093/jac/dky548

871. CDC. Antibiotic resistance threats in the United States, 2019. Atlanta, GA: US Department of Health and Human Services, CDC; 2019. https://www.cdc.gov/drugresistance/pdf/threats-report/2019-ar-threats-report-508.pdf

872. St Cyr S, Barbee L, Workowski KA, et al. Update to CDC's treatment guidelines for gonococcal infection, 2020. MMWR Morb Mortal Wkly Rep 2020;69:1911–6. PMID:33332296 https://doi.org/10.15585/mmwr.mm6950a6

873. Clinical and Laboratory Standards Institute. Performance standards for antimicrobial susceptibility testing: twentieth informational supplement. Clinical and Laboratory Standards Institute document M100-S20. Wayne, PA: Clinical and Laboratory Standards Institute; 2010.

874. CDC. Cephalosporin-resistant *Neisseria gonorrhoeae* public health response plan. Atlanta, GA: US Department of Health and Human Services, CDC; 2012. https://www.cdc.gov/std/treatment/Ceph-R-ResponsePlanJuly30-2012.pdf

875. Poncin T, Merimeche M, Braille A, et al. Two cases of multidrug-resistant *Neisseria gonorrhoeae* related to travel in south-eastern Asia, France, June 2019. Euro Surveill 2019;24:1900528. PMID:31507264 https://doi.org/10.2807/1560-7917.ES.2019.24.36.1900528

876. Carnicer-Pont D, Smithson A, Fina-Homar E, Bastida MT; Gonococcus Antimicrobial Resistance Surveillance Working Group. First cases of *Neisseria gonorrhoeae* resistant to ceftriaxone in Catalonia, Spain, May 2011. Enferm Infecc Microbiol Clin 2012;30:218–9. PMID:22244992 https://doi.org/10.1016/j.eimc.2011.11.010

877. Cámara J, Serra J, Ayats J, et al. Molecular characterization of two high-level ceftriaxone-resistant *Neisseria gonorrhoeae* isolates detected in Catalonia, Spain. J Antimicrob Chemother 2012;67:1858–60. PMID:22566592 https://doi.org/10.1093/jac/dks162

878. Eyre DW, Sanderson ND, Lord E, et al. Gonorrhoea treatment failure caused by a *Neisseria gonorrhoeae* strain with combined ceftriaxone and high-level azithromycin resistance, England, February 2018. Euro Surveill 2018;23:1800323. PMID:29991383 https://doi.org/10.2807/1560-7917.ES.2018.23.27.1800323

879. Fifer H, Hughes G, Whiley D, Lahra MM. Lessons learnt from ceftriaxone-resistant gonorrhoea in the UK and Australia. Lancet Infect Dis 2020;20:276–8. PMID:32112753 https://doi.org/10.1016/S1473-3099(20)30055-4

880. Chisholm SA, Mouton JW, Lewis DA, Nichols T, Ison CA, Livermore DM. Cephalosporin MIC creep among gonococci: time for a pharmacodynamic rethink? J Antimicrob Chemother 2010;65:2141–8. PMID:20693173 https://doi.org/10.1093/jac/dkq289

881. Connolly KL, Eakin AE, Gomez C, Osborn BL, Unemo M, Jerse AE. Pharmacokinetic data are predictive of in vivo efficacy for cefixime and ceftriaxone against susceptible and resistant *Neisseria gonorrhoeae* strains in the gonorrhea mouse model. Antimicrob Agents Chemother 2019;63:e01644-18. PMID:30642924 https://doi.org/10.1128/AAC.01644-18

882. Blondeau JM, Hansen G, Metzler K, Hedlin P. The role of PK/PD parameters to avoid selection and increase of resistance: mutant prevention concentration. J Chemother 2004;16(Suppl 3):1–19. PMID:15334827 https://doi.org/10.1080/1120009X.2004.11782371

883. Moran JS, Levine WC. Drugs of choice for the treatment of uncomplicated gonococcal infections. Clin Infect Dis 1995;20(Suppl 1):S47–65. PMID:7795109 https://doi.org/10.1093/clinids/20.Supplement_1.S47

854. Lo JY, Ho KM, Leung AO, et al.头孢布烯耐药与淋病奈瑟菌感染治疗失败。Antimicrob Agents Chemother 2008;52:3564-7. PMID:18663018 https://doi.org/10.1128/ AAC.00198-08

855. Deguchi T, Yasuda M, Yokoi S, et al.间隔6小时双倍剂量200 mg头孢克肟治疗无并发症淋球菌性尿道炎。J Infect Chemother 2003;9:35-9. PMID:12673405 https:// doi.org/10.1007/s10156-002-0204-8

856. Unemo M, Golparian D, Hestner A.经国际建议证实的咽部淋病头孢曲松治疗失败，瑞典，2010年7月。Euro Surveill 2011;16:19792. PMID:21329645

857. Unemo M, Golparian D, Syversen G, Vestrheim DF, Moi H.2010年挪威两例使用国际推荐一线cefixime治疗淋病经证实的临床失败病例。Euro Surveill 2010;15:19721. PMID:21144442 https://doi.org/10.2807/ese.15.47.19721-en

858. Unemo M, Golparian D, Potočnik M, Jeverica S.2011年9月斯洛文尼亚经证实的咽部淋病使用国际推荐一线ceftriaxone治疗失败。Euro Surveill 2012;17:20200. PMID:22748003

859. Ison CA, Hussey J, Sankar KN, Evans J, Alexander S.2010年英格兰cefixime和azithromycin治疗淋病失败。Euro Surveill 2011;16:19833. PMID:21492528

860. Forsyth S, Penney P, Rooney G.英国cefixime耐药*Neisseria gonorrhoeae*：反思实践与推荐意见的时刻。Int J STD AIDS 2011;22:296-7. PMID:21571983 https://doi.org/10.1258/ ijsa.2009.009191

861. Lewis DA, Sriruttan C, Müller EE, et al.南非首两例超广谱头孢菌素耐药*Neisseria gonorrhoeae*感染的表型与基因特征及其与cefixime治疗失败的关联。J Antimicrob Chemother 2013;68:1267-70. PMID:23416957 https:// doi.org/10.1093/jac/dkt034

862. Ota KV, Fisman DN, Tamari IE, et al.男男性行为人群咽部*Neisseria gonorrhoeae*和*Chlamydia trachomatis*感染的发病率及治疗结局：一项13年回顾性队列研究。Clin Infect Dis 2009;48:1237-43. PMID:19323630 https://doi.org/10.1086/597586

863. Allen VG, Mitterni L, Seah C, et al.加拿大Toronto的*Neisseria gonorrhoeae*治疗失败及cefixime敏感性。JAMA 2013;309:163-70. PMID:23299608 https://doi.org/10.1001/ jama.2012.176575

864. Chen MY, Stevens K, Tideman R, et al.澳大利亚500 mg ceftriaxone未能清除咽部淋病。J Antimicrob Chemother 2013;68:1445-7. PMID:23390207 https://doi.org/10.1093/jac/ dkt017

865. Tapsall J, Read P, Carmody C, et al.经分子微生物学方法证实的两例咽部淋病ceftriaxone治疗失败。J Med Microbiol 2009;58:683-7. PMID:19369534 https://doi.org/10.1099/jmm.0.007641-0

866. Ohnishi M, Saika T, Hoshina S ， 等. 对头孢曲松耐药的金黄色葡萄球菌，日本. 新发传染病 2011;17:148-9. PMID:21192886 https://doi.org/10.3201/eid1701.100397

867. Unemo M, Golparian D, Nicholas R, Ohnishi M, Gallay A, Sednaoui P.法国高水平cefixime和ceftriaxone耐药*Neisseria gonorrhoeae*：成功国际克隆中新型penA镶嵌等位基因导致治疗失败。Antimicrob Agents Chemother 2012;56:1273-

868. 80. PMID:22155830 https://doi.org/10.1128/AAC.05760-11
CDC.CDC性传播疾病治疗指南2010年更新：口服头孢菌素不再推荐用于淋球菌感染治疗。MMWR Morb Mortal Wkly Rep 2012;61:590-4. PMID:22874837

869. Wind CM, de Vries E, Schim van der Loeff MF, et al.近期接受azithromycin治疗患者中*Neisseria gonorrhoeae*分离株对azithromycin敏感性降低。Clin Infect Dis 2017;65:37-45. PMID:28510723 https://doi.org/10.1093/cid/cix249

870. Kong FYS, Horner P, Unemo M, Hocking JS.关于使用azithromycin治疗细菌性性传播感染的药代动力学考量：综述。J Antimicrob Chemother 2019;74:1157-66. PMID:30649333 https:// doi.org/10.1093/jac/ dky548

871. CDC.2019年美国抗生素耐药威胁。Atlanta, GA: US Department of Health and Human Services, CDC; 2019. https://www.cdc.gov/ drugresistance/pdf/threats-report/2019-ar- threats-report-508.pdf

872. St Cyr S, Barbee L, Workowski KA, et al.CDC淋球菌感染治疗指南2020年更新。MMWR Morb Mortal Wkly Rep 2020;69:1911-6. PMID:33332296 https://doi.org/10.15585/ mmwr.mm6950a6

873. Clinical and Laboratory Standards Institute.抗菌药物敏感性试验性能标准：第二十版信息补充。Clinical and Laboratory Standards Institute document M100-S20. Wayne, PA: Clinical and Laboratory Standards Institute; 2010.

874. CDC.头孢菌素耐药*Neisseria gonorrhoeae*公共卫生应对计划。Atlanta, GA: US Department of Health and Human Services, CDC; 2012. https:// www.cdc.gov/std/treatment/Ceph-R- ResponsePlanJuly30-2012.pdf

875. Poncin T, Merimeche M, Braille A, et al.2019年6月法国两例与东南亚旅行相关的多重耐药*Neisseria gonorrhoeae*。Euro Surveill 2019;24:1900528. PMID:31507264 https:// doi.org/10.2807/1560-7917.ES.2019.24.36.1900528

876. Carnicer-Pont D, Smithson A, Fina-Homar E, Bastida MT；淋球菌抗菌药物耐药监测工作组。西班牙加泰罗尼亚首例对头孢曲松耐药的淋病奈瑟菌，2011年5月。Enferm Infecc Microbiol Clin 2012;30:218-9。PMID:22244992 https://doi.org/10.1016/j.eimc.2011.11.010

877. Cámara J, Serra J, Ayats J, et al.西班牙Catalonia检测到的两株高水平ceftriaxone耐药*Neisseria gonorrhoeae*分离株的分子特征。J Antimicrob Chemother 2012;67:1858-60. PMID:22566592 https:// doi.org/10.1093/jac/dks162

878. Eyre DW, Sanderson ND, Lord E, et al.2018年2月英格兰由同时具有ceftriaxone耐药和高水平azithromycin耐药的*Neisseria gonorrhoeae*菌株引起的淋病治疗失败。Euro Surveill 2018;23:1800323. PMID:29991383 https://doi.org/10.2807/1560-7917.ES.2018.23.27.1800323

879. Fifer H, Hughes G, Whiley D, Lahra MM.从英国和澳大利亚ceftriaxone耐药淋病中汲取的教训。Lancet Infect Dis 2020;20:276-8. PMID:32112753 https://doi.org/10.1016/ S1473-3099(20) 30055-4

880. Chisholm SA, Mouton JW, Lewis DA, Nichols T, Ison CA, Livermore DM.淋球菌中头孢菌素MIC漂移：是时候重新思考药效学了?J Antimicrob Chemother 2010;65:2141-8. PMID:20693173 https:// doi.org/10.1093/jac/dkq289

881. Connolly KL, Eakin AE, Gomez C, Osborn BL, Unemo M, Jerse AE. 药代动力学数据可预测cefixime和ceftriaxone在淋病小鼠模型中对敏感和耐药*Neisseria gonorrhoeae*菌株的体内疗效。Antimicrob Agents Chemother 2019;63:e01644-18. PMID:30642924 https:// doi.org/10.1128/ AAC.01644-18

882. Blondeau JM, Hansen G, Metzler K, Hedlin P.PK/PD参数在避免耐药选择与增加中的作用：突变预防浓度。J Chemother 2004;16(Suppl 3): 1-19. PMID:15334827 https://doi.org/10.1080/1120009X.2004.11782371

883. Moran JS, Levine WC.无并发症淋球菌感染治疗的首选药物。Clin Infect Dis 1995;20(Suppl 1): S47-65. PMID:7795109 https:// doi.org/10.1093/clinids/20. Supplement_1.S47

884. Unemo M, Golparian D, Eyre DW. Antimicrobial resistance in *Neisseria gonorrhoeae* and treatment of gonorrhea. Methods Mol Biol 2019;1997:37–58. PMID:31119616 https://doi.org/10.1007/978-1-4939-9496-0_3
885. Kirkcaldy RD, Weinstock HS, Moore PC, et al. The efficacy and safety of gentamicin plus azithromycin and gemifloxacin plus azithromycin as treatment of uncomplicated gonorrhea. Clin Infect Dis 2014;59:1083–91. PMID:25031289 https://doi.org/10.1093/cid/ciu521
886. Ross JDC, Brittain C, Cole M, et al.; G-ToG trial team. Gentamicin compared with ceftriaxone for the treatment of gonorrhoea (G-ToG): a randomised non-inferiority trial. Lancet 2019;393:2511–20. PMID:31056291 https://doi.org/10.1016/S0140-6736(18)32817-4
887. Singh V, Bala M, Bhargava A, Kakran M, Bhatnagar R. In vitro efficacy of 21 dual antimicrobial combinations comprising novel and currently recommended combinations for treatment of drug resistant gonorrhoea in future era. PLoS One 2018;13:e0193678. PMID:29509792 https://doi.org/10.1371/journal.pone.0193678
888. Mayer KH, Klausner JD, Handsfield HH. Intersecting epidemics and educable moments: sexually transmitted disease risk assessment and screening in men who have sex with men. Sex Transm Dis 2001;28:464–7. PMID:11473219 https://doi.org/10.1097/00007435-200108000-00008
889. Linhart Y, Shohat T, Amitai Z, et al. Sexually transmitted infections among brothel-based sex workers in Tel-Aviv area, Israel: high prevalence of pharyngeal gonorrhoea. Int J STD AIDS 2008;19:656–9. PMID:18824615 https://doi.org/10.1258/ijsa.2008.008127
890. Johnson Jones ML, Chapin-Bardales J, Bizune D, et al.; National HIV Behavioral Surveillance Sexually Transmitted Infection Study Group. Extragenital chlamydia and gonorrhea among community venue-attending men who have sex with men—five cities, United States, 2017. MMWR Morb Mortal Wkly Rep 2019;68:321–5. PMID:30973847 https://doi.org/10.15585/mmwr.mm6814a1
891. Chow EP, Williamson DA, Fortune R, et al. Prevalence of genital and oropharyngeal chlamydia and gonorrhoea among female sex workers in Melbourne, Australia, 2015–2017: need for oropharyngeal testing. Sex Transm Infect 2019;95:398–401. PMID:31113904 https://doi.org/10.1136/sextrans-2018-053957
892. Cornelisse VJ, Williamson D, Zhang L, et al. Evidence for a new paradigm of gonorrhoea transmission: cross-sectional analysis of *Neisseria gonorrhoeae* infections by anatomical site in both partners in 60 male couples. Sex Transm Infect 2019;95:437–42. PMID:30996106 https://doi.org/10.1136/sextrans-2018-053803
893. Kissinger PJ, Reilly K, Taylor SN, Leichliter JS, Rosenthal S, Martin DH. Early repeat *Chlamydia trachomatis* and *Neisseria gonorrhoeae* infections among heterosexual men. Sex Transm Dis 2009;36:498–500. PMID:19617870 https://doi.org/10.1097/OLQ.0b013e3181a4d147
894. Berenger BM, Demczuk W, Gratrix J, Pabbaraju K, Smyczek P, Martin I. Genetic characterization and enhanced surveillance of ceftriaxone-resistant *Neisseria gonorrhoeae* strain, Alberta, Canada, 2018. Emerg Infect Dis 2019;25:1660–7. PMID:31407661 https://doi.org/10.3201/eid2509.190407
895. Rob F, Klubalová B, Nyčová E, Hercogová J, Unemo M. Gentamicin 240 mg plus azithromycin 2 g vs. ceftriaxone 500 mg plus azithromycin 2 g for treatment of rectal and pharyngeal gonorrhoea: a randomized controlled trial. Clin Microbiol Infect 2020;26:207–12. PMID:31419483 https://doi.org/10.1016/j.cmi.2019.08.004
896. Romano A, Gaeta F, Valluzzi RL, Caruso C, Rumi G, Bousquet PJ. IgE-mediated hypersensitivity to cephalosporins: cross-reactivity and tolerability of penicillins, monobactams, and carbapenems. J Allergy Clin Immunol 2010;126:994–9. PMID:20888035 https://doi.org/10.1016/j.jaci.2010.06.052
897. American College of Obstetricians and Gynecologists' Committee on Obstetric Practice. Committee opinion No. 717: sulfonamides, nitrofurantoin, and risk of birth defects. Obstet Gynecol 2017;130:e150–2. PMID:28832488 https://doi.org/10.1097/AOG.0000000000002300
898. Haimovici R, Roussel TJ. Treatment of gonococcal conjunctivitis with single-dose intramuscular ceftriaxone. Am J Ophthalmol 1989;107:511–4. PMID:2496606 https://doi.org/10.1016/0002-9394(89)90495-9
899. Bleich AT, Sheffield JS, Wendel GD Jr, Sigman A, Cunningham FG. Disseminated gonococcal infection in women. Obstet Gynecol 2012;119:597–602. PMID:22353959 https://doi.org/10.1097/AOG.0b013e318244eda9
900. Belkacem A, Caumes E, Ouanich J, et al.; Working Group FRA-DGI. Changing patterns of disseminated gonococcal infection in France: cross-sectional data 2009–2011. Sex Transm Infect 2013;89:613–5. PMID:23920397 https://doi.org/10.1136/sextrans-2013-051119
901. Birrell JM, Gunathilake M, Singleton S, Williams S, Krause V. Characteristics and impact of disseminated gonococcal infection in the "Top End" of Australia. Am J Trop Med Hyg 2019;101:753–60. PMID:31392956 https://doi.org/10.4269/ajtmh.19-0288
902. Crew PE, Abara WE, McCulley L, et al. Disseminated gonococcal infections in patients receiving eculizumab: a case series. Clin Infect Dis 2019;69:596–600. PMID:30418536 https://doi.org/10.1093/cid/ciy958
903. Curry SJ, Krist AH, Owens DK, et al.; US Preventive Services Task Force. Ocular prophylaxis for gonococcal ophthalmia neonatorum: US Preventive Services Task Force reaffirmation recommendation statement. JAMA 2019;321:394–8. PMID:30694327 https://doi.org/10.1001/jama.2018.21367
904. Kreisel K, Weston E, Braxton J, Llata E, Torrone E. Keeping an eye on chlamydia and gonorrhea conjunctivitis in infants in the United States, 2010–2015. Sex Transm Dis 2017;44:356–8. PMID:28499285 https://doi.org/10.1097/OLQ.0000000000000613
905. Scott WJ, Eck CD. Povidone-iodine and ophthalmia neonatorum. Ophthalmology 2012;119:653–4. PMID:22385492 https://doi.org/10.1016/j.ophtha.2011.11.037
906. David M, Rumelt S, Weintraub Z. Efficacy comparison between povidone iodine 2.5% and tetracycline 1% in prevention of ophthalmia neonatorum. Ophthalmology 2011;118:1454–8. PMID:21439642 https://doi.org/10.1016/j.ophtha.2010.12.003
907. Binenbaum G, Bruno CJ, Forbes BJ, et al. Periocular ulcerative dermatitis associated with gentamicin ointment prophylaxis in newborns. J Pediatr 2010;156:320–1. PMID:20105641 https://doi.org/10.1016/j.jpeds.2009.11.060
908. Nathawad R, Mendez H, Ahmad A, et al. Severe ocular reactions after neonatal ocular prophylaxis with gentamicin ophthalmic ointment. Pediatr Infect Dis J 2011;30:175–6. PMID:20885334 https://doi.org/10.1097/INF.0b013e3181f6c2e5
909. Taylor-Robinson D, Jensen JS. *Mycoplasma genitalium*: from chrysalis to multicolored butterfly. Clin Microbiol Rev 2011;24:498–514. PMID:21734246 https://doi.org/10.1128/CMR.00006-11
910. Seña AC, Lensing S, Rompalo A, et al. *Chlamydia trachomatis, Mycoplasma genitalium*, and *Trichomonas vaginalis* infections in men with nongonococcal urethritis: predictors and persistence after therapy. J Infect Dis 2012;206:357–65. PMID:22615318 https://doi.org/10.1093/infdis/jis356
911. Huppert JS, Mortensen JE, Reed JL, Kahn JA, Rich KD, Hobbs MM. *Mycoplasma genitalium* detected by transcription-mediated amplification is associated with *Chlamydia trachomatis* in adolescent women. Sex Transm Dis 2008;35:250–4. PMID:18490867 https://doi.org/10.1097/OLQ.0b013e31815abac6

884. Unemo M, Golparian D, Eyre DW.*Neisseria gonorrhoeae*的抗菌药物耐药与淋病治疗。Methods Mol Biol 2019;1997:37-58. PMID:31119616 https://doi.org/10.1007/978-1-4939-9496-0_3
885. Kirkcaldy RD, Weinstock HS, Moore PC, et al.gentamicin联合azithromycin与gemifloxacin联合azithromycin治疗无并发症淋病的疗效与安全性。Clin Infect Dis 2014;59:1083-91. PMID:25031289 https://doi.org/10.1093/ cid/ciu521
886. Ross JDC, Brittain C, Cole M, et al.; G-ToG trial team.Gentamicin与ceftriaxone治疗淋病的比较(G-ToG)：一项随机非劣效性试验。Lancet 2019;393:2511-20. PMID:31056291 https://doi.org/10.1016/S0140-6736(18) 32817-4
887. Singh V, Bala M, Bhargava A, Kakran M, Bhatnagar R.21种双重抗菌药物组合的体外疗效，包括新型和目前推荐的组合，用于未来时代耐药淋病的治疗。PLoS One 2018;13:e0193678. PMID:29509792 https://doi.org/10.1371/journal.pone.0193678
888. Mayer KH, Klausner JD, Handsfield HH.交叉流行病与可教育时刻：男男性行为人群中的性传播疾病风险评估和筛查。Sex Transm Dis 2001;28:464-7. PMID:11473219 https://doi.org/10.1097/00007435-200108000-00008
889. Linhart Y, Shohat T, Amitai Z, et al.以色列特拉维夫地区妓院性工作者中的性传播感染：咽部淋病高流行率。Int J STD AIDS 2008;19:656-9. PMID:18824615 https://doi.org/10.1258/ijsa.2008.008127
890. Johnson Jones ML, Chapin-Bardales J, Bizune D, et al.; National HIV Behavioral Surveillance Sexually Transmitted Infection Study Group.社区场所参加的男男性行为人群中的生殖器外衣原体和淋病--美国五个城市，2017年。MMWR Morb Mortal Wkly Rep 2019;68:321-5. PMID:30973847 https://doi.org/10.15585/mmwr.mm6814a1
891. Chow EP, Williamson DA, Fortune R, et al.澳大利亚墨尔本女性性工作者中生殖器和口咽部衣原体和淋病的流行率，2015-2017：口咽部检测的需求。Sex Transm Infect 2019;95:398-401. PMID:31113904 https://doi.org/10.1136/sextrans-2018-053957
892. Cornelisse VJ, Williamson D, Zhang L, et al.淋病传播新范式的证据：60对男性伴侣中双方按解剖部位淋病奈瑟菌感染的横断面分析。Sex Transm Infect 2019;95:437-42. PMID:30996106 https://doi.org/10.1136/sextrans-2018-053803
893. Kissinger PJ, Reilly K, Taylor SN, Leichliter JS, Rosenthal S, Martin DH.异性恋男性中早期重复沙眼衣原体和淋病奈瑟菌感染。Sex Transm Dis 2009;36:498-500. PMID:19617870 https://doi.org/10.1097/OLQ.0b013e3181a4d147
894. Berenger BM, Demczuk W, Gratrix J, Pabbaraju K, Smyczek P, Martin I.头孢曲松耐药淋病奈瑟菌菌株的遗传特征和增强监测，加拿大阿尔伯塔，2018年。Emerg Infect Dis 2019;25:1660-7. PMID:31407661 https://doi.org/10.3201/eid2509.190407
895. Rob F, Klubalová B, Nyčová E, Hercogová J, Unemo M.庆大霉素240 mg加阿奇霉素2 g vs.头孢曲松500 mg加阿奇霉素2 g治疗直肠和咽部淋病：一项随机对照试验。Clin Microbiol Infect 2020;26:207-12. PMID:31419483 https://doi.org/10.1016/j.cmi.2019.08.004
896. Romano A, Gaeta F, Valluzzi RL, Caruso C, Rumi G, Bousquet PJ.IgE介导的头孢菌素超敏反应：青霉素类、单环内酰胺类和碳青霉烯类的交叉反应性与耐受性。J Allergy Clin Immunol 2010;126:994-9. PMID:20888035 https://doi.org/10.1016/j.jaci.2010.06.052
897. 美国妇产科医师学会产科实践委员会。委员会意见第717号：磺胺类药物、呋喃妥因与出生缺陷风险。Obstet Gynecol 2017;130:e150-2. PMID:28832488 https://doi.org/10.1097/ AOG.0000000000002300
898. Haimovici R, Roussel TJ.单剂肌内注射ceftriaxone治疗淋球菌性结膜炎。Am J Ophthalmol 1989;107:511-4. PMID:2496606 https://doi.org/10.1016/0002-9394(89) 90495-9
899. Bleich AT, Sheffield JS, Wendel GD Jr, Sigman A, Cunningham FG.女性播散性淋球菌感染。Obstet Gynecol 2012;119:597-602. PMID:22353959 https://doi.org/10.1097/ AOG.0b013e318244eda9
900. Belkacem A, Caumes E, Ouanich J, et al.; Working Group FRA-DGI.法国播散性淋球菌感染模式的变化：2009-2011年横断面数据。Sex Transm Infect 2013;89:613-5. PMID:23920397 https://doi.org/10.1136/sextrans-2013-051119
901. Birrell JM, Gunathilake M, Singleton S, Williams S, Krause V.澳大利亚"Top End"地区播散性淋球菌感染的特征与影响。Am J Trop Med Hyg 2019;101:753-60. PMID:31392956 https://doi.org/10.4269/ajtmh.19-0288
902. Crew PE, Abara WE, McCulley L, et al.接受eculizumab治疗患者的播散性淋球菌感染：病例系列。Clin Infect Dis 2019;69:596-600. PMID:30418536 https://doi.org/10.1093/cid/ ciy958
903. Curry SJ, Krist AH, Owens DK, et al.; US Preventive Services Task Force.新生儿淋球菌性眼炎的眼部预防：US Preventive Services Task Force重申推荐声明。JAMA 2019;321:394-8. PMID:30694327 https://doi.org/10.1001/jama.2018.21367
904. Kreisel K, Weston E, Braxton J, Llata E, Torrone E.关注美国婴儿衣原体和淋病性结膜炎，2010-2015年。Sex Transm Dis 2017;44:356-8. PMID:28499285 https://doi.org/10.1097/OLQ.0000000000000613
905. Scott WJ, Eck CD.聚维酮碘与新生儿眼炎。Ophthalmology 2012;119:653-4. PMID:22385492 https://doi.org/10.1016/j.ophtha.2011.11.037
906. David M, Rumelt S, Weintraub Z.2.5%聚维酮碘与1%四环素预防新生儿眼炎的疗效比较。Ophthalmology 2011;118:1454-8. PMID:21439642 https://doi.org/10.1016/j.ophtha.2010.12.003
907. Binenbaum G, Bruno CJ, Forbes BJ, et al.新生儿gentamicin软膏预防相关的眶周溃疡性皮炎。J Pediatr 2010;156:320-1. PMID:20105641 https://doi.org/10.1016/j.jpeds.2009.11.060
908. Nathawad R, Mendez H, Ahmad A, et al.新生儿眼部预防使用gentamicin眼膏后严重眼部反应。Pediatr Infect Dis J 2011;30:175-6. PMID:20885334 https://doi.org/10.1097/INF.0b013e3181f6c2e5
909. Taylor-Robinson D, Jensen JS. 生殖支原体：从蛹到多彩蝴蝶. 临床微生物学评论 2011;24:498-514. PMID:21734246 https://doi.org/10.1128/CMR.00006-11
910. Seña AC, Lensing S, Rompalo A, et al.非淋球菌性尿道炎男性中*Chlamydia trachomatis*、*Mycoplasma genitalium*和*Trichomonas vaginalis*感染：预测因素及治疗后持续存在。J Infect Dis 2012;206:357-65. PMID:22615318 https://doi.org/10.1093/infdis/jis356
911. Huppert JS, Mortensen JE, Reed JL, Kahn JA, Rich KD, Hobbs MM.通过转录介导扩增检测到的*Mycoplasma genitalium*与青少年女性*Chlamydia trachomatis*相关。Sex Transm Dis 2008;35:250-4. PMID:18490867 https://doi.org/10.1097/ OLQ.0b013e31815abac6

912. Mena L, Wang X, Mroczkowski TF, Martin DH. *Mycoplasma genitalium* infections in asymptomatic men and men with urethritis attending a sexually transmitted diseases clinic in New Orleans. Clin Infect Dis 2002;35:1167–73. PMID:12410476 https://doi.org/10.1086/343829
913. Falk L. The overall agreement of proposed definitions of mucopurulent cervicitis in women at high risk of Chlamydia infection. Acta Derm Venereol 2010;90:506–11. PMID:20814628 https://doi.org/10.2340/00015555-0924
914. Anagrius C, Loré B, Jensen JS. *Mycoplasma genitalium*: prevalence, clinical significance, and transmission. Sex Transm Infect 2005;81:458–62. PMID:16326846 https://doi.org/10.1136/sti.2004.012062
915. Manhart LE, Critchlow CW, Holmes KK, et al. Mucopurulent cervicitis and *Mycoplasma genitalium*. J Infect Dis 2003;187:650–7. PMID:12599082 https://doi.org/10.1086/367992
916. Lusk MJ, Konecny P, Naing ZW, Garden FL, Cumming RG, Rawlinson WD. *Mycoplasma genitalium* is associated with cervicitis and HIV infection in an urban Australian STI clinic population. Sex Transm Infect 2011;87:107–9. PMID:21071566 https://doi.org/10.1136/sti.2010.045138
917. Dehon PM, McGowin CL. The immunopathogenesis of *Mycoplasma genitalium* infections in women: a narrative review. Sex Transm Dis 2017;44:428–32. PMID:28608793 https://doi.org/10.1097/OLQ.0000000000000621
918. Bjartling C, Osser S, Persson K. The association between *Mycoplasma genitalium* and pelvic inflammatory disease after termination of pregnancy. BJOG 2010;117:361–4. PMID:20015303 https://doi.org/10.1111/j.1471-0528.2009.02455.x
919. Bjartling C, Osser S, Persson K. *Mycoplasma genitalium* in cervicitis and pelvic inflammatory disease among women at a gynecologic outpatient service. Am J Obstet Gynecol 2012;206:476.e1–8. PMID:22483084 https://doi.org/10.1016/j.ajog.2012.02.036
920. Taylor BD, Zheng X, O'Connell CM, Wiesenfeld HC, Hillier SL, Darville T. Risk factors for *Mycoplasma genitalium* endometritis and incident infection: a secondary data analysis of the T cell Response Against Chlamydia (TRAC) Study. Sex Transm Infect 2018;94:414–20. PMID:29563165 https://doi.org/10.1136/sextrans-2017-053376
921. Cohen CR, Mugo NR, Astete SG, et al. Detection of *Mycoplasma genitalium* in women with laparoscopically diagnosed acute salpingitis. Sex Transm Infect 2005;81:463–6. PMID:16326847 https://doi.org/10.1136/sti.2005.015701
922. Haggerty CL, Totten PA, Astete SG, Ness RB. *Mycoplasma genitalium* among women with nongonococcal, nonchlamydial pelvic inflammatory disease. Infect Dis Obstet Gynecol 2006;2006:30184. PMID:17485798 https://doi.org/10.1155/IDOG/2006/30184
923. Short VL, Totten PA, Ness RB, Astete SG, Kelsey SF, Haggerty CL. Clinical presentation of *Mycoplasma genitalium* infection versus *Neisseria gonorrhoeae* infection among women with pelvic inflammatory disease. Clin Infect Dis 2009;48:41–7. PMID:19025498 https://doi.org/10.1086/594123
924. Simms I, Eastick K, Mallinson H, et al. Associations between *Mycoplasma genitalium, Chlamydia trachomatis*, and pelvic inflammatory disease. Sex Transm Infect 2003;79:154–6. PMID:12690141 https://doi.org/10.1136/sti.79.2.154
925. Oakeshott P, Aghaizu A, Hay P, et al. Is *Mycoplasma genitalium* in women the "New Chlamydia?" A community-based prospective cohort study. Clin Infect Dis 2010;51:1160–6. PMID:20942656 https://doi.org/10.1086/656739
926. Wiesenfeld HC, Hillier SL, Meyn L, et al. *Mycoplasma genitalium*—is it a pathogen in acute pelvic inflammatory disease (PID)? Sex Transm Infect 2013;89(Suppl 1):A34. https://doi.org/10.1136/sextrans-2013-051184.0106
927. Møller BR, Taylor-Robinson D, Furr PM, Freundt EA. Acute upper genital-tract disease in female monkeys provoked experimentally by *Mycoplasma genitalium*. Br J Exp Pathol 1985;66:417–26. PMID:4027175
928. Wiesenfeld HC, Manhart LE. *Mycoplasma genitalium* in women: current knowledge and research priorities for this recently emerged pathogen. J Infect Dis 2017;216(suppl_2):S389–95.
929. Clausen HF, Fedder J, Drasbek M, et al. Serological investigation of *Mycoplasma genitalium* in infertile women. Hum Reprod 2001;16:1866–74. PMID:11527890 https://doi.org/10.1093/humrep/16.9.1866
930. Svenstrup HF, Fedder J, Kristoffersen SE, Trolle B, Birkelund S, Christiansen G. *Mycoplasma genitalium, Chlamydia trachomatis*, and tubal factor infertility—a prospective study. Fertil Steril 2008;90:513–20. PMID:17548070 https://doi.org/10.1016/j.fertnstert.2006.12.056
931. Idahl A, Jurstrand M, Olofsson JI, Fredlund H. *Mycoplasma genitalium* serum antibodies in infertile couples and fertile women. Sex Transm Infect 2015;91:589–91. PMID:25921018 https://doi.org/10.1136/sextrans-2015-052011
932. Edwards RK, Ferguson RJ, Reyes L, Brown M, Theriaque DW, Duff P. Assessing the relationship between preterm delivery and various microorganisms recovered from the lower genital tract. J Matern Fetal Neonatal Med 2006;19:357–63. PMID:16801313 https://doi.org/10.1080/00207170600712071
933. Vandepitte J, Bukenya J, Hughes P, et al. Clinical characteristics associated with *Mycoplasma genitalium* infection among women at high risk of HIV and other STI in Uganda. Sex Transm Dis 2012;39:487–91. PMID:22592838 https://doi.org/10.1097/OLQ.0b013e31824b1cf3
934. Rowlands S, Danielewski JA, Tabrizi SN, Walker SP, Garland SM. Microbial invasion of the amniotic cavity in midtrimester pregnancies using molecular microbiology. Am J Obstet Gynecol 2017;217:71.e1–5. PMID:28268197 https://doi.org/10.1016/j.ajog.2017.02.051
935. Jurstrand M, Jensen JS, Magnuson A, Kamwendo F, Fredlund H. A serological study of the role of *Mycoplasma genitalium* in pelvic inflammatory disease and ectopic pregnancy. Sex Transm Infect 2007;83:319–23. PMID:17475688 https://doi.org/10.1136/sti.2007.024752
936. Ashshi AM, Batwa SA, Kutbi SY, Malibary FA, Batwa M, Refaat B. Prevalence of 7 sexually transmitted organisms by multiplex real-time PCR in Fallopian tube specimens collected from Saudi women with and without ectopic pregnancy. BMC Infect Dis 2015;15:569. PMID:26666587 https://doi.org/10.1186/s12879-015-1313-1
937. Bissessor M, Tabrizi SN, Bradshaw CS, et al. The contribution of *Mycoplasma genitalium* to the aetiology of sexually acquired infectious proctitis in men who have sex with men. Clin Microbiol Infect 2016;22:260–5. PMID:26686807 https://doi.org/10.1016/j.cmi.2015.11.016
938. Ong JJ, Aung E, Read TRH, et al. Clinical characteristics of anorectal *Mycoplasma genitalium* infection and microbial cure in men who have sex with men. Sex Transm Dis 2018;45:522–6. PMID:29465653 https://doi.org/10.1097/OLQ.0000000000000793
939. Read TRH, Murray GL, Danielewski JA, et al. symptoms, sites, and significance of *Mycoplasma genitalium* in men who have sex with men. Emerg Infect Dis 2019;25:719–27. PMID:30882306 https://doi.org/10.3201/eid2504.181258
940. Cina M, Baumann L, Egli-Gany D, et al. *Mycoplasma genitalium* incidence, persistence, concordance between partners and progression: systematic review and meta-analysis. Sex Transm Infect 2019;95:328–35. PMID:31055469 https://doi.org/10.1136/sextrans-2018-053823
941. Baumann L, Cina M, Egli-Gany D, et al. Prevalence of *Mycoplasma genitalium* in different population groups: systematic review andmeta-analysis. Sex Transm Infect 2018;94:255–62. PMID:29440466 https://doi.org/10.1136/sextrans-2017-053384

912. Mena L, Wang X, Mroczkowski TF, Martin DH.新奥尔良性传播疾病门诊就诊的无症状男性和尿道炎男性中*Mycoplasma genitalium*感染。Clin Infect Dis 2002;35:1167-73. PMID:12410476 https://doi.org/10.1086/343829
913. Falk L.衣原体感染高风险女性中黏液脓性宫颈炎拟定定义的整体一致性。Acta Derm Venereol 2010;90:506-11. PMID:20814628 https://doi.org/10.2340/00015555-0924
914. Anagrius C, Loré B, Jensen JS.*Mycoplasma genitalium*：患病率、临床意义与传播。Sex Transm Infect 2005;81:458-62. PMID:16326846 https://doi.org/10.1136/ sti.2004.012062
915. Manhart LE, Critchlow CW, Holmes KK, et al.黏液脓性宫颈炎与*Mycoplasma genitalium*。 J Infect Dis 2003;187:650-7. PMID:12599082 https://doi.org/10.1086/367992
916. Lusk MJ, Konecny P, Naing ZW, Garden FL, Cumming RG, Rawlinson WD.*Mycoplasma genitalium*与澳大利亚城市STI门诊人群中的宫颈炎和HIV感染相关。Sex Transm Infect 2011;87:107-9. PMID:21071566 https://doi.org/10.1136/ sti.2010.045138
917. Dehon PM, McGowin CL.女性*Mycoplasma genitalium*感染的免疫发病机制：叙述性综述。Sex Transm Dis 2017;44:428-32. PMID:28608793 https://doi.org/10.1097/ OLQ.0000000000000621
918. Bjartling C, Osser S, Persson K.*Mycoplasma genitalium*与终止妊娠后盆腔炎性疾病之间的关联。BJOG 2010;117:361-4. PMID:20015303 https://doi.org/10.1111/j.1471-0528.2009.02455.x
919. Bjartling C, Osser S, Persson K.妇科门诊女性宫颈炎和盆腔炎性疾病中的*Mycoplasma genitalium*。Am J Obstet Gynecol 2012;206:476.e1-8. PMID:22483084 https://doi.org/10.1016/j.ajog.2012.02.036
920. Taylor BD, Zheng X, O'Connell CM, Wiesenfeld HC, Hillier SL, Darville T.*Mycoplasma genitalium*子宫内膜炎和偶发感染的危险因素：T细胞应答抗衣原体(TRAC)研究的二次数据分析。Sex Transm Infect 2018;94:414-20. PMID:29563165 https://doi.org/10.1136/sextrans-2017-053376
921. Cohen CR, Mugo NR, Astete SG, et al.腹腔镜诊断急性输卵管炎女性中*Mycoplasma genitalium*的检测。Sex Transm Infect 2005;81:463-6. PMID:16326847 https://doi.org/10.1136/sti.2005.015701
922. Haggerty CL, Totten PA, Astete SG, Ness RB.非淋球菌、非衣原体性盆腔炎性疾病女性中的*Mycoplasma genitalium*。Infect Dis Obstet Gynecol 2006;2006:30184. PMID:17485798 https://doi.org/10.1155/IDOG/2006/30184
923. Short VL, Totten PA, Ness RB, Astete SG, Kelsey SF, Haggerty CL.盆腔炎性疾病女性中*Mycoplasma genitalium*感染与*Neisseria gonorrhoeae*感染的临床表现比较。Clin Infect Dis 2009;48:41-7. PMID:19025498 https://doi.org/10.1086/594123
924. Simms I, Eastick K, Mallinson H, et al.*Mycoplasma genitalium*、*Chlamydia trachomatis*与盆腔炎性疾病之间的关联。Sex Transm Infect 2003;79:154-6. PMID:12690141 https:// doi.org/10.1136/sti.79.2.154
925. Oakeshott P, Aghaizu A, Hay P, et al.女性中的*Mycoplasma genitalium*是"新衣原体"吗?一项基于社区的前瞻性队列研究。Clin Infect Dis 2010;51:1160-6. PMID:20942656 https://doi.org/10.1086/656739
926. Wiesenfeld HC, Hillier SL, Meyn L, et al.生殖支原体--它是急性盆腔炎性疾病(PID)的致病菌吗?Sex Transm Infect 2013;89(Suppl 1): A34. https://doi.org/10.1136/ sextrans-2013-051184.0106
927. Møller BR, Taylor-Robinson D, Furr PM, Freundt EA.实验性生殖支原体在雌性猴中引发的急性上生殖道疾病。Br J Exp Pathol 1985;66:417-26. PMID:4027175
928. Wiesenfeld HC, Manhart LE.女性生殖支原体感染：对这一新出现病原体的现有认识和研究重点。J Infect Dis 2017;216(suppl_2): S389-95.
929. Clausen HF, Fedder J, Drasbek M, et al.不孕女性中生殖支原体的血清学调查。Hum Reprod 2001;16:1866-74. PMID:11527890 https://doi.org/10.1093/ humrep/16.9.1866
930. Svenstrup HF, Fedder J, Kristoffersen SE, Trolle B, Birkelund S, Christiansen G.生殖支原体、沙眼衣原体与输卵管因素不孕--一项前瞻性研究。Fertil Steril 2008;90:513-20. PMID:17548070 https://doi.org/10.1016/j.fertnstert.2006.12.056
931. Idahl A, Jurstrand M, Olofsson JI, Fredlund H.不孕夫妇与可育女性中生殖支原体血清抗体。Sex Transm Infect 2015;91:589-91. PMID:25921018 https://doi.org/10.1136/ sextrans-2015-052011
932. Edwards RK, Ferguson RJ, Reyes L, Brown M, Theriaque DW, Duff P.评估早产与下生殖道分离出的多种微生物之间的关系。J Matern Fetal Neonatal Med 2006;19:357-63. PMID:16801313 https://doi.org/10.1080/00207170600712071
933. Vandepitte J, Bukenya J, Hughes P, et al.乌干达HIV及其他STI高危女性中与生殖支原体感染相关的临床特征。Sex Transm Dis 2012;39:487-91. PMID:22592838 https://doi.org/10.1097/OLQ.0b013e31824b1cf3
934. Rowlands S, Danielewski JA, Tabrizi SN, Walker SP, Garland SM.应用分子微生物学方法检测中孕期妊娠羊膜腔的微生物侵入。Am J Obstet Gynecol 2017;217:71. e1-5. PMID:28268197 https://doi.org/10.1016/j.ajog.2017.02.051
935. Jurstrand M, Jensen JS, Magnuson A, Kamwendo F, Fredlund H.关于生殖支原体在盆腔炎性疾病和异位妊娠中作用的血清学研究。Sex Transm Infect 2007;83:319-23. PMID:17475688 https://doi.org/10.1136/ sti.2007.024752
936. Ashshi AM, Batwa SA, Kutbi SY, Malibary FA, Batwa M, Refaat B.采用多重实时PCR检测沙特异位妊娠与非异位妊娠女性输卵管标本中7种性传播病原体的流行率。BMC Infect Dis 2015;15:569. PMID:26666587 https://doi.org/10.1186/s12879-015-1313-1
937. Bissessor M, Tabrizi SN, Bradshaw CS, et al.生殖支原体在男男性行为人群性获得性感染性直肠炎病因学中的作用。Clin Microbiol Infect 2016;22:260-5. PMID:26686807 https://doi.org/10.1016/j.cmi.2015.11.016
938. Ong JJ, Aung E, Read TRH, et al.男男性行为人群中肛门直肠生殖支原体感染的临床特征及微生物学治愈。Sex Transm Dis 2018;45:522-6. PMID:29465653 https://doi.org/10.1097/OLQ.0000000000000793
939. Read TRH, Murray GL, Danielewski JA, et al.男男性行为人群中生殖支原体的症状、部位及意义。Emerg Infect Dis 2019;25:719-27. PMID:30882306 https://doi.org/10.3201/eid2504.181258
940. Cina M, Baumann L, Egli-Gany D, et al.生殖支原体的发病率、持续性、性伴间一致性及疾病进展：系统综述与meta分析。Sex Transm Infect 2019;95:328-35. PMID:31055469 https://doi.org/10.1136/sextrans-2018-053823
941. Baumann L, Cina M, Egli-Gany D, et al.不同人群组中生殖支原体的流行率：系统综述与meta分析。Sex Transm Infect 2018;94:255-62. PMID:29440466 https:// doi.org/10.1136/sextrans-2017-053384

942. Vandepitte J, Weiss HA, Bukenya J, et al. Association between *Mycoplasma genitalium* infection and HIV acquisition among female sex workers in Uganda: evidence from a nested case-control study. Sex Transm Infect 2014;90:545–9. PMID:24687129 https://doi.org/10.1136/sextrans-2013-051467
943. Ferré VM, Ekouevi DK, Gbeasor-Komlanvi FA, et al. Prevalence of human papillomavirus, human immunodeficiency virus and other sexually transmitted infections among female sex workers in Togo: a national cross-sectional survey. Clin Microbiol Infect 2019;25:1560. e1–7. PMID:31051265 https://doi.org/10.1016/j.cmi.2019.04.015
944. Mavedzenge SN, Van Der Pol B, Weiss HA, et al. The association between *Mycoplasma genitalium* and HIV-1 acquisition in African women. AIDS 2012;26:617–24. PMID:22210630 https://doi.org/10.1097/QAD.0b013e32834ff690
945. Salado-Rasmussen K, Jensen JS. *Mycoplasma genitalium* testing pattern and macrolide resistance: a Danish nationwide retrospective survey. Clin Infect Dis 2014;59:24–30. PMID:24729494 https://doi.org/10.1093/cid/ciu217
946. Wold C, Sorthe J, Hartgill U, Olsen AO, Moghaddam A, Reinton N. Identification of macrolide-resistant *Mycoplasma genitalium* using real-time PCR. J Eur Acad Dermatol Venereol 2015;29:1616–20. PMID:25622510 https://doi.org/10.1111/jdv.12963
947. Gesink D, Racey CS, Seah C, et al. *Mycoplasma genitalium* in Toronto, Ont: estimates of prevalence and macrolide resistance. Can Fam Physician 2016;62:e96–101. PMID:27331225
948. Kristiansen GQ, Lisby JG, Schønning K. 5' nuclease genotyping assay for identification of macrolide-resistant *Mycoplasma genitalium* in clinical specimens. J Clin Microbiol 2016;54:1593–7. PMID:27053672 https://doi.org/10.1128/JCM.00012-16
949. Braam JF, Slotboom B, Van Marm S, et al. High prevalence of the A2058T macrolide resistance-associated mutation in *Mycoplasma genitalium* strains from the Netherlands. J Antimicrob Chemother 2017;72:1529–30. PMID:28158595 https://doi.org/10.1093/jac/dkw584
950. Murray GL, Bradshaw CS, Bissessor M, et al. Increasing macrolide and fluoroquinolone resistance in *Mycoplasma genitalium*. Emerg Infect Dis 2017;23:809–12. PMID:28418319 https://doi.org/10.3201/eid2305.161745
951. Chernesky MA, Jang D, Martin I, et al.; Canadian MG Study Group. *Mycoplasma genitalium* antibiotic resistance-mediating mutations in Canadian women with or without *Chlamydia trachomatis* infection. Sex Transm Dis 2017;44:433–5. PMID:28608794 https://doi.org/10.1097/OLQ.0000000000000617
952. Barberá MJ, Fernández-Huerta M, Jensen JS, Caballero E, Andreu A. *Mycoplasma genitalium* macrolide and fluoroquinolone resistance: prevalence and risk factors among a 2013–2014 cohort of patients in Barcelona, Spain. Sex Transm Dis 2017;44:457–62. PMID:28703723 https://doi.org/10.1097/OLQ.0000000000000631
953. Sweeney EL, Trembizki E, Bletchly C, et al. Levels of *Mycoplasma genitalium* antimicrobial resistance differ by both region and gender in the state of Queensland, Australia: implications for treatment guidelines. J Clin Microbiol 2019;57:e01555-18. PMID:30602443 https://doi.org/10.1128/JCM.01555-18
954. Bissessor M, Tabrizi SN, Twin J, et al. Macrolide resistance and azithromycin failure in a *Mycoplasma genitalium*-infected cohort and response of azithromycin failures to alternative antibiotic regimens. Clin Infect Dis 2015;60:1228–36. PMID:25537875 https://doi.org/10.1093/cid/ciu1162
955. Piñeiro L, Idigoras P, de la Caba I, López-Olaizola M, Cilla G. Guided antibiotic therapy for *Mycoplasma genitalium* infections: analysis of mutations associated with resistance to macrolides and fluoroquinolones [Spanish]. Enferm Infecc Microbiol Clin 2019;37:394–7. PMID:30396750
956. Dionne-Odom J, Geisler WM, Aaron KJ, et al. High prevalence of multidrug-resistant *Mycoplasma genitalium* in human immunodeficiency virus-infected men who have sex with men in Alabama. Clin Infect Dis 2018;66:796–8. PMID:29028993 https://doi.org/10.1093/cid/cix853
957. Pitt R, Fifer H, Woodford N, Alexander S. Detection of markers predictive of macrolide and fluoroquinolone resistance in *Mycoplasma genitalium* from patients attending sexual health services in England. Sex Transm Infect 2018;94:9–13. PMID:28717051 https://doi.org/10.1136/sextrans-2017-053164
958. Unemo M, Salado-Rasmussen K, Hansen M, et al. Clinical and analytical evaluation of the new Aptima *Mycoplasma genitalium* assay, with data on *M. genitalium* prevalence and antimicrobial resistance in *M. genitalium* in Denmark, Norway and Sweden in 2016. Clin Microbiol Infect 2018;24:533–9. PMID:28923377 https://doi.org/10.1016/j.cmi.2017.09.006
959. Anderson T, Coughlan E, Werno A. *Mycoplasma genitalium* macrolide and fluoroquinolone resistance detection and clinical implications in a selected cohort in New Zealand. J Clin Microbiol 2017;55:3242–8. PMID:28878004 https://doi.org/10.1128/JCM.01087-17
960. Shimada Y, Deguchi T, Nakane K, et al. Emergence of clinical strains of *Mycoplasma genitalium* harbouring alterations in ParC associated with fluoroquinolone resistance. Int J Antimicrob Agents 2010;36:255–8. PMID:20580532 https://doi.org/10.1016/j.ijantimicag.2010.05.011
961. Muller EE, Mahlangu MP, Lewis DA, Kularatne RS. Macrolide and fluoroquinolone resistance-associated mutations in *Mycoplasma genitalium* in Johannesburg, South Africa, 2007–2014. BMC Infect Dis 2019;19:148. PMID:30760230 https://doi.org/10.1186/s12879-019-3797-6
962. Chambers LC, Jensen JS, Morgan JL, et al. Lack of association between the S83I ParC mutation in *Mycoplasma genitalium* and treatment outcomes among men who have sex with men with nongonococcal urethritis. Sex Transm Dis 2019;46:805–9. PMID:31259853 https://doi.org/10.1097/OLQ.0000000000001035
963. Durukan D, Read TRH, Murray G, et al. Resistance-guided antimicrobial therapy using doxycycline-moxifloxacin and doxycycline-2.5g azithromycin for the treatment of *Mycoplasma genitalium* infection: efficacy and tolerability. Clin Infect Dis 2020;71:1461–8. PMID:31629365 https://doi.org/10.1093/cid/ciz1031
964. Li Y, Le WJ, Li S, Cao YP, Su XH. Meta-analysis of the efficacy of moxifloxacin in treating *Mycoplasma genitalium* infection. Int J STD AIDS 2017;28:1106–14. PMID:28118803 https://doi.org/10.1177/0956462416688562
965. Mondeja BA, Couri J, Rodríguez NM, Blanco O, Fernández C, Jensen JS. Macrolide-resistant *Mycoplasma genitalium* infections in Cuban patients: an underestimated health problem. BMC Infect Dis 2018;18:601. PMID:30486786 https://doi.org/10.1186/s12879-018-3523-9
966. Glaser AM, Geisler WM, Ratliff AE, Xiao L, Waites KB, Gaisa M. Two cases of multidrug-resistant genitourinary *Mycoplasma genitalium* infection successfully eradicated with minocycline. Int J STD AIDS 2019;30:512–4. PMID:30999836 https://doi.org/10.1177/0956462418816757
967. Xiao L, Waites KB, Van Der Pol B, Aaron KJ, Hook EW 3rd, Geisler WM. *Mycoplasma genitalium* infections with macrolide and fluoroquinolone resistance-associated mutations in heterosexual African American couples in Alabama. Sex Transm Dis 2019;46:18–24. PMID:29979336 https://doi.org/10.1097/OLQ.0000000000000891
968. Slifirski JB, Vodstrcil LA, Fairley CK, et al. *Mycoplasma genitalium* infection in adults reporting sexual contact with infected partners, Australia, 2008–2016. Emerg Infect Dis 2017;23:1826–33. PMID:29047422 https://doi.org/10.3201/eid2311.170998
969. Anderson MR, Klink K, Cohrssen A. Evaluation of vaginal complaints. JAMA 2004;291:1368–79. PMID:15026404 https://doi.org/10.1001/jama.291.11.1368

942. Vandepitte J, Weiss HA, Bukenya J, et al.乌干达女性性工作者中生殖支原体感染与HIV感染获得之间的关联：一项巢式病例对照研究的证据。Sex Transm Infect 2014;90:545-9. PMID:24687129 https://doi.org/10.1136/sextrans-2013-051467
943. Ferré VM, Ekouevi DK, Gbeasor-Komlanvi FA, et al.多哥女性性工作者中人乳头瘤病毒、人类免疫缺陷病毒及其他性传播感染的流行率：一项全国横断面调查。Clin Microbiol Infect 2019;25:1560. e1-7. PMID:31051265 https://doi.org/10.1016/j.cmi.2019.04.015
944. Mavedzenge SN, Van Der Pol B, Weiss HA, et al.非洲女性中生殖支原体与HIV-1感染获得之间的关联。AIDS 2012;26:617-24. PMID:22210630 https://doi.org/10.1097/QAD.0b013e32834ff690
945. Salado-Rasmussen K, Jensen JS.生殖支原体检测模式与大环内酯类耐药：一项丹麦全国回顾性调查。Clin Infect Dis 2014;59:24-30. PMID:24729494 https://doi.org/10.1093/cid/ciu217
946. Wold C, Sorthe J, Hartgill U, Olsen AO, Moghaddam A, Reinton N.应用实时PCR鉴定大环内酯类耐药生殖支原体。J Eur Acad Dermatol Venereol 2015;29:1616-20. PMID:25622510 https://doi.org/10.1111/jdv.12963
947. Gesink D, Racey CS, Seah C, et al.加拿大安大略省多伦多的生殖支原体：流行率与大环内酯类耐药估计。Can Fam Physician 2016;62:e96-101. PMID:27331225
948. Kristiansen GQ, Lisby JG, Schønning K.用于鉴定临床标本中大环内酯类耐药生殖支原体的5'核酸酶基因分型检测。J Clin Microbiol 2016;54:1593-7. PMID:27053672 https://doi.org/10.1128/JCM.00012-16
949. Braam JF, Slotboom B, Van Marm S, et al.荷兰生殖支原体菌株中A2058T大环内酯类耐药相关突变的高流行率。J Antimicrob Chemother 2017;72:1529-30. PMID:28158595 https://doi.org/10.1093/jac/ dkw584
950. Murray GL, Bradshaw CS, Bissessor M, et al.生殖支原体对大环内酯类和氟喹诺酮类耐药性不断增加。Emerg Infect Dis 2017;23:809-12. PMID:28418319 https://doi.org/10.3201/ eid2305.161745
951. Chernesky MA, Jang D, Martin I, et al.; Canadian MG Study Group.伴或不伴沙眼衣原体感染的加拿大女性中生殖支原体抗生素耐药介导突变。Sex Transm Dis 2017;44:433-5. PMID:28608794 https://doi.org/10.1097/OLQ.0000000000000617
952. Barberá MJ, Fernández-Huerta M, Jensen JS, Caballero E, Andreu A.生殖支原体大环内酯类和氟喹诺酮类耐药：西班牙巴塞罗那2013-2014年患者队列中的流行率及危险因素。Sex Transm Dis 2017;44:457-62. PMID:28703723 https://doi.org/10.1097/OLQ.0000000000000631
953. Sweeney EL, Trembizki E, Bletchly C, et al.澳大利亚昆士兰州生殖支原体抗菌药物耐药水平因地区和性别而异：对治疗指南的意义。J Clin Microbiol 2019;57:e01555-18. PMID:30602443 https://doi.org/10.1128/JCM.01555-18
954. Bissessor M, Tabrizi SN, Twin J, et al.生殖支原体感染队列中的大环内酯类耐药与阿奇霉素治疗失败及阿奇霉素治疗失败者对替代抗生素方案的应答。Clin Infect Dis 2015;60:1228-36. PMID:25537875 https://doi.org/10.1093/cid/ciu1162
955. Piñeiro L, Idigoras P, de la Caba I, López-Olaizola M, Cilla G.生殖支原体感染的指导性抗生素治疗：大环内酯类和氟喹诺酮类耐药相关突变分析[西班牙语]。Enferm Infecc Microbiol Clin 2019;37:394-7. PMID:30396750
956. Dionne-Odom J, Geisler WM, Aaron KJ，等.阿拉巴马州人类免疫缺陷病毒感染男男性行为者中多重耐药生殖支原体高流行率.Clin Infect Dis 2018;66:796-8. PMID:29028993 https://doi.org/10.1093/cid/cix853
957. Pitt R, Fifer H, Woodford N, Alexander S.在英国性健康服务机构就诊患者中检测*Mycoplasma genitalium*对大环内酯类和氟喹诺酮类耐药预测标志物。Sex Transm Infect 2018;94:9-13. PMID:28717051 https://doi.org/10.1136/sextrans-2017-053164
958. Unemo M, Salado-Rasmussen K, Hansen M, et al.新型Aptima *Mycoplasma genitalium*检测的临床与分析评估，附2016年丹麦、挪威和瑞典*M.genitalium*流行率及*M.genitalium*抗菌药物耐药性数据。Clin Microbiol Infect 2018;24:533-9. PMID:28923377 https://doi.org/10.1016/j.cmi.2017.09.006
959. Anderson T, Coughlan E, Werno A.生殖支原体在新西兰特定队列中的大环内酯类和氟喹诺酮类耐药性检测及临床意义。J Clin Microbiol 2017;55:3242-8. PMID:28878004 https://doi.org/10.1128/JCM.01087-17
960. Shimada Y, Deguchi T, Nakane K, et al.携带与氟喹诺酮类耐药相关的ParC改变的生殖支原体临床菌株的出现。Int J Antimicrob Agents 2010;36:255-8. PMID:20580532 https://doi.org/10.1016/j.ijantimicag.2010.05.011
961. Muller EE, Mahlangu MP, Lewis DA, Kularatne RS.2007-2014年南非约翰内斯堡*Mycoplasma genitalium*中大环内酯类和氟喹诺酮类耐药相关突变。BMC Infect Dis 2019;19:148. PMID:30760230 https://doi.org/10.1186/ s12879-019-3797-6
962. Chambers LC, Jensen JS, Morgan JL, et al.男男性行为者中非淋菌性尿道炎患者生殖支原体 S83I ParC 突变与治疗结局之间缺乏关联。Sex Transm Dis 2019;46:805-9. PMID:31259853 https://doi.org/10.1097/OLQ.0000000000001035
963. Durukan D, Read TRH, Murray G, et al.使用多西环素-莫西沙星和多西环素-2.5g 阿奇霉素的耐药指导抗菌治疗用于治疗生殖支原体感染：疗效和耐受性。Clin Infect Dis 2020;71:1461-8. PMID:31629365 https://doi.org/10.1093/cid/ciz1031
964. 李Y，乐WJ，李S，曹YP，苏XH。莫西沙星治疗生殖支原体感染疗效的Meta分析。Int J STD AIDS 2017;28:1106-14. PMID:28118803 https://doi.org/10.1177/0956462416688562
965. Mondeja BA, Couri J, Rodríguez NM, Blanco O, Fernández C, Jensen JS.古巴患者中大环内酯耐药*Mycoplasma genitalium*感染：一个被低估的健康问题。BMC Infect Dis 2018;18:601. PMID:30486786 https://doi.org/10.1186/ s12879-018-3523-9
966. Glaser AM, Geisler WM, Ratliff AE, Xiao L, Waites KB, Gaisa M.两例多重耐药泌尿生殖道*Mycoplasma genitalium*感染经米诺环素成功根除。Int J STD AIDS 2019; 30: 512-4. PMID: 30999836 https://doi.org/10.1177/0956462418816757
967. Xiao L, Waites KB, Van Der Pol B, Aaron KJ, Hook EW 3rd, Geisler WM.生殖支原体感染与阿拉巴马州异性恋非洲裔美国夫妇中大环内酯类和氟喹诺酮类耐药相关突变。Sex Transm Dis 2019;46:18-24. PMID:29979336 https://doi.org/10.1097/OLQ.0000000000000891
968. Slifirski JB, Vodstrcil LA, Fairley CK, et al.生殖支原体感染在报告与感染伴侣有性接触的成年人中，澳大利亚，2008-2016。Emerg Infect Dis 2017;23:1826-33. PMID:29047422 https://doi.org/10.3201/eid2311.170998
969. Anderson MR, Klink K, Cohrssen A.阴道主诉的评估。JAMA 2004;291:1368-79. PMID:15026404 https://doi.org/10.1001/jama.291.11.1368

970. Swidsinski A, Mendling W, Loening-Baucke V, et al. Adherent biofilms in bacterial vaginosis. Obstet Gynecol 2005;106:1013–23. PMID:16260520 https://doi.org/10.1097/01.AOG.0000183594.45524.d2
971. Brotman RM, Klebanoff MA, Nansel TR, et al. Bacterial vaginosis assessed by Gram stain and diminished colonization resistance to incident gonococcal, chlamydial, and trichomonal genital infection. J Infect Dis 2010;202:1907–15. PMID:21067371 https://doi.org/10.1086/657320
972. Peebles K, Velloza J, Balkus JE, McClelland RS, Barnabas RV. High global burden and costs of bacterial vaginosis: a systematic review and meta-analysis. Sex Transm Dis 2019;46:304–11. PMID:30624309 https://doi.org/10.1097/OLQ.0000000000000972
973. Kenyon CR, Buyze J, Klebanoff M, Brotman RM. Association between bacterial vaginosis and partner concurrency: a longitudinal study. Sex Transm Infect 2018;94:75–7. PMID:27645157 https://doi.org/10.1136/sextrans-2016-052652
974. Sanchez S, Garcia PJ, Thomas KK, Catlin M, Holmes KK. Intravaginal metronidazole gel versus metronidazole plus nystatin ovules for bacterial vaginosis: a randomized controlled trial. Am J Obstet Gynecol 2004;191:1898–906. PMID:15592270 https://doi.org/10.1016/j.ajog.2004.06.089
975. Ness RB, Soper DE, Holley RL, et al.; PID Evaluation and Clinical Health (PEACH) Study Investigators. Douching and endometritis: results from the PID evaluation and clinical health (PEACH) study. Sex Transm Dis 2001;28:240–5. PMID:11318257 https://doi.org/10.1097/00007435-200104000-00010
976. Gondwe T, Ness R, Totten PA, et al. Novel bacterial vaginosis-associated organisms mediate the relationship between vaginal douching and pelvic inflammatory disease. Sex Transm Infect 2020;96:439–44. PMID:31810995 https://doi.org/10.1136/sextrans-2019-054191
977. Abbai NS, Reddy T, Ramjee G. Prevalent bacterial vaginosis infection—a risk factor for incident sexually transmitted infections in women in Durban, South Africa. Int J STD AIDS 2016;27:1283–8. PMID:26538552 https://doi.org/10.1177/0956462415616038
978. Morris BJ, Hankins CA, Banerjee J, et al. Does male circumcision reduce women's risk of sexually transmitted infections, cervical cancer, and associated conditions? Front Public Health 2019;7:4. PMID:30766863 https://doi.org/10.3389/fpubh.2019.00004
979. Srinivasan S, Liu C, Mitchell CM, et al. Temporal variability of human vaginal bacteria and relationship with bacterial vaginosis. PLoS One 2010;5:e10197. PMID:20419168 https://doi.org/10.1371/journal.pone.0010197
980. Gajer P, Brotman RM, Bai G, et al. Temporal dynamics of the human vaginal microbiota. Sci Transl Med 2012;4:132ra52. PMID:22553250 https://doi.org/10.1126/scitranslmed.3003605
981. Fethers KA, Fairley CK, Morton A, et al. Early sexual experiences and risk factors for bacterial vaginosis. J Infect Dis 2009;200:1662–70. PMID:19863439 https://doi.org/10.1086/648092
982. Achilles SL, Austin MN, Meyn LA, Mhlanga F, Chirenje ZM, Hillier SL. Impact of contraceptive initiation on vaginal microbiota. Am J Obstet Gynecol 2018;218:622.e1–10. PMID:29505773 https://doi.org/10.1016/j.ajog.2018.02.017
983. Vodstrcil LA, Plummer ME, Fairley CK, et al. Combined oral contraceptive pill-exposure alone does not reduce the risk of bacterial vaginosis recurrence in a pilot randomised controlled trial. Sci Rep 2019;9:3555. PMID:30837554 https://doi.org/10.1038/s41598-019-39879-8
984. Brooks JP, Edwards DJ, Blithe DL, et al. Effects of combined oral contraceptives, depot medroxyprogesterone acetate and the levonorgestrel-releasing intrauterine system on the vaginal microbiome. Contraception 2017;95:405–13. PMID:27913230 https://doi.org/10.1016/j.contraception.2016.11.006
985. Moore KR, Harmon QE, Baird DD. Serum 25-hydroxyvitamin D and risk of self-reported bacterial vaginosis in a prospective cohort study of young African American women. J Womens Health (Larchmt) 2018;27:1278–84. PMID:29897832 https://doi.org/10.1089/jwh.2017.6804
986. Lokken EM, Balkus JE, Kiarie J, et al. Association of recent bacterial vaginosis with acquisition of *Mycoplasma genitalium*. Am J Epidemiol 2017;186:194–201. PMID:28472225 https://doi.org/10.1093/aje/kwx043
987. Brusselaers N, Shrestha S, van de Wijgert J, Verstraelen H. Vaginal dysbiosis and the risk of human papillomavirus and cervical cancer: systematic review and meta-analysis. Am J Obstet Gynecol 2019;221:9–18.e8. PMID:30550767 https://doi.org/10.1016/j.ajog.2018.12.011
988. Abbai NS, Nyirenda M, Naidoo S, Ramjee G. Prevalent herpes simplex virus-2 increases the risk of incident bacterial vaginosis in women from South Africa. AIDS Behav 2018;22:2172–80. PMID:28956191 https://doi.org/10.1007/s10461-017-1924-1
989. Laxmi U, Agrawal S, Raghunandan C, Randhawa VS, Saili A. Association of bacterial vaginosis with adverse fetomaternal outcome in women with spontaneous preterm labor: a prospective cohort study. J Matern Fetal Neonatal Med 2012;25:64–7. PMID:21557693 https://doi.org/10.3109/14767058.2011.565390
990. Cherpes TL, Wiesenfeld HC, Melan MA, et al. The associations between pelvic inflammatory disease, *Trichomonas vaginalis* infection, and positive herpes simplex virus type 2 serology. Sex Transm Dis 2006;33:747–52. PMID:16691155 https://doi.org/10.1097/01.olq.0000218869.52753.c7
991. Nelson DB, Hanlon A, Hassan S, et al. Preterm labor and bacterial vaginosis-associated bacteria among urban women. J Perinat Med 2009;37:130–4. PMID:18999913 https://doi.org/10.1515/JPM.2009.026
992. Atashili J, Poole C, Ndumbe PM, Adimora AA, Smith JS. Bacterial vaginosis and HIV acquisition: a meta-analysis of published studies. AIDS 2008;22:1493–501. PMID:18614873 https://doi.org/10.1097/QAD.0b013e3283021a37
993. Gosmann C, Anahtar MN, Handley SA, et al. Lactobacillus-deficient cervicovaginal bacterial communities are associated with increased HIV acquisition in young South African women. Immunity 2017;46:29–37. PMID:28087240 https://doi.org/10.1016/j.immuni.2016.12.013
994. McClelland RS, Lingappa JR, Srinivasan S, et al. Evaluation of the association between the concentrations of key vaginal bacteria and the increased risk of HIV acquisition in African women from five cohorts: a nested case-control study. Lancet Infect Dis 2018;18:554–64. PMID:29396006 https://doi.org/10.1016/S1473-3099(18)30058-6
995. Johnston C, Magaret A, Srinivasan S, et al. P239 Genital HSV-2 suppression is not associated with alterations in the vaginal microbiome: a one-way, cross-over study. Sex Transm Infect 2019;95(Suppl 1):A148.
996. Zozaya M, Ferris MJ, Siren JD, et al. Bacterial communities in penile skin, male urethra, and vaginas of heterosexual couples with and without bacterial vaginosis. Microbiome 2016;4:16. PMID:27090518 https://doi.org/10.1186/s40168-016-0161-6
997. Liu CM, Hungate BA, Tobian AA, et al. Penile microbiota and female partner bacterial vaginosis in Rakai, Uganda. MBio 2015;6:e00589. PMID:26081632 https://doi.org/10.1128/mBio.00589-15
998. Mehta SD. Systematic review of randomized trials of treatment of male sexual partners for improved bacteria vaginosis outcomes in women. Sex Transm Dis 2012;39:822–30. PMID:23007709 https://doi.org/10.1097/OLQ.0b013e3182631d89

970. Swidsinski A, Mendling W, Loening-Baucke V，等.细菌性阴道病中的黏附性生物膜.Obstet Gynecol 2005;106:1013-23. PMID:16260520 https://doi.org/10.1097/01.AOG.0000183594.45524.d2
971. Brotman RM, Klebanoff MA, Nansel TR, et al.革兰染色评估的细菌性阴道病与对淋球菌、衣原体及滴虫性生殖道感染新发定植抵抗力降低的关系。J Infect Dis 2010;202:1907-15. PMID:21067371 https://doi.org/10.1086/657320
972. Peebles K, Velloza J, Balkus JE, McClelland RS, Barnabas RV.细菌性阴道病的全球高负担与高成本：系统综述与荟萃分析。Sex Transm Dis 2019;46:304-11. PMID:30624309 https://doi.org/10.1097/OLQ.0000000000000972
973. Kenyon CR, Buyze J, Klebanoff M, Brotman RM.细菌性阴道病与性伴并发关系：一项纵向研究。Sex Transm Infect 2018;94:75-7. PMID:27645157 https://doi.org/10.1136/sextrans-2016-052652
974. Sanchez S, Garcia PJ, Thomas KK, Catlin M, Holmes KK.阴道内甲硝唑凝胶与甲硝唑加制霉菌素卵形栓剂治疗细菌性阴道病的比较：一项随机对照试验。Am J Obstet Gynecol 2004;191:1898-906. PMID:15592270 https://doi.org/10.1016/j.ajog.2004.06.089
975. Ness RB, Soper DE, Holley RL, et al.; PID Evaluation and Clinical Health(PEACH) Study Investigators.阴道冲洗与子宫内膜炎：来自PID评估与临床健康(PEACH)研究的结果。Sex Transm Dis 2001;28:240-5. PMID:11318257 https://doi.org/10.1097/00007435-200104000-00010
976. Gondwe T, Ness R, Totten PA, et al.新型细菌性阴道病相关微生物介导阴道冲洗与盆腔炎性疾病之间的关系。Sex Transm Infect 2020;96:439-44. PMID:31810995 https://doi.org/10.1136/sextrans-2019-054191
977. Abbai NS, Reddy T, Ramjee G.普遍存在的细菌性阴道病感染--南非德班女性新发性传播感染的危险因素。Int J STD AIDS 2016;27:1283-8. PMID:26538552 https://doi.org/10.1177/0956462415616038
978. Morris BJ, Hankins CA, Banerjee J, et al.男性包皮环切术是否降低女性性传播感染、宫颈癌及相关疾病的风险?Front Public Health 2019;7:4. PMID:30766863 https://doi.org/10.3389/fpubh.2019.00004
979. Srinivasan S, Liu C, Mitchell CM, et al.人类阴道细菌的时间变异性及其与细菌性阴道病的关系。PLoS One 2010;5:e10197. PMID:20419168 https://doi.org/10.1371/journal.pone.0010197
980. Gajer P, Brotman RM, Bai G, et al.人类阴道微生物群的时间动态。Sci Transl Med 2012;4:132ra52. PMID:22553250 https://doi.org/10.1126/Sci Transl Med.3003605
981. Fethers KA, Fairley CK, Morton A, et al.早期性经历与细菌性阴道病的危险因素。J Infect Dis 2009;200:1662-70. PMID:19863439 https://doi.org/10.1086/648092
982. Achilles SL, Austin MN, Meyn LA, Mhlanga F, Chirenje ZM, Hillier SL.避孕起始对阴道微生物群的影响。Am J Obstet Gynecol 2018;218:622.e1-10. PMID:29505773 https://doi.org/10.1016/j.ajog.2018.02.017
983. Vodstrcil LA, Plummer ME, Fairley CK, et al.在一项初步随机对照试验中，单纯复方口服避孕药暴露并不能降低细菌性阴道病复发的风险。Sci Rep 2019;9:3555. PMID:30837554 https://doi.org/10.1038/s41598-019-39879-8
984. Brooks JP, Edwards DJ, Blithe DL, et al.复方口服避孕药、长效醋酸甲羟孕酮和左炔诺孕酮宫内释放系统对阴道微生物组的影响。Contraception 2017;95:405-13. PMID:27913230 https://doi.org/10.1016/j.Contraception.2016.11.006
985. Moore KR, Harmon QE, Baird DD.血清25-羟基维生素D与年轻非洲裔美国女性自我报告细菌性阴道病风险的前瞻性队列研究。J Womens Health(Larchmt) 2018;27:1278-84. PMID:29897832 https://doi.org/10.1089/ jwh.2017.6804
986. Lokken EM, Balkus JE, Kiarie J, et al.近期细菌性阴道病与生殖支原体感染的相关性。Am J Epidemiol 2017;186:194-201. PMID:28472225 https://doi.org/10.1093/aje/ kwx043
987. Brusselaers N, Shrestha S, van de Wijgert J, Verstraelen H.阴道菌群失调与人乳头瘤病毒及宫颈癌风险：系统综述与荟萃分析。Am J Obstet Gynecol 2019;221:9-18.e8. PMID:30550767 https://doi.org/10.1016/j.ajog.2018.12.011
988. Abbai NS, Nyirenda M, Naidoo S, Ramjee G.南非女性中流行的单纯疱疹病毒2型增加新发细菌性阴道病的风险。AIDS Behav 2018;22:2172-80. PMID:28956191 https://doi.org/10.1007/s10461-017-1924-1
989. Laxmi U, Agrawal S, Raghunandan C, Randhawa VS, Saili A.自发性早产女性中细菌性阴道病与不良母婴结局的相关性：一项前瞻性队列研究。J Matern Fetal Neonatal Med 2012;25:64-7. PMID:21557693 https://doi.org/10.3109/14767058.2011.565390
990. Cherpes TL, Wiesenfeld HC, Melan MA, et al.盆腔炎性疾病、阴道毛滴虫感染与单纯疱疹病毒2型血清学阳性之间的关联。Sex Transm Dis 2006;33:747-52. PMID:16691155 https://doi.org/10.1097/01. olq.0000218869.52753.c7
991. Nelson DB, Hanlon A, Hassan S, et al.城市女性中的早产与细菌性阴道病相关细菌。J Perinat Med 2009;37:130-4. PMID:18999913 https://doi.org/10.1515/ JPM.2009.026
992. Atashili J, Poole C, Ndumbe PM, Adimora AA, Smith JS.细菌性阴道病与HIV感染：已发表研究的荟萃分析。AIDS 2008;22:1493-501. PMID:18614873 https://doi.org/10.1097/ QAD.0b013e3283021a37
993. Gosmann C, Anahtar MN, Handley SA, et al.缺乏乳杆菌的宫颈阴道细菌群落与南非年轻女性HIV感染风险增加相关。Immunity 2017;46:29-37. PMID:28087240 https://doi.org/10.1016/j.immuni.2016.12.013
994. McClelland RS, Lingappa JR, Srinivasan S, et al.来自五个队列的非洲女性中关键阴道细菌浓度与HIV感染风险增加之间关联的评估：一项巢式病例对照研究。Lancet Infect Dis 2018;18:554-64. PMID:29396006 https://doi.org/10.1016/S1473-3099(18)30058-6
995. Johnston C, Magaret A, Srinivasan S, et al.P239 生殖器HSV-2抑制与阴道微生物组改变无关：一项单向交叉研究。Sex Transm Infect 2019;95(Suppl 1):A148.
996. Zozaya M, Ferris MJ, Siren JD, et al.患有和不患有细菌性阴道病的异性恋伴侣的阴茎皮肤、男性尿道和阴道中的细菌群落。Microbiome 2016;4:16. PMID:27090518 https://doi.org/10.1186/s40168-016-0161-6
997. Liu CM, Hungate BA, Tobian AA, et al.乌干达拉凯的阴茎微生物群与女性伴侣的细菌性阴道病。MBio 2015;6:e00589. PMID:26081632 https://doi.org/10.1128/mBio.00589-15
998. Mehta SD.针对改善女性细菌性阴道病结局的男性性伴治疗随机试验的系统综述。Sex Transm Dis 2012;39:822-30. PMID:23007709 https://doi.org/10.1097/OLQ.0b013e3182631d89

999. Amsel R, Totten PA, Spiegel CA, Chen KC, Eschenbach D, Holmes KK. Nonspecific vaginitis. Diagnostic criteria and microbial and epidemiologic associations. Am J Med 1983;74:14–22. PMID:6600371 https://doi.org/10.1016/0002-9343(83)91112-9
1000. Nugent RP, Krohn MA, Hillier SL. Reliability of diagnosing bacterial vaginosis is improved by a standardized method of Gram stain interpretation. J Clin Microbiol 1991;29:297–301. PMID:1706728 https://doi.org/10.1128/JCM.29.2.297-301.1991
1001. Schwebke JR, Hillier SL, Sobel JD, McGregor JA, Sweet RL. Validity of the vaginal Gram stain for the diagnosis of bacterial vaginosis. Obstet Gynecol 1996;88:573–6. PMID:8841221 https://doi.org/10.1016/0029-7844(96)00233-5
1002. Coleman JS, Gaydos CA. Molecular diagnosis of bacterial vaginosis: an update. J Clin Microbiol 2018;56:e00342-18. PMID:29769280 https://doi.org/10.1128/JCM.00342-18
1003. Myziuk L, Romanowski B, Johnson SC. BVBlue test for diagnosis of bacterial vaginosis. J Clin Microbiol 2003;41:1925–8. PMID:12734228 https://doi.org/10.1128/JCM.41.5.1925-1928.2003
1004. Bradshaw CS, Morton AN, Garland SM, Horvath LB, Kuzevska I, Fairley CK. Evaluation of a point-of-care test, BVBlue, and clinical and laboratory criteria for diagnosis of bacterial vaginosis. J Clin Microbiol 2005;43:1304–8. PMID:15750100 https://doi.org/10.1128/JCM.43.3.1304-1308.2005
1005. West B, Morison L, Schim van der Loeff M, et al. Evaluation of a new rapid diagnostic kit (FemExam) for bacterial vaginosis in patients with vaginal discharge syndrome in The Gambia. Sex Transm Dis 2003;30:483–9. PMID:12782948 https://doi.org/10.1097/00007435-200306000-00003
1006. Fredricks DN, Fiedler TL, Thomas KK, Oakley BB, Marrazzo JM. Targeted PCR for detection of vaginal bacteria associated with bacterial vaginosis. J Clin Microbiol 2007;45:3270–6. PMID:17687006 https://doi.org/10.1128/JCM.01272-07
1007. Gaydos CA, Beqaj S, Schwebke JR, et al. Clinical validation of a test for the diagnosis of vaginitis. Obstet Gynecol 2017;130:181–9. PMID:28594779 https://doi.org/10.1097/AOG.0000000000002090
1008. Cartwright CP, Lembke BD, Ramachandran K, et al. Development and validation of a semiquantitative, multitarget PCR assay for diagnosis of bacterial vaginosis. J Clin Microbiol 2012;50:2321–9. PMID:22535982 https://doi.org/10.1128/JCM.00506-12
1009. Hilbert DW, Smith WL, Chadwick SG, et al. Development and validation of a highly accurate quantitative real-time PCR assay for diagnosis of bacterial vaginosis. J Clin Microbiol 2016;54:1017–24. Erratum in: J Clin Microbiol 2016;54:1930. PMID:26818677 https://doi.org/10.1128/JCM.03104-15
1010. Schwebke JR, Desmond R. A randomized trial of metronidazole in asymptomatic bacterial vaginosis to prevent the acquisition of sexually transmitted diseases. Am J Obstet Gynecol 2007;196:517.e1–6. PMID:17547876 https://doi.org/10.1016/j.ajog.2007.02.048
1011. Fjeld H, Raknes G. Is combining metronidazole and alcohol really hazardous? [Norwegian]. Tidsskr Nor Laegeforen 2014;134:1661–3. PMID:25223673 https://doi.org/10.4045/tidsskr.14.0081
1012. Hillier SL, Nyirjesy P, Waldbaum AS, et al. Secnidazole treatment of bacterial vaginosis: a randomized controlled trial. Obstet Gynecol 2017;130:379–86. PMID:28697102 https://doi.org/10.1097/AOG.0000000000002135
1013. Schwebke JR, Morgan FG Jr, Koltun W, Nyirjesy P. A phase-3, double-blind, placebo-controlled study of the effectiveness and safety of single oral doses of secnidazole 2 g for the treatment of women with bacterial vaginosis. Am J Obstet Gynecol 2017;217:678.e1–9. Erratum in: Am J Obstet Gynecol 2018;219;110. PMID:28867602 https://doi.org/10.1016/j.ajog.2017.08.017
1014. Chavoustie SE, Gersten JK, Samuel MJ, Schwebke JR. A phase 3, multicenter, prospective, open-label study to evaluate the safety of a single dose of secnidazole 2 g for the treatment of women and postmenarchal adolescent girls with bacterial vaginosis. J Womens Health (Larchmt) 2018;27:492–7. PMID:29323627 https://doi.org/10.1089/jwh.2017.6500
1015. Livengood CH 3rd, Ferris DG, Wiesenfeld HC, et al. Effectiveness of two tinidazole regimens in treatment of bacterial vaginosis: a randomized controlled trial. Obstet Gynecol 2007;110:302–9. PMID:17666604 https://doi.org/10.1097/01.AOG.0000275282.60506.3d
1016. Sobel JD, Nyirjesy P, Brown W. Tinidazole therapy for metronidazole-resistant vaginal trichomoniasis. Clin Infect Dis 2001;33:1341–6. PMID:11565074 https://doi.org/10.1086/323034
1017. Chavoustie SE, Jacobs M, Reisman HA, et al. Metronidazole vaginal gel 1.3% in the treatment of bacterial vaginosis: a dose-ranging study. J Low Genit Tract Dis 2015;19:129–34. PMID:24983350 https://doi.org/10.1097/LGT.0000000000000062
1018. Schwebke JR, Marrazzo J, Beelen AP, Sobel JD. A phase 3, multicenter, randomized, double-blind, vehicle-controlled study evaluating the safety and efficacy of metronidazole vaginal gel 1.3% in the treatment of bacterial vaginosis. Sex Transm Dis 2015;42:376–81. PMID:26222750 https://doi.org/10.1097/OLQ.0000000000000300
1019. Faro S, Skokos CK; Clindesse Investigators Group. The efficacy and safety of a single dose of Clindesse vaginal cream versus a seven-dose regimen of Cleocin vaginal cream in patients with bacterial vaginosis. Infect Dis Obstet Gynecol 2005;13:155–60. PMID:16240515 https://doi.org/10.1080/10647440500148321
1020. Marrazzo JM, Dombrowski JC, Wierzbicki MR, et al. Safety and efficacy of a novel vaginal anti-infective, TOL-463, in the treatment of bacterial vaginosis and vulvovaginal candidiasis: a randomized, single-blind, phase 2, controlled trial. Clin Infect Dis 2019;68:803–9. PMID:30184181 https://doi.org/10.1093/cid/ciy554
1021. Antonio MA, Meyn LA, Murray PJ, Busse B, Hillier SL. Vaginal colonization by probiotic *Lactobacillus crispatus* CTV-05 is decreased by sexual activity and endogenous *Lactobacilli*. J Infect Dis 2009;199:1506–13. PMID:19331578 https://doi.org/10.1086/598686
1022. Senok AC, Verstraelen H, Temmerman M, Botta GA. Probiotics for the treatment of bacterial vaginosis. Cochrane Database Syst Rev 2009;(4):CD006289. PMID:19821358 https://doi.org/10.1002/14651858.CD006289.pub2
1023. Abad CL, Safdar N. The role of *Lactobacillus* probiotics in the treatment or prevention of urogenital infections—a systematic review. J Chemother 2009;21:243–52. PMID:19567343 https://doi.org/10.1179/joc.2009.21.3.243
1024. Mastromarino P, Macchia S, Meggiorini L, et al. Effectiveness of *Lactobacillus*-containing vaginal tablets in the treatment of symptomatic bacterial vaginosis. Clin Microbiol Infect 2009;15:67–74. PMID:19046169 https://doi.org/10.1111/j.1469-0691.2008.02112.x
1025. Hemmerling A, Harrison W, Schroeder A, et al. Phase 2a study assessing colonization efficiency, safety, and acceptability of *Lactobacillus crispatus* CTV-05 in women with bacterial vaginosis. Sex Transm Dis 2010;37:745–50. PMID:20644497 https://doi.org/10.1097/OLQ.0b013e3181e50026
1026. Bunge KE, Beigi RH, Meyn LA, Hillier SL. The efficacy of retreatment with the same medication for early treatment failure of bacterial vaginosis. Sex Transm Dis 2009;36:711–3. PMID:19652628 https://doi.org/10.1097/OLQ.0b013e3181af6cfd
1027. Aguin T, Akins RA, Sobel JD. High-dose vaginal maintenance metronidazole for recurrent bacterial vaginosis: a pilot study. Sex Transm Dis 2014;41:290–1. PMID:24722380 https://doi.org/10.1097/OLQ.0000000000000123

999. Amsel R, Totten PA, Spiegel CA, Chen KC, Eschenbach D, Holmes KK.非特异性阴道炎。诊断标准及微生物学与流行病学关联。Am J Med 1983;74:14-22. PMID:6600371 https://doi.org/10.1016/0002-9343(83)91112-9
1000. Nugent RP, Krohn MA, Hillier SL.标准化的革兰染色判读方法提高了细菌性阴道病诊断的可靠性。J Clin Microbiol 1991;29:297-301. PMID:1706728 https://doi.org/10.1128/JCM.29.2.297-301.1991
1001. Schwebke JR, Hillier SL, Sobel JD, McGregor JA, Sweet RL.阴道革兰染色诊断细菌性阴道病的有效性。Obstet Gynecol 1996;88:573-6. PMID:8841221 https://doi.org/10.1016/0029-7844(96)00233-5
1002. Coleman JS, Gaydos CA.细菌性阴道病的分子诊断：最新进展。J Clin Microbiol 2018;56:e00342-18. PMID:29769280 https://doi.org/10.1128/JCM.00342-18
1003. Myziuk L, Romanowski B, Johnson SC.BVBlue试验用于细菌性阴道病的诊断。J Clin Microbiol 2003;41:1925-8. PMID:12734228 https://doi.org/10.1128/JCM.41.5.1925-1928.2003
1004. Bradshaw CS, Morton AN, Garland SM, Horvath LB, Kuzevska I, Fairley CK.对即时检验BVBlue以及临床和实验室标准诊断细菌性阴道病的评估。J Clin Microbiol 2005;43:1304-8. PMID:15750100 https://doi.org/10.1128/JCM.43.3.1304-1308.2005
1005. West B, Morison L, Schim van der Loeff M, et al.在冈比亚阴道分泌物综合征患者中评估一种新的细菌性阴道病快速诊断试剂盒(FemExam)。Sex Transm Dis 2003;30:483-9. PMID:12782948 https://doi.org/10.1097/00007435-200306000-00003
1006. Fredricks DN, Fiedler TL, Thomas KK, Oakley BB, Marrazzo JM.靶向PCR检测与细菌性阴道病相关的阴道细菌。J Clin Microbiol 2007;45:3270-6. PMID:17687006 https://doi.org/10.1128/JCM.01272-07
1007. Gaydos CA, Beqaj S, Schwebke JR, et al.一种阴道炎诊断检测的临床验证。Obstet Gynecol 2017;130:181-9. PMID:28594779 https://doi.org/10.1097/AOG.0000000000002090
1008. Cartwright CP, Lembke BD, Ramachandran K, et al.用于细菌性阴道病诊断的半定量多靶标PCR检测方法的开发与验证。J Clin Microbiol 2012;50:2321-9. PMID:22535982 https://doi.org/10.1128/JCM.00506-12
1009. Hilbert DW, Smith WL, Chadwick SG, et al.用于细菌性阴道病诊断的高准确度定量实时PCR检测方法的开发与验证。J Clin Microbiol 2016;54:1017-24. 勘误见：J Clin Microbiol 2016;54:1930. PMID:26818677 https://doi.org/10.1128/JCM.03104-15
1010. Schwebke JR, Desmond R.甲硝唑治疗无症状细菌性阴道病以预防性传播感染获得的随机试验。Am J Obstet Gynecol 2007;196:517.e1-6. PMID:17547876 https://doi.org/10.1016/j.ajog.2007.02.048
1011. Fjeld H, Raknes G.甲硝唑与酒精合用真的危险吗?[挪威语]。Tidsskr Nor Laegeforen 2014;134:1661-3. PMID:25223673 https://doi.org/10.4045/tidsskr.14.0081
1012. Hillier SL, Nyirjesy P, Waldbaum AS, et al.塞克硝唑治疗细菌性阴道病：一项随机对照试验。Obstet Gynecol 2017;130:379-86. PMID:28697102 https://doi.org/10.1097/ AOG.0000000000002135
1013. Schwebke JR, Morgan FG Jr, Koltun W, Nyirjesy P.单次口服塞克硝唑2g治疗女性细菌性阴道病的有效性和安全性的3期双盲安慰剂对照研究。Am J Obstet Gynecol 2017;217:678.e1-9. 勘误见：Am J Obstet Gynecol 2018;219;110. PMID:28867602 https://doi.org/10.1016/j.ajog.2017.08.017
1014. Chavoustie SE, Gersten JK, Samuel MJ, Schwebke JR.评估单剂塞克硝唑2 g治疗患有细菌性阴道病的女性和月经初潮后青春期女孩安全性的3期多中心前瞻性开放标签研究。J Womens Health(Larchmt) 2018;27:492-7. PMID:29323627 https://doi.org/10.1089/jwh.2017.6500
1015. Livengood CH 3rd, Ferris DG, Wiesenfeld HC, et al.两种替硝唑方案治疗细菌性阴道病的有效性：一项随机对照试验。Obstet Gynecol 2007;110:302-9. PMID:17666604 https://doi.org/10.1097/01.AOG.0000275282.60506.3d
1016. Sobel JD, Nyirjesy P, Brown W.替硝唑治疗甲硝唑耐药性阴道滴虫感染。Clin Infect Dis 2001;33:1341-6. PMID:11565074 https://doi.org/10.1086/323034
1017. Chavoustie SE, Jacobs M, Reisman HA, et al.1.3%甲硝唑阴道凝胶治疗细菌性阴道病：一项剂量范围研究。J Low Genit Tract Dis 2015;19:129-34. PMID:24983350 https:// doi.org/10.1097/LGT.0000000000000062
1018. Schwebke JR, Marrazzo J, Beelen AP, Sobel JD.一项评估1.3%甲硝唑阴道凝胶治疗细菌性阴道病安全性和有效性的3期、多中心、随机、双盲、赋形剂对照研究。Sex Transm Dis 2015;42:376-81. PMID:26222750 https://doi.org/10.1097/ OLQ.0000000000000300
1019. Faro S, Skokos CK; Clindesse Investigators Group.单剂量Clindesse阴道乳膏与七剂量Cleocin阴道乳膏方案治疗细菌性阴道病患者疗效和安全性的比较。Infect Dis Obstet Gynecol 2005;13:155-60. PMID:16240515 https://doi.org/10.1080/10647440500148321
1020. Marrazzo JM, Dombrowski JC, Wierzbicki MR, et al.新型阴道抗感染药物TOL-463治疗细菌性阴道病和外阴阴道念珠菌病的安全性和有效性：一项随机、单盲、2期、对照试验。Clin Infect Dis 2019;68:803-9. PMID:30184181 https://doi.org/10.1093/cid/ciy554
1021. Antonio MA, Meyn LA, Murray PJ, Busse B, Hillier SL.益生菌卷曲乳杆菌CTV-05的阴道定植因性活动和内源性乳杆菌而减少。J Infect Dis 2009;199:1506-13. PMID:19331578 https://doi.org/10.1086/598686
1022. Senok AC, Verstraelen H, Temmerman M, Botta GA.益生菌治疗细菌性阴道病。Cochrane Database Syst Rev 2009;(4): CD006289. PMID:19821358 https://doi.org/10.1002/14651858.CD006289.pub2
1023. Abad CL, Safdar N.乳杆菌益生菌在治疗或预防泌尿生殖道感染中的作用--一项系统评价。J Chemother 2009;21:243-52. PMID:19567343 https:// doi.org/10.1179/joc.2009.21.3.243
1024. Mastromarino P, Macchia S, Meggiorini L, et al.含乳杆菌阴道片剂治疗有症状细菌性阴道病的有效性。Clin Microbiol Infect 2009;15:67-74. PMID:19046169 https://doi.org/10.1111/j.1469-0691.2008.02112.x
1025. Hemmerling A, Harrison W, Schroeder A, et al.评估卷曲乳杆菌CTV-05在细菌性阴道病女性中定植效率、安全性和可接受性的2a期研究。Sex Transm Dis 2010;37:745-50. PMID:20644497 https://doi.org/10.1097/OLQ.0b013e3181e50026
1026. Bunge KE, Beigi RH, Meyn LA, Hillier SL.使用相同药物再次治疗细菌性阴道病早期治疗失败的有效性。Sex Transm Dis 2009;36:711-3. PMID:19652628 https:// doi.org/10.1097/OLQ.0b013e3181af6cfd
1027. Aguin T, Akins RA, Sobel JD.高剂量阴道甲硝唑维持治疗复发性细菌性阴道病：一项初步研究。Sex Transm Dis 2014;41:290-1. PMID:24722380 https://doi.org/10.1097/OLQ.0000000000000123

1028. Sobel JD, Ferris D, Schwebke J, et al. Suppressive antibacterial therapy with 0.75% metronidazole vaginal gel to prevent recurrent bacterial vaginosis. Am J Obstet Gynecol 2006;194:1283–9. PMID:16647911 https://doi.org/10.1016/j.ajog.2005.11.041
1029. Reichman O, Akins R, Sobel JD. Boric acid addition to suppressive antimicrobial therapy for recurrent bacterial vaginosis. Sex Transm Dis 2009;36:732–4. PMID:19704395 https://doi.org/10.1097/OLQ.0b013e3181b08456
1030. McClelland RS, Richardson BA, Hassan WM, et al. Improvement of vaginal health for Kenyan women at risk for acquisition of human immunodeficiency virus type 1: results of a randomized trial. J Infect Dis 2008;197:1361–8. PMID:18444793 https://doi.org/10.1086/587490
1031. Schwebke J, Carter B, Waldbaum A, et al. Results of a phase 3, randomized, double-blind, placebo-controlled study to evaluate the efficacy and safety of astodrimer gel for prevention of recurrent bacterial vaginosis. Am J Obstet Gynecol 2019;221:672–3. https://doi.org/10.1016/j.ajog.2019.10.087
1032. Cohen CR, Wierzbicki MR, French AL, et al. Randomized trial of Lactin-V to prevent recurrence of bacterial vaginosis. N Engl J Med 2020;382:1906–15. PMID:32402161 https://doi.org/10.1056/NEJMoa1915254
1033. Turner AN, Carr Reese P, Fields KS, et al. A blinded, randomized controlled trial of high-dose vitamin D supplementation to reduce recurrence of bacterial vaginosis. Am J Obstet Gynecol 2014;211:479.e1–13. PMID:24949544 https://doi.org/10.1016/j.ajog.2014.06.023
1034. Plummer EL, Vodstrcil LA, Danielewski JA, et al. Combined oral and topical antimicrobial therapy for male partners of women with bacterial vaginosis: acceptability, tolerability and impact on the genital microbiota of couples—a pilot study. PLoS One 2018;13:e0190199. PMID:29293559 https://doi.org/10.1371/journal.pone.0190199
1035. Schwebke JR, Lensing SY, Lee J, et al. Treatment of male sexual partners of women with bacterial vaginosis (BV): a randomized, double-blind, placebo-controlled trial. Clin Infect Dis 2020; Epub December 31, 2020. PMID: 33383580
1036. Koumans EH, Kendrick JS; CDC Bacterial Vaginosis Working Group. Preventing adverse sequelae of bacterial vaginosis: a public health program and research agenda. Sex Transm Dis 2001;28:292–7. PMID:11354269 https://doi.org/10.1097/00007435-200105000-00011
1037. Hauth JC, Goldenberg RL, Andrews WW, DuBard MB, Copper RL. Reduced incidence of preterm delivery with metronidazole and erythromycin in women with bacterial vaginosis. N Engl J Med 1995;333:1732–6. PMID:7491136 https://doi.org/10.1056/NEJM199512283332603
1038. Morales WJ, Schorr S, Albritton J. Effect of metronidazole in patients with preterm birth in preceding pregnancy and bacterial vaginosis: a placebo-controlled, double-blind study. Am J Obstet Gynecol 1994;171:345–9. PMID:8059811 https://doi.org/10.1016/S0002-9378(94)70033-8
1039. Yudin MH, Landers DV, Meyn L, Hillier SL. Clinical and cervical cytokine response to treatment with oral or vaginal metronidazole for bacterial vaginosis during pregnancy: a randomized trial. Obstet Gynecol 2003;102:527–34. PMID:12962937
1040. Ugwumadu A, Reid F, Hay P, Manyonda I. Natural history of bacterial vaginosis and intermediate flora in pregnancy and effect of oral clindamycin. Obstet Gynecol 2004;104:114–9. PMID:15229009 https://doi.org/10.1097/01.AOG.0000130068.21566.4e
1041. Burtin P, Taddio A, Ariburnu O, Einarson TR, Koren G. Safety of metronidazole in pregnancy: a meta-analysis. Am J Obstet Gynecol 1995;172:525–9. PMID:7856680 https://doi.org/10.1016/0002-9378(95)90567-7
1042. Piper JM, Mitchel EF, Ray WA. Prenatal use of metronidazole and birth defects: no association. Obstet Gynecol 1993;82:348–52. PMID:8355932
1043. Sheehy O, Santos F, Ferreira E, Berard A. The use of metronidazole during pregnancy: a review of evidence. Curr Drug Saf 2015;10:170–9. PMID:25986038 https://doi.org/10.2174/1574886310021505151 24548
1044. Lamont RF, Nhan-Chang CL, Sobel JD, Workowski K, Conde-Agudelo A, Romero R. Treatment of abnormal vaginal flora in early pregnancy with clindamycin for the prevention of spontaneous preterm birth: a systematic review and metaanalysis. Am J Obstet Gynecol 2011;205:177–90. PMID:22071048 https://doi.org/10.1016/j.ajog.2011.03.047
1045. Odendaal HJ, Popov I, Schoeman J, Smith M, Grové D. Preterm labour—is bacterial vaginosis involved? S Afr Med J 2002;92:231–4. PMID:12040953
1046. Carey JC, Klebanoff MA, Hauth JC, et al.; National Institute of Child Health and Human Development Network of Maternal-Fetal Medicine Units. Metronidazole to prevent preterm delivery in pregnant women with asymptomatic bacterial vaginosis. N Engl J Med 2000;342:534–40. PMID:10684911 https://doi.org/10.1056/NEJM200002243420802
1047. Vermeulen GM, Bruinse HW. Prophylactic administration of clindamycin 2% vaginal cream to reduce the incidence of spontaneous preterm birth in women with an increased recurrence risk: a randomised placebo-controlled double-blind trial. Br J Obstet Gynaecol 1999;106:652–7. PMID:10428520 https://doi.org/10.1111/j.1471-0528.1999.tb08363.x
1048. McDonald HM, O'Loughlin JA, Vigneswaran R, et al. Impact of metronidazole therapy on preterm birth in women with bacterial vaginosis flora (*Gardnerella vaginalis*): a randomised, placebo controlled trial. Br J Obstet Gynaecol 1997;104:1391–7. PMID:9422018 https://doi.org/10.1111/j.1471-0528.1997.tb11009.x
1049. Ugwumadu A, Manyonda I, Reid F, Hay P. Effect of early oral clindamycin on late miscarriage and preterm delivery in asymptomatic women with abnormal vaginal flora and bacterial vaginosis: a randomised controlled trial. Lancet 2003;361:983–8. PMID:12660054 https://doi.org/10.1016/S0140-6736(03)12823-1
1050. Subtil D, Brabant G, Tilloy E, et al. Early clindamycin for bacterial vaginosis in pregnancy (PREMEVA): a multicentre, double-blind, randomised controlled trial. Lancet 2018;392:2171–9. PMID:30322724 https://doi.org/10.1016/S0140-6736(18)31617-9
1051. Erickson SH, Oppenheim GL, Smith GH. Metronidazole in breast milk. Obstet Gynecol 1981;57:48–50. PMID:7454176
1052. Passmore CM, McElnay JC, Rainey EA, D'Arcy PF. Metronidazole excretion in human milk and its effect on the suckling neonate. Br J Clin Pharmacol 1988;26:45–51. PMID:3203060 https://doi.org/10.1111/j.1365-2125.1988.tb03362.x
1053. United Kingdom National Health Service. Medicines Q&A: metronidazole—is it safe to use with breastfeeding? [Internet]. London, England: United Kingdom National Health Service, UK Medicines Information; 2012. https://studylib.net/doc/7341270/metronidazole-in-breastfeeding-mothers
1054. Jamieson DJ, Duerr A, Klein RS, et al. Longitudinal analysis of bacterial vaginosis: findings from the HIV epidemiology research study. Obstet Gynecol 2001;98:656–63. PMID:11576584 https://doi.org/10.1097/00006250-200110000-00023
1055. Rowley J, Vander Hoorn S, Korenromp E, et al. Chlamydia, gonorrhoea, trichomoniasis and syphilis: global prevalence and incidence estimates, 2016. Bull World Health Organ 2019;97:548–562P. PMID:31384073 https://doi.org/10.2471/BLT.18.228486
1056. Hoots BE, Peterman TA, Torrone EA, Weinstock H, Meites E, Bolan GA. A Trich-y question: should *Trichomonas vaginalis* infection be reportable? Sex Transm Dis 2013;40:113–6. PMID:23321992 https://doi.org/10.1097/OLQ.0b013e31827c08c3

1028. Sobel JD, Ferris D, Schwebke J, et al.0.75%甲硝唑阴道凝胶抑制性抗菌治疗预防复发性细菌性阴道病。Am J Obstet Gynecol 2006;194:1283-9. PMID:16647911 https://doi.org/10.1016/j.ajog.2005.11.041
1029. Reichman O, Akins R, Sobel JD.在复发性细菌性阴道病的抑制性抗菌治疗中加入硼酸。Sex Transm Dis 2009;36:732-4. PMID:19704395 https://doi.org/10.1097/ OLQ.0b013e3181b08456
1030. McClelland RS, Richardson BA, Hassan WM, et al.改善有1型人类免疫缺陷病毒获得风险的肯尼亚女性阴道健康：一项随机试验结果。J Infect Dis 2008;197:1361-8. PMID:18444793 https://doi.org/10.1086/587490
1031. Schwebke J, Carter B, Waldbaum A, et al.一项评估astodrimer凝胶预防复发性细菌性阴道病有效性和安全性的3期、随机、双盲、安慰剂对照研究结果。Am J Obstet Gynecol 2019;221:672-3. https://doi.org/10.1016/j.ajog.2019.10.087
1032. Cohen CR, Wierzbicki MR, French AL, et al.Lactin-V预防细菌性阴道病复发的随机试验。N Engl J Med 2020;382:1906-15. PMID:32402161 https://doi.org/10.1056/ NEJMoa1915254
1033. Turner AN, Carr Reese P, Fields KS, et al.高剂量维生素D补充减少细菌性阴道病复发的盲法、随机对照试验。Am J Obstet Gynecol 2014;211:479.e1-13. PMID:24949544 https://doi.org/10.1016/j.ajog.2014.06.023
1034. Plummer EL, Vodstrcil LA, Danielewski JA, et al.对细菌性阴道病女性的男性性伴联合口服和局部抗菌治疗：可接受性、耐受性及对夫妇生殖道微生物群的影响--一项初步研究。PLoS One 2018;13:e0190199. PMID:29293559 https://doi.org/10.1371/journal.pone.0190199
1035. Schwebke JR, Lensing SY, Lee J, et al.治疗细菌性阴道病(BV)女性的男性性伴：一项随机、双盲、安慰剂对照试验。Clin Infect Dis 2020; Epub December 31, 2020. PMID: 33383580
1036. Koumans EH, Kendrick JS; CDC Bacterial Vaginosis Working Group. 预防细菌性阴道病的不良后遗症：公共卫生项目和研究议程。Sex Transm Dis 2001;28:292-7. PMID:11354269 https://doi.org/10.1097/00007435-200105000-00011
1037. Hauth JC, Goldenberg RL, Andrews WW, DuBard MB, Copper RL.甲硝唑和红霉素降低细菌性阴道病女性早产发生率。N Engl J Med 1995;333:1732-6. PMID:7491136 https://doi.org/10.1056/NEJM199512283332603
1038. Morales WJ, Schorr S, Albritton J.甲硝唑对既往妊娠早产且患细菌性阴道病患者的影响：一项安慰剂对照、双盲研究。Am J Obstet Gynecol 1994;171:345-9. PMID:8059811 https://doi.org/10.1016/S0002-9378(94) 70033-8
1039. Yudin MH, Landers DV, Meyn L, Hillier SL.妊娠期细菌性阴道病口服或阴道甲硝唑治疗的临床和宫颈细胞因子反应：一项随机试验。Obstet Gynecol 2003;102:527-34. PMID:12962937
1040. Ugwumadu A, Reid F, Hay P, Manyonda I.妊娠期细菌性阴道病和中间型菌群的 natural history 及口服克林霉素的效果。Obstet Gynecol 2004;104:114-9. PMID:15229009 https://doi.org/10.1097/01.AOG.0000130068.21566.4e
1041. Burtin P, Taddio A, Ariburnu O, Einarson TR, Koren G.妊娠期甲硝唑的安全性：一项meta分析。Am J Obstet Gynecol 1995;172:525-9. PMID:7856680 https://doi.org/10.1016/0002-9378(95) 90567-7
1042. Piper JM, Mitchel EF, Ray WA.产前使用甲硝唑与出生缺陷：无关联。Obstet Gynecol 1993;82:348-52. PMID:8355932
1043. Sheehy O, Santos F, Ferreira E, Berard A.妊娠期使用甲硝唑：证据综述。Curr Drug Saf 2015;10:170-9. PMID:25986038 https://doi.org/10.2174/1574886310021505151 24548
1044. Lamont RF, Nhan-Chang CL, Sobel JD, Workowski K, Conde-Agudelo A, Romero R.妊娠早期使用克林霉素治疗异常阴道菌群以预防自发性早产：一项系统评价和meta分析。Am J Obstet Gynecol 2011;205:177-90. PMID:22071048 https://doi.org/10.1016/j.ajog.2011.03.047
1045. Odendaal HJ, Popov I, Schoeman J, Smith M, Grové D.早产--是否涉及细菌性阴道病?S Afr Med J 2002;92:231-4. PMID:12040953
1046. Carey JC, Klebanoff MA, Hauth JC, et al.; National Institute of Child Health and Human Development Network of Maternal-Fetal Medicine Units.甲硝唑预防无症状细菌性阴道病孕妇早产。N Engl J Med 2000;342:534-40. PMID:10684911 https://doi.org/10.1056/NEJM200002243420802
1047. Vermeulen GM, Bruinse HW.预防性使用克林霉素2%阴道乳膏降低复发风险增高女性自发性早产发生率：一项随机安慰剂对照双盲试验。Br J Obstet Gynaecol 1999;106:652-7. PMID:10428520 https://doi.org/10.1111/j.1471-0528.1999.tb08363.x
1048. McDonald HM, O'Loughlin JA, Vigneswaran R, et al.甲硝唑治疗对细菌性阴道病菌群(阴道加德纳菌)女性早产的影响：一项随机安慰剂对照试验。Br J Obstet Gynaecol 1997;104:1391-7. PMID:9422018 https://doi.org/10.1111/j.1471-0528.1997.tb11009.x
1049. Ugwumadu A, Manyonda I, Reid F, Hay P.早期口服克林霉素对阴道菌群异常及细菌性阴道病无症状女性晚期流产和早产的影响：一项随机对照试验。Lancet 2003;361:983-8. PMID:12660054 https://doi.org/10.1016/S0140-6736(03) 12823-1
1050. Subtil D, Brabant G, Tilloy E, et al.妊娠期细菌性阴道病早期克林霉素治疗(PREMEVA)：一项多中心双盲随机对照试验。Lancet 2018;392:2171-9. PMID:30322724 https://doi.org/10.1016/S0140-6736(18) 31617-9
1051. Erickson SH, Oppenheim GL, Smith GH.甲硝唑在母乳中。Obstet Gynecol 1981;57:48-50. PMID:7454176
1052. Passmore CM, McElnay JC, Rainey EA, D'Arcy PF.甲硝唑在人乳中的排泄及其对哺乳新生儿的影响。Br J Clin Pharmacol 1988;26:45-51. PMID:3203060 https://doi.org/10.1111/j.1365-2125.1988.tb03362.x
1053. United Kingdom National Health Service.药物问答：甲硝唑--哺乳期使用是否安全?[Internet].London, England: United Kingdom National Health Service, UK Medicines Information; 2012. https://studylib.net/doc/7341270/ metronidazole-in-breastfeeding-mothers
1054. Jamieson DJ, Duerr A, Klein RS, et al.细菌性阴道病的纵向分析：来自HIV流行病学研究的结果。Obstet Gynecol 2001;98:656-63. PMID:11576584 https:// doi.org/10.1097/00006250-200110000-00023
1055. Rowley J, Vander Hoorn S, Korenromp E, et al.衣原体、淋病、滴虫感染和梅毒：2016年全球患病率和发病率估计。Bull World Health Organ 2019;97:548-562P.PMID:31384073 https://doi.org/10.2471/ BLT.18.228486
1056. Hoots BE, Peterman TA, Torrone EA, Weinstock H, Meites E, Bolan GA.一个Trich-y问题：阴道毛滴虫感染是否应报告?Sex Transm Dis 2013;40:113-6. PMID:23321992 https://doi.org/10.1097/OLQ.0b013e31827c08c3

1057. Flagg EW, Meites E, Phillips C, Papp J, Torrone EA. Prevalence of *Trichomonas vaginalis* among civilian, noninstitutionalized male and female population aged 14 to 59 years: United States, 2013 to 2016. Sex Transm Dis 2019;46:e93–6. PMID:31517807 https://doi.org/10.1097/OLQ.0000000000001013

1058. Daugherty M, Glynn K, Byler T. Prevalence of *Trichomonas vaginalis* infection among US males, 2013–2016. Clin Infect Dis 2019;68:460–5. PMID:29893808 https://doi.org/10.1093/cid/ciy499c

1059. Alcaide ML, Feaster DJ, Duan R, et al. The incidence of *Trichomonas vaginalis* infection in women attending nine sexually transmitted diseases clinics in the USA. Sex Transm Infect 2016;92:58–62. PMID:26071390 https://doi.org/10.1136/sextrans-2015-052010

1060. Muzny CA, Blackburn RJ, Sinsky RJ, Austin EL, Schwebke JR. Added benefit of nucleic acid amplification testing for the diagnosis of *Trichomonas vaginalis* among men and women attending a sexually transmitted diseases clinic. Clin Infect Dis 2014;59:834–41. PMID:24928292 https://doi.org/10.1093/cid/ciu446

1061. Meites E, Llata E, Braxton J, et al. *Trichomonas vaginalis* in selected U.S. sexually transmitted disease clinics: testing, screening, and prevalence. Sex Transm Dis 2013;40:865–9. PMID:24113409 https://doi.org/10.1097/OLQ.0000000000000038

1062. Ginocchio CC, Chapin K, Smith JS, et al. Prevalence of *Trichomonas vaginalis* and coinfection with *Chlamydia trachomatis* and *Neisseria gonorrhoeae* in the United States as determined by the Aptima *Trichomonas vaginalis* nucleic acid amplification assay. J Clin Microbiol 2012;50:2601–8. PMID:22622447 https://doi.org/10.1128/JCM.00748-12

1063. Shuter J, Bell D, Graham D, Holbrook KA, Bellin EY. Rates of and risk factors for trichomoniasis among pregnant inmates in New York City. Sex Transm Dis 1998;25:303–7. PMID:9662764 https://doi.org/10.1097/00007435-199807000-00006

1064. Sosman JM, MacGowan RJ, Margolis AD, et al.; Project START Study Group. Screening for sexually transmitted diseases and hepatitis in 18–29-year-old men recently released from prison: feasibility and acceptability. Int J STD AIDS 2005;16:117–22. PMID:15825246 https://doi.org/10.1258/0956462053057594

1065. Rogers SM, Turner CF, Hobbs M, et al. Epidemiology of undiagnosed trichomoniasis in a probability sample of urban young adults. PLoS One 2014;9:e90548. PMID:24626058 https://doi.org/10.1371/journal.pone.0090548

1066. Mayer KH, Bush T, Henry K, et al.; SUN Investigators. Ongoing sexually transmitted disease acquisition and risk-taking behavior among US HIV-infected patients in primary care: implications for prevention interventions. Sex Transm Dis 2012;39:1–7. PMID:22183836 https://doi.org/10.1097/OLQ.0b013e31823b1922

1067. Seña AC, Miller WC, Hobbs MM, et al. *Trichomonas vaginalis* infection in male sexual partners: implications for diagnosis, treatment, and prevention. Clin Infect Dis 2007;44:13–22. PMID:17143809 https://doi.org/10.1086/511144

1068. Kelley CF, Rosenberg ES, O'Hara BM, Sanchez T, del Rio C, Sullivan PS. Prevalence of urethral *Trichomonas vaginalis* in black and white men who have sex with men. Sex Transm Dis 2012;39:739. PMID:22902674 https://doi.org/10.1097/OLQ.0b013e318264248b

1069. Sutton M, Sternberg M, Koumans EH, McQuillan G, Berman S, Markowitz L. The prevalence of *Trichomonas vaginalis* infection among reproductive-age women in the United States, 2001–2004. Clin Infect Dis 2007;45:1319–26. PMID:17968828 https://doi.org/10.1086/522532

1070. Peterman TA, Tian LH, Metcalf CA, Malotte CK, Paul SM, Douglas JM Jr; RESPECT-2 Study Group. Persistent, undetected *Trichomonas vaginalis* infections? Clin Infect Dis 2009;48:259–60. PMID:19113985 https://doi.org/10.1086/595706

1071. Wølner-Hanssen P, Krieger JN, Stevens CE, et al. Clinical manifestations of vaginal trichomoniasis. JAMA 1989;261:571–6. PMID:2783346 https://doi.org/10.1001/jama.1989.03420040109029

1072. Gray RH, Kigozi G, Serwadda D, et al. The effects of male circumcision on female partners' genital tract symptoms and vaginal infections in a randomized trial in Rakai, Uganda. Am J Obstet Gynecol 2009;200:42.e1–7. PMID:18976733 https://doi.org/10.1016/j.ajog.2008.07.069

1073. Sobngwi-Tambekou J, Taljaard D, Nieuwoudt M, Lissouba P, Puren A, Auvert B. Male circumcision and *Neisseria gonorrhoeae*, *Chlamydia trachomatis* and *Trichomonas vaginalis*: observations after a randomised controlled trial for HIV prevention. Sex Transm Infect 2009;85:116–20. PMID:19074928 https://doi.org/10.1136/sti.2008.032334

1074. Tsai CS, Shepherd BE, Vermund SH. Does douching increase risk for sexually transmitted infections? A prospective study in high-risk adolescents. Am J Obstet Gynecol 2009;200:38.e1–8. PMID:18667177 https://doi.org/10.1016/j.ajog.2008.06.026

1075. Silver BJ, Guy RJ, Kaldor JM, Jamil MS, Rumbold AR. *Trichomonas vaginalis* as a cause of perinatal morbidity: a systematic review and meta-analysis. Sex Transm Dis 2014;41:369–76. PMID:24825333 https://doi.org/10.1097/OLQ.0000000000000134

1076. Yang S, Zhao W, Wang H, Wang Y, Li J, Wu X. *Trichomonas vaginalis* infection-associated risk of cervical cancer: a meta-analysis. Eur J Obstet Gynecol Reprod Biol 2018;228:166–73. PMID:29980111 https://doi.org/10.1016/j.ejogrb.2018.06.031

1077. Najafi A, Chaechi Nosrati MR, Ghasemi E, et al. Is there association between *Trichomonas vaginalis* infection and prostate cancer risk?: A systematic review and meta-analysis. Microb Pathog 2019;137:103752. PMID:31539586 https://doi.org/10.1016/j.micpath.2019.103752

1078. Wang CC, McClelland RS, Reilly M, et al. The effect of treatment of vaginal infections on shedding of human immunodeficiency virus type 1. J Infect Dis 2001;183:1017–22. PMID:11237825 https://doi.org/10.1086/319287

1079. Kissinger P, Amedee A, Clark RA, et al. *Trichomonas vaginalis* treatment reduces vaginal HIV-1 shedding. Sex Transm Dis 2009;36:11–6. PMID:19008776 https://doi.org/10.1097/OLQ.0b013e318186decf

1080. Minkoff H, Grunebaum AN, Schwarz RH, et al. Risk factors for prematurity and premature rupture of membranes: a prospective study of the vaginal flora in pregnancy. Am J Obstet Gynecol 1984;150:965–72. PMID:6391179 https://doi.org/10.1016/0002-9378(84)90392-2

1081. Cotch MF, Pastorek JG 2nd, Nugent RP, et al.; The Vaginal Infections and Prematurity Study Group. *Trichomonas vaginalis* associated with low birth weight and preterm delivery. Sex Transm Dis 1997;24:353–60. PMID:9243743 https://doi.org/10.1097/00007435-199707000-00008

1082. Moodley P, Wilkinson D, Connolly C, Moodley J, Sturm AW. *Trichomonas vaginalis* is associated with pelvic inflammatory disease in women infected with human immunodeficiency virus. Clin Infect Dis 2002;34:519–22. PMID:11797180 https://doi.org/10.1086/338399

1083. Francis SC, Kent CK, Klausner JD, et al. Prevalence of rectal *Trichomonas vaginalis* and *Mycoplasma genitalium* in male patients at the San Francisco STD clinic, 2005–2006. Sex Transm Dis 2008;35:797–800. PMID:18607317 https://doi.org/10.1097/OLQ.0b013e318177ec39

1084. Hollman D, Coupey SM, Fox AS, Herold BC. Screening for *Trichomonas vaginalis* in high-risk adolescent females with a new transcription-mediated nucleic acid amplification test (NAAT): associations with ethnicity, symptoms, and prior and current STIs. J Pediatr Adolesc Gynecol 2010;23:312–6. PMID:20493735 https://doi.org/10.1016/j.jpag.2010.03.004

1085. Roth AM, Williams JA, Ly R, et al. Changing sexually transmitted infection screening protocol will result in improved case finding for *Trichomonas vaginalis* among high-risk female populations. Sex Transm Dis 2011;38:398–400. PMID:21217417 https://doi.org/10.1097/OLQ.0b013e318203e3ce

1057. Flagg EW, Meites E, Phillips C, Papp J, Torrone EA.14至59岁平民非机构化男女人群中阴道毛滴虫患病率：美国，2013至2016年。Sex Transm Dis 2019;46:e93-6. PMID:31517807 https://doi.org/10.1097/OLQ.0000000000001013

1058. Daugherty M, Glynn K, Byler T.美国男性中阴道毛滴虫感染患病率，2013-2016年。Clin Infect Dis 2019;68:460-5. PMID:29893808 https://doi.org/10.1093/cid/ciy499c

1059. Alcaide ML, Feaster DJ, Duan R, et al.美国九家性传播疾病诊所就诊女性中阴道毛滴虫感染发病率。Sex Transm Infect 2016;92:58-62. PMID:26071390 https://doi.org/10.1136/sextrans-2015-052010

1060. Muzny CA, Blackburn RJ, Sinsky RJ, Austin EL, Schwebke JR.核酸扩增检测对性病门诊就诊男性和女性阴道毛滴虫诊断的附加益处。Clin Infect Dis 2014;59:834-41. PMID:24928292 https://doi.org/10.1093/cid/ciu446

1061. Meites E, Llata E, Braxton J, et al.选定阴道毛滴虫美国性传播疾病诊所：检测、筛查和患病率。Sex Transm Dis 2013;40:865-9. PMID:24113409 https://doi.org/10.1097/OLQ.0000000000000038

1062. Ginocchio CC, Chapin K, Smith JS, et al.通过Aptima 阴道毛滴虫核酸扩增检测确定的美国阴道毛滴虫患病率及与沙眼衣原体和淋病奈瑟菌的合并感染。J Clin Microbiol 2012;50:2601-8. PMID:22622447 https://doi.org/10.1128/JCM.00748-12

1063. Shuter J, Bell D, Graham D, Holbrook KA, Bellin EY.纽约市怀孕囚犯中滴虫感染率及危险因素。Sex Transm Dis 1998;25:303-7. PMID:9662764 https://doi.org/10.1097/00007435-199807000-00006

1064. Sosman JM, MacGowan RJ, Margolis AD, et al.; Project START Study Group.近期出狱的18-29岁男性性传播疾病和肝炎筛查：可行性和可接受性。Int J STD AIDS 2005;16:117-22. PMID:15825246 https://doi.org/10.1258/0956462053057594

1065. Rogers SM, Turner CF, Hobbs M, et al.城市年轻成人概率样本中未诊断滴虫感染的流行病学。PLoS One 2014;9:e90548. PMID:24626058 https://doi.org/10.1371/ journal.pone.0090548

1066. Mayer KH, Bush T, Henry K, et al.; SUN Investigators.美国HIV感染患者初级保健中持续的性传播疾病获得和危险行为：对预防干预的启示。Sex Transm Dis 2012;39:1-7. PMID:22183836 https://doi.org/10.1097/OLQ.0b013e31823b1922

1067. Seña AC, Miller WC, Hobbs MM, et al.男性性伴中阴道毛滴虫感染：对诊断、治疗和预防的启示。Clin Infect Dis 2007;44:13-22. PMID:17143809 https://doi.org/10.1086/511144

1068. Kelley CF, Rosenberg ES, O'Hara BM, Sanchez T, del Rio C, Sullivan PS.男男性行为人群黑人和白人男性中尿道阴道毛滴虫患病率。Sex Transm Dis 2012;39:739. PMID:22902674 https://doi.org/10.1097/OLQ.0b013e318264248b

1069. Sutton M, Sternberg M, Koumans EH, McQuillan G, Berman S, Markowitz L.美国育龄女性中阴道毛滴虫感染患病率，2001-2004年。Clin Infect Dis 2007;45:1319-26. PMID:17968828 https://doi.org/10.1086/522532

1070. Peterman TA, Tian LH, Metcalf CA, Malotte CK, Paul SM, Douglas JM Jr; RESPECT-2 Study Group.持续性未检测到的阴道毛滴虫感染?Clin Infect Dis 2009;48:259-60. PMID:19113985 https://doi.org/10.1086/595706

1071. Wølner-Hanssen P, Krieger JN, Stevens CE, et al.阴道滴虫感染的临床表现。JAMA 1989;261:571-6. PMID:2783346 https://doi.org/10.1001/jama.1989.03420040109029

1072. Gray RH, Kigozi G, Serwadda D, et al.乌干达拉凯随机试验中男性包皮环切对女性伴侣生殖道症状和阴道感染的影响。Am J Obstet Gynecol 2009;200:42.e1-7. PMID:18976733 https://doi.org/10.1016/j.ajog.2008.07.069

1073. Sobngwi-Tambekou J, Taljaard D, Nieuwoudt M, Lissouba P, Puren A, Auvert B.男性包皮环切与淋病奈瑟菌、沙眼衣原体和阴道毛滴虫:HIV预防随机对照试验后的观察。Sex Transm Infect 2009;85:116-20. PMID:19074928 https://doi.org/10.1136/sti.2008.032334

1074. Tsai CS, Shepherd BE, Vermund SH.阴道冲洗是否增加性传播感染风险?高危青少年前瞻性研究。Am J Obstet Gynecol 2009;200:38.e1-8. PMID:18667177 https://doi.org/10.1016/j.ajog.2008.06.026

1075. Silver BJ, Guy RJ, Kaldor JM, Jamil MS, Rumbold AR.阴道毛滴虫作为围产期发病率的原因：系统综述和荟萃分析。Sex Transm Dis 2014;41:369-76. PMID:24825333 https://doi.org/10.1097/OLQ.0000000000000134

1076. Yang S, Zhao W, Wang H, Wang Y, Li J, Wu X.阴道毛滴虫感染相关的宫颈癌风险：一项meta分析。Eur J Obstet Gynecol Reprod Biol 2018;228:166-73. PMID:29980111 https://doi.org/10.1016/j.ejogrb.2018.06.031

1077. Najafi A, Chaechi Nosrati MR, Ghasemi E, et al.阴道毛滴虫感染与前列腺癌风险之间是否存在关联?：一项系统综述与meta分析。Microb Pathog 2019;137:103752. PMID:31539586 https://doi.org/10.1016/j.micpath.2019.103752

1078. Wang CC, McClelland RS, Reilly M, et al.阴道感染治疗对1型人类免疫缺陷病毒排毒的影响。J Infect Dis 2001;183:1017-22. PMID:11237825 https:// doi.org/10.1086/319287

1079. Kissinger P, Amedee A, Clark RA, et al.阴道毛滴虫治疗可减少阴道HIV-1排毒。Sex Transm Dis 2009;36:11-6. PMID:19008776 https://doi.org/10.1097/OLQ.0b013e318186decf

1080. Minkoff H, Grunebaum AN, Schwarz RH, et al.早产与胎膜早破的危险因素：妊娠期阴道菌群的前瞻性研究。Am J Obstet Gynecol 1984;150:965-72. PMID:6391179 https:// doi.org/10.1016/0002-9378(84) 90392-2

1081. Cotch MF, Pastorek JG 2nd, Nugent RP, et al.; The Vaginal Infections and Prematurity Study Group.阴道毛滴虫与低出生体重和早产相关。Sex Transm Dis 1997;24:353-60. PMID:9243743 https://doi.org/10.1097/00007435-199707000-00008

1082. Moodley P, Wilkinson D, Connolly C, Moodley J, Sturm AW.阴道毛滴虫与感染人类免疫缺陷病毒女性的盆腔炎性疾病相关。Clin Infect Dis 2002;34:519-22. PMID:11797180 https://doi.org/10.1086/338399

1083. Francis SC, Kent CK, Klausner JD, et al.2005-2006年旧金山STD诊所男性患者直肠阴道毛滴虫和生殖支原体的患病率。Sex Transm Dis 2008;35:797-800. PMID:18607317 https://doi.org/10.1097/OLQ.0b013e318177ec39

1084. Hollman D, Coupey SM, Fox AS, Herold BC.使用新型转录介导核酸扩增检测(NAAT)对高危青少年女性进行阴道毛滴虫筛查：与种族、症状及既往和当前STI的关联。J Pediatr Adolesc Gynecol 2010;23:312-6. PMID:20493735 https:// doi.org/10.1016/ j.jpag.2010.03.004

1085. Roth AM, Williams JA, Ly R, et al.改变性传播感染筛查方案将改善高危女性人群中阴道毛滴虫的病例发现。Sex Transm Dis 2011;38:398-400. PMID:21217417 https://doi.org/10.1097/OLQ.0b013e318203e3ce

1086. Hobbs MM, Seña AC. Modern diagnosis of *Trichomonas vaginalis* infection. Sex Transm Infect 2013;89:434–8. PMID:23633669 https://doi.org/10.1136/sextrans-2013-051057
1087. Kingston MA, Bansal D, Carlin EM. 'Shelf life' of *Trichomonas vaginalis*. Int J STD AIDS 2003;14:28–9. PMID:12590789 https://doi.org/10.1258/095646203321043228
1088. Schwebke JR, Hobbs MM, Taylor SN, et al. Molecular testing for *Trichomonas vaginalis* in women: results from a prospective U.S. clinical trial. J Clin Microbiol 2011;49:4106–11. PMID:21940475 https://doi.org/10.1128/JCM.01291-11
1089. Huppert JS, Mortensen JE, Reed JL, et al. Rapid antigen testing compares favorably with transcription-mediated amplification assay for the detection of *Trichomonas vaginalis* in young women. Clin Infect Dis 2007;45:194–8. PMID:17578778 https://doi.org/10.1086/518851
1090. Van Der Pol B, Williams JA, Taylor SN, et al. Detection of *Trichomonas vaginalis* DNA by use of self-obtained vaginal swabs with the BD ProbeTec Qx assay on the BD Viper system. J Clin Microbiol 2014;52:885–9. PMID:24391200 https://doi.org/10.1128/JCM.02966-13
1091. Van Der Pol B, Williams JA, Fuller D, Taylor SN, Hook EW 3rd. Combined testing for chlamydia, gonorrhea, and trichomonas by use of the BD Max CT/GC/TV assay with genitourinary specimen types. J Clin Microbiol 2016;55:155–64. PMID:27795343 https://doi.org/10.1128/JCM.01766-16
1092. Schwebke JR, Gaydos CA, Davis T, et al. Clinical evaluation of the Cepheid Xpert TV Assay for detection of *Trichomonas vaginalis* with prospectively collected specimens from men and women. J Clin Microbiol 2018;56:e01091-17. PMID:29167292 https://doi.org/10.1128/JCM.01091-17
1093. Campbell L, Woods V, Lloyd T, Elsayed S, Church DL. Evaluation of the OSOM Trichomonas rapid test versus wet preparation examination for detection of *Trichomonas vaginalis* vaginitis in specimens from women with a low prevalence of infection. J Clin Microbiol 2008;46:3467–9. PMID:18685008 https://doi.org/10.1128/JCM.00671-08
1094. Huppert JS, Hesse E, Kim G, et al. Adolescent women can perform a point-of-care test for trichomoniasis as accurately as clinicians. Sex Transm Infect 2010;86:514–9. PMID:20595142 https://doi.org/10.1136/sti.2009.042168
1095. Sheele JM, Crandall CJ, Arko BL, et al. The OSOM® Trichomonas Test is unable to accurately diagnose *Trichomonas vaginalis* from urine in men. Am J Emerg Med 2019;37:1002–3. PMID:30361151 https://doi.org/10.1016/j.ajem.2018.10.022
1096. Gaydos CA, Schwebke J, Dombrowski J, et al. Clinical performance of the Solana® Point-of-Care Trichomonas Assay from clinician-collected vaginal swabs and urine specimens from symptomatic and asymptomatic women. Expert Rev Mol Diagn 2017;17:303–6. PMID:28092466 https://doi.org/10.1080/14737159.2017.1282823
1097. Gaydos CA, Hobbs M, Marrazzo J, et al. Rapid diagnosis of *Trichomonas vaginalis* by testing vaginal swabs in an isothermal helicase-dependent AmpliVue Assay. Sex Transm Dis 2016;43:369–73. PMID:27196258 https://doi.org/10.1097/OLQ.0000000000000447
1098. Patil MJ, Nagamoti JM, Metgud SC. Diagnosis of *Trichomonas vaginalis* from vaginal specimens by wet mount microscopy, In Pouch TV culture system, and PCR. J Glob Infect Dis 2012;4:22–5. PMID:22529623 https://doi.org/10.4103/0974-777X.93756
1099. Lawing LF, Hedges SR, Schwebke JR. Detection of trichomonosis in vaginal and urine specimens from women by culture and PCR. J Clin Microbiol 2000;38:3585–8. PMID:11015368 https://doi.org/10.1128/JCM.38.10.3585-3588.2000
1100. Mohamed OA, Cohen CR, Kungu D, et al. Urine proves a poor specimen for culture of *Trichomonas vaginalis* in women. Sex Transm Infect 2001;77:78–9. PMID:11158705 https://doi.org/10.1136/sti.77.1.78
1101. Rivers CA, Muzny CA, Schwebke JR. Diagnostic rates differ on the basis of the number of read days with the use of the InPouch culture system for *Trichomonas vaginalis* screening. J Clin Microbiol 2013;51:3875–6. PMID:24006006 https://doi.org/10.1128/JCM.02006-13
1103. Audisio T, Pigini T, de Riutort SV, et al. Validity of the Papanicolaou smear in the diagnosis of *Candida* spp., *Trichomonas vaginalis*, and bacterial vaginosis. J Low Genit Tract Dis 2001;5:223–5. PMID:17050980
1104. Loo SK, Tang WY, Lo KK. Clinical significance of *Trichomonas vaginalis* detected in Papanicolaou smear: a survey in female Social Hygiene Clinic. Hong Kong Med J 2009;15:90–3. PMID:19342733
1105. Howe K, Kissinger PJ. Single-dose compared with multidose metronidazole for the treatment of trichomoniasis in women: a meta-analysis. Sex Transm Dis 2017;44:29–34. PMID:27898571 https://doi.org/10.1097/OLQ.0000000000000537
1105. Kissinger P, Mena L, Levison J, et al. A randomized treatment trial: single versus 7-day dose of metronidazole for the treatment of *Trichomonas vaginalis* among HIV-infected women. J Acquir Immune Defic Syndr 2010;55:565–71. PMID:21423852 https://doi.org/10.1097/QAI.0b013e3181eda955
1106. Wood BA, Monro AM. Pharmacokinetics of tinidazole and metronidazole in women after single large oral doses. Br J Vener Dis 1975;51:51–3. PMID:1092424 https://doi.org/10.1136/sti.51.1.51
1107. Viitanen J, Haataja H, Männistö PT. Concentrations of metronidazole and tinidazole in male genital tissues. Antimicrob Agents Chemother 1985;28:812–4. PMID:4083864 https://doi.org/10.1128/AAC.28.6.812
1108. Gabriel G, Robertson E, Thin RN. Single dose treatment of trichomoniasis. J Int Med Res 1982;10:129–30. PMID:7067925 https://doi.org/10.1177/030006058201000212
1109. Mati JK, Wallace RJ. The treatment of trichomonal vaginitis using a single dose of tinidazole by mouth. East Afr Med J 1974;51:883–8. PMID:4616829
1110. Anjaeyulu R, Gupte SA, Desai DB. Single-dose treatment of trichomonal vaginitis: a comparison of tinidazole and metronidazole. J Int Med Res 1977;5:438–41. PMID:590601
1111. Apte VV, Packard RS. Tinidazole in the treatment of trichomoniasis, giardiasis and amoebiasis. Report of a multicentre study. Drugs 1978;15(Suppl 1):43–8. PMID:657995 https://doi.org/10.2165/00003495-197800151-00009
1112. O-Prasertsawat P, Jetsawangsri T. Split-dose metronidazole or single-dose tinidazole for the treatment of vaginal trichomoniasis. Sex Transm Dis 1992;19:295–7. PMID:1411848 https://doi.org/10.1097/00007435-199209000-00011
1113. Kawamura N. Metronidazole and tinidazole in a single large dose for treating urogenital infections with *Trichomonas vaginalis* in men. Br J Vener Dis 1978;54:81–3. PMID:305809 https://doi.org/10.1136/sti.54.2.81
1114. Forna F, Gülmezoglu AM. Interventions for treating trichomoniasis in women. Cochrane Database Syst Rev 2003;(2):CD000218. PMID:12804391
1115. Cu-Uvin S, Ko H, Jamieson DJ, et al.; HIV Epidemiology Research Study (HERS) Group. Prevalence, incidence, and persistence or recurrence of trichomoniasis among human immunodeficiency virus (HIV)-positive women and among HIV-negative women at high risk for HIV infection. Clin Infect Dis 2002;34:1406–11. PMID:11981738 https://doi.org/10.1086/340264
1116. Schwebke JR, Barrientes FJ. Prevalence of *Trichomonas vaginalis* isolates with resistance to metronidazole and tinidazole. Antimicrob Agents Chemother 2006;50:4209–10. PMID:17000740 https://doi.org/10.1128/AAC.00814-06

1086. Hobbs MM, Seña AC.阴道毛滴虫感染的现代诊断。Sex Transm Infect 2013;89:434-8. PMID:23633669 https://doi.org/10.1136/sextrans-2013-051057
1087. Kingston MA, Bansal D, Carlin EM.阴道毛滴虫的"保存期限"。Int J STD AIDS 2003;14:28-9. PMID:12590789 https://doi.org/10.1258/095646203321043228
1088. Schwebke JR, Hobbs MM, Taylor SN, et al.女性阴道毛滴虫的分子检测：一项美国前瞻性临床试验结果。J Clin Microbiol 2011;49:4106-11. PMID:21940475 https://doi.org/10.1128/JCM.01291-11
1089. Huppert JS, Mortensen JE, Reed JL, et al.快速抗原检测在年轻女性阴道毛滴虫检测中与转录介导扩增试验相比具有优势。Clin Infect Dis 2007;45:194-8. PMID:17578778 https://doi.org/10.1086/518851
1090. Van Der Pol B, Williams JA, Taylor SN, et al.使用自采阴道拭子结合BD Viper系统上的BD ProbeTec Qx检测法检测阴道毛滴虫DNA。J Clin Microbiol 2014;52:885-9. PMID:24391200 https://doi.org/10.1128/JCM.02966-13
1091. Van Der Pol B, Williams JA, Fuller D, Taylor SN, Hook EW 3rd.使用BD Max CT/GC/TV 检测结合泌尿生殖道标本类型对衣原体、淋病和滴虫感染进行联合检测。J Clin Microbiol 2016;55:155-64. PMID:27795343 https:// doi.org/10.1128/JCM.01766-16
1092. Schwebke JR, Gaydos CA, Davis T, et al.对 Cepheid Xpert TV 检测法用于检测男性和女性前瞻性采集标本中阴道毛滴虫的临床评价。J Clin Microbiol 2018;56:e01091-17. PMID:29167292 https://doi.org/10.1128/JCM.01091-17
1093. Campbell L, Woods V, Lloyd T, Elsayed S, Church DL.在感染率较低的女性标本中，OSOM 滴虫快速检测与湿片检查检测阴道毛滴虫阴道炎的评估比较。J Clin Microbiol 2008;46:3467-9. PMID:18685008 https://doi.org/10.1128/JCM.00671-08
1094. Huppert JS, Hesse E, Kim G, et al.青少年女性进行滴虫感染即时检测的准确性可与临床医生相当。Sex Transm Infect 2010;86:514-9. PMID:20595142 https://doi.org/10.1136/sti.2009.042168
1095. Sheele JM, Crandall CJ, Arko BL, et al.OSOM® 滴虫检测无法从男性尿液中准确诊断阴道毛滴虫。Am J Emerg Med 2019;37:1002-3. PMID:30361151 https:// doi.org/10.1016/j.ajem.2018.10.022
1096. Gaydos CA, Schwebke J, Dombrowski J, et al.Solana® 即时滴虫检测法使用临床医生采集的有症状和无症状女性阴道拭子及尿液标本的临床性能。Expert Rev Mol Diagn 2017;17:303-6. PMID:28092466 https://doi.org/10.1080/14737159.2017.1282823
1097. Gaydos CA, Hobbs M, Marrazzo J, et al.通过等温解旋酶依赖性 AmpliVue 检测法检测阴道拭子快速诊断阴道毛滴虫。Sex Transm Dis 2016;43:369-73. PMID:27196258 https://doi.org/10.1097/OLQ.0000000000000447
1098. Patil MJ, Nagamoti JM, Metgud SC.通过湿片显微镜检查、In Pouch TV 培养系统和 PCR 从阴道标本中诊断阴道毛滴虫。J Glob Infect Dis 2012;4:22-5. PMID:22529623 https://doi.org/10.4103/0974-777X.93756
1099. Lawing LF, Hedges SR, Schwebke JR.通过培养和 PCR 检测女性阴道和尿液标本中的滴虫病。J Clin Microbiol 2000;38:3585-8. PMID:11015368 https://doi.org/10.1128/JCM.38.10.3585-3588.2000
1100. Mohamed OA, Cohen CR, Kungu D, et al.尿液被证明是女性阴道毛滴虫培养的不良标本。Sex Transm Infect 2001;77:78-9. PMID:11158705 https://doi.org/10.1136/ sti.77.1.78
1101. Rivers CA, Muzny CA, Schwebke JR.使用 InPouch 培养系统筛查阴道毛滴虫时，诊断率因读取天数不同而异。J Clin Microbiol 2013;51:3875-6. PMID:24006006 https://doi.org/10.1128/JCM.02006-13
1103. Audisio T, Pigini T, de Riutort SV, et al.巴氏涂片诊断念珠菌属、阴道毛滴虫和细菌性阴道病的有效性。J Low Genit Tract Dis 2001;5:223-5. PMID:17050980
1104. Loo SK, Tang WY, Lo KK.巴氏涂片中检出阴道毛滴虫的临床意义：女性社会卫生诊所的调查。Hong Kong Med J 2009;15:90-3. PMID:19342733
1105. Howe K, Kissinger PJ.单剂量与多剂量甲硝唑治疗女性滴虫感染的比较：一项荟萃分析。Sex Transm Dis 2017;44:29-34. PMID:27898571 https:// doi.org/10.1097/OLQ.0000000000000537
1105. Kissinger P, Mena L, Levison J, et al.一项随机治疗试验：单剂量与 7 天剂量甲硝唑治疗 HIV 感染女性中阴道毛滴虫的比较。J Acquir Immune Defic Syndr 2010;55:565-71. PMID:21423852 https://doi.org/10.1097/QAI.0b013e3181eda955
1106. Wood BA, Monro AM.女性单次大剂量口服后替硝唑和甲硝唑的药代动力学。Br J Vener Dis 1975;51:51-3. PMID:1092424 https://doi.org/10.1136/sti.51.1.51
1107. Viitanen J, Haataja H, Männistö PT.甲硝唑和替硝唑在男性生殖组织中的浓度。Antimicrob Agents Chemother 1985;28:812-4. PMID:4083864 https://doi.org/10.1128/ AAC.28.6.812
1108. Gabriel G, Robertson E, Thin RN.滴虫感染的单剂量治疗。J Int Med Res 1982;10:129-30. PMID:7067925 https://doi.org/10.1177/030006058201000212
1109. Mati JK, Wallace RJ.单次口服剂量替硝唑治疗滴虫性阴道炎。East Afr Med J 1974;51:883-8. PMID:4616829
1110. Anjaeyulu R, Gupte SA, Desai DB.滴虫性阴道炎的单剂量治疗：替硝唑与甲硝唑的比较。J Int Med Res 1977;5:438-41. PMID:590601
1111. Apte VV, Packard RS.替硝唑治疗滴虫感染、贾第虫病和阿米巴病。一项多中心研究报告。Drugs 1978;15(Suppl 1): 43-8. PMID:657995 https://doi.org/10.2165/00003495-197800151-00009
1112. O-Prasertsawat P, Jetsawangsri T.分剂量甲硝唑或单剂量替硝唑治疗阴道滴虫感染。Sex Transm Dis 1992;19:295-7. PMID:1411848 https://doi.org/10.1097/00007435-199209000-00011
1113. Kawamura N.单次大剂量甲硝唑和替硝唑治疗男性阴道毛滴虫泌尿生殖道感染。Br J Vener Dis 1978;54:81-3. PMID:305809 https://doi.org/10.1136/ sti.54.2.81
1114. Forna F, Gülmezoglu AM.女性滴虫感染的干预措施。Cochrane Database Syst Rev 2003;(2): CD000218. PMID:12804391
1115. Cu-Uvin S, Ko H, Jamieson DJ, et al.; HIV Epidemiology Research Study(HERS) Group.人类免疫缺陷病毒(HIV) 阳性女性及 HIV 感染高危 HIV 阴性女性中滴虫感染的患病率、发病率及持续或复发情况。Clin Infect Dis 2002;34:1406-11. PMID:11981738 https://doi.org/10.1086/340264
1116. Schwebke JR, Barrientes FJ.对甲硝唑和替硝唑耐药的阴道毛滴虫分离株的患病率。Antimicrob Agents Chemother 2006;50:4209-10. PMID:17000740 https://doi.org/10.1128/AAC.00814-06

1117. Van Der Pol B, Williams JA, Orr DP, Batteiger BE, Fortenberry JD. Prevalence, incidence, natural history, and response to treatment of *Trichomonas vaginalis* infection among adolescent women. J Infect Dis 2005;192:2039–44. PMID:16288365 https://doi.org/10.1086/498217
1118. Kirkcaldy RD, Augostini P, Asbel LE, et al. *Trichomonas vaginalis* antimicrobial drug resistance in 6 US cities, STD Surveillance Network, 2009–2010. Emerg Infect Dis 2012;18:939–43. PMID:22608054 https://doi.org/10.3201/eid1806.111590
1119. Crowell AL, Sanders-Lewis KA, Secor WE. In vitro metronidazole and tinidazole activities against metronidazole-resistant strains of *Trichomonas vaginalis*. Antimicrob Agents Chemother 2003;47:1407–9. PMID:12654679 https://doi.org/10.1128/AAC.47.4.1407-1409.2003
1120. Muzny CA, Mena L, Lillis RA, et al. A comparison of 2 g single-dose versus 7-day 500 mg twice daily metronidazole for the treatment trichomoniasis in women by selected clinical factors. Am J Obstet Gynecol 2019;221:669. https://doi.org/10.1016/j.ajog.2019.10.079
1121. Sobel JD, Nyirjesy P, Brown W. Tinidazole therapy for metronidazole-resistant vaginal trichomoniasis. Clin Infect Dis 2001;33:1341–6. PMID:11565074 https://doi.org/10.1086/323034
1122. Nyirjesy P, Gilbert J, Mulcahy LJ. Resistant trichomoniasis: successful treatment with combination therapy. Sex Transm Dis 2011;38:962–3. PMID:21934573 https://doi.org/10.1097/OLQ.0b013e31822037e4
1123. Muzny C, Barnes A, Mena L. Symptomatic *Trichomonas vaginalis* infection in the setting of severe nitroimidazole allergy: successful treatment with boric acid. Sex Health 2012;9:389–91. PMID:22877600 https://doi.org/10.1071/SH11114
1124. Aggarwal A, Shier RM. Recalcitrant *Trichomonas vaginalis* infections successfully treated with vaginal acidification. J Obstet Gynaecol Can 2008;30:55–8. PMID:18198069 https://doi.org/10.1016/S1701-2163(16)32714-1
1125. Dan M, Sobel JD. Failure of nitazoxanide to cure trichomoniasis in three women. Sex Transm Dis 2007;34:813–4. PMID:17551415 https://doi.org/10.1097/NMD.0b013e31802f5d9a
1126. Seña AC, Bachmann LH, Hobbs MM. Persistent and recurrent *Trichomonas vaginalis* infections: epidemiology, treatment and management considerations. Expert Rev Anti Infect Ther 2014;12:673–85. PMID:24555561 https://doi.org/10.1586/14787210.2014.887440
1127. Helms DJ, Mosure DJ, Secor WE, Workowski KA. Management of *Trichomonas vaginalis* in women with suspected metronidazole hypersensitivity. Am J Obstet Gynecol 2008;198:370.e1–7. PMID:18221927 https://doi.org/10.1016/j.ajog.2007.10.795
1128. Gendelman SR, Pien LC, Gutta RC, Abouhassan SR. Modified oral metronidazole desensitization protocol. Allergy Rhinol (Providence) 2014;5:66–9. PMID:24612959 https://doi.org/10.2500/ar.2014.5.0080
1129. Nyirjesy P, Sobel JD, Weitz MV, Leaman DJ, Gelone SP. Difficult-to-treat trichomoniasis: results with paromomycin cream. Clin Infect Dis 1998;26:986–8. PMID:9564487 https://doi.org/10.1086/513951
1130. Klebanoff MA, Carey JC, Hauth JC, et al.; National Institute of Child Health and Human Development Network of Maternal-Fetal Medicine Units. Failure of metronidazole to prevent preterm delivery among pregnant women with asymptomatic *Trichomonas vaginalis* infection. N Engl J Med 2001;345:487–93. PMID:11519502 https://doi.org/10.1056/NEJMoa003329
1131. Stringer E, Read JS, Hoffman I, Valentine M, Aboud S, Goldenberg RL. Treatment of trichomoniasis in pregnancy in sub-Saharan Africa does not appear to be associated with low birth weight or preterm birth. S Afr Med J 2010;100:58–64. PMID:20429491
1132. Caro-Patón T, Carvajal A, Martin de Diego I, Martin-Arias LH, Alvarez Requejo A, Rodríguez Pinilla E. Is metronidazole teratogenic? A meta-analysis. Br J Clin Pharmacol 1997;44:179–82. PMID:9278206 https://doi.org/10.1046/j.1365-2125.1997.00660.x
1133. Gülmezoglu AM. Interventions for trichomoniasis in pregnancy. Cochrane Database Syst Rev 2002;(3):CD000220. PMID:12137609
1134. Goldenberg RL, Mwatha A, Read JS, et al.; Hptn024 Team. The HPTN 024 Study: the efficacy of antibiotics to prevent chorioamnionitis and preterm birth. Am J Obstet Gynecol 2006;194:650–61. PMID:16522393 https://doi.org/10.1016/j.ajog.2006.01.004
1135. Mann JR, McDermott S, Zhou L, Barnes TL, Hardin J. Treatment of trichomoniasis in pregnancy and preterm birth: an observational study. J Womens Health (Larchmt) 2009;18:493–7. PMID:19361316 https://doi.org/10.1089/jwh.2008.0964
1136. Carter JE, Whithaus KC. Neonatal respiratory tract involvement by *Trichomonas vaginalis*: a case report and review of the literature. Am J Trop Med Hyg 2008;78:17–9. PMID:18187779 https://doi.org/10.4269/ajtmh.2008.78.17
1137. Trintis J, Epie N, Boss R, Riedel S. Neonatal *Trichomonas vaginalis* infection: a case report and review of literature. Int J STD AIDS 2010;21:606–7. PMID:20975098 https://doi.org/10.1258/ijsa.2010.010174
1138. Miller M, Liao Y, Wagner M, Korves C. HIV, the clustering of sexually transmitted infections, and sex risk among African American women who use drugs. Sex Transm Dis 2008;35:696–702. PMID:18418289 https://doi.org/10.1097/OLQ.0b013e31816b1fb8
1139. Anderson BL, Firnhaber C, Liu T, et al. Effect of trichomoniasis therapy on genital HIV viral burden among African women. Sex Transm Dis 2012;39:638–42. PMID:22797689 https://doi.org/10.1097/OLQ.0b013e31825725ad
1140. Masese LN, Graham SM, Gitau R, et al. A prospective study of vaginal trichomoniasis and HIV-1 shedding in women on antiretroviral therapy. BMC Infect Dis 2011;11:307. PMID:22047086 https://doi.org/10.1186/1471-2334-11-307
1141. Balkus JE, Richardson BA, Mochache V, et al. A prospective cohort study comparing the effect of single-dose 2 g metronidazole on *Trichomonas vaginalis* infection in HIV-seropositive versus HIV-seronegative women. Sex Transm Dis 2013;40:499–505. PMID:23677023 https://doi.org/10.1097/OLQ.0b013e31828fce34
1142. Gumbo FZ, Duri K, Kandawasvika GQ, et al. Risk factors of HIV vertical transmission in a cohort of women under a PMTCT program at three peri-urban clinics in a resource-poor setting. J Perinatol 2010;30:717–23. PMID:20336078 https://doi.org/10.1038/jp.2010.31
1143. Brüggemann RJ, Alffenaar JW, Blijlevens NM, et al. Clinical relevance of the pharmacokinetic interactions of azole antifungal drugs with other coadministered agents. Clin Infect Dis 2009;48:1441–58. PMID:19361301 https://doi.org/10.1086/598327
1144. Shahid Z, Sobel JD. Reduced fluconazole susceptibility of *Candida albicans* isolates in women with recurrent vulvovaginal candidiasis: effects of long-term fluconazole therapy. Diagn Microbiol Infect Dis 2009;64:354–6. PMID:19501794 https://doi.org/10.1016/j.diagmicrobio.2009.03.021
1145. Marchaim D, Lemanek L, Bheemreddy S, Kaye KS, Sobel JD. Fluconazole-resistant *Candida albicans* vulvovaginitis. Obstet Gynecol 2012;120:1407–14. PMID:23168767 https://doi.org/10.1097/AOG.0b013e31827307b2
1146. Denning DW, Kneale M, Sobel JD, Rautemaa-Richardson R. Global burden of recurrent vulvovaginal candidiasis: a systematic review. Lancet Infect Dis 2018;18:e339–47. PMID:30078662 https://doi.org/10.1016/S1473-3099(18)30103-8
1147. Crouss T, Sobel JD, Smith K, Nyirjesy P. Long-term outcomes of women with recurrent vulvovaginal candidiasis after a course of maintenance antifungal therapy. J Low Genit Tract Dis 2018;22:382–6. PMID:29975334 https://doi.org/10.1097/LGT.0000000000000413

1117. Van Der Pol B, Williams JA, Orr DP, Batteiger BE, Fortenberry JD.青少年女性中阴道毛滴虫感染的患病率、发病率、自然史及治疗反应。J Infect Dis 2005;192:2039-44. PMID:16288365 https:// doi.org/10.1086/498217
1118. Kirkcaldy RD, Augostini P, Asbel LE, et al.美国 6 个城市阴道毛滴虫抗菌药物耐药性，STD Surveillance Network,2009-2010。Emerg Infect Dis 2012;18:939-43. PMID:22608054 https://doi.org/10.3201/eid1806.111590
1119. Crowell AL, Sanders-Lewis KA, Secor WE.甲硝唑和替硝唑对阴道毛滴虫甲硝唑耐药株的体外活性。Antimicrob Agents Chemother 2003;47:1407-9. PMID:12654679 https://doi.org/10.1128/AAC.47.4.1407-1409.2003
1120. Muzny CA, Mena L, Lillis RA, et al.按选定临床因素比较 2 g 单剂量与 7 天 500 mg 每日两次甲硝唑治疗女性滴虫感染。Am J Obstet Gynecol 2019;221:669. https://doi.org/10.1016/j.ajog.2019.10.079
1121. Sobel JD, Nyirjesy P, Brown W.替硝唑治疗甲硝唑耐药性阴道滴虫感染。Clin Infect Dis 2001;33:1341-6. PMID:11565074 https://doi.org/10.1086/323034
1122. Nyirjesy P, Gilbert J, Mulcahy LJ.耐药性滴虫感染：联合治疗成功治愈。Sex Transm Dis 2011;38:962-3. PMID:21934573 https://doi.org/10.1097/OLQ.0b013e31822037e4
1123. Muzny C, Barnes A, Mena L.严重硝基咪唑过敏情况下的症状性阴道毛滴虫感染：硼酸成功治疗。Sex Health 2012;9:389-91. PMID:22877600 https://doi.org/10.1071/SH11114
1124. Aggarwal A, Shier RM.阴道酸化成功治疗顽固性阴道毛滴虫感染。J Obstet Gynaecol Can 2008;30:55-8. PMID:18198069 https:// doi.org/10.1016/ S1701-2163(16) 32714-1
1125. Dan M, Sobel JD.硝唑尼特治疗三例女性滴虫感染失败。Sex Transm Dis 2007;34:813-4. PMID:17551415 https://doi.org/10.1097/NMD.0b013e31802f5d9a
1126. Seña AC, Bachmann LH, Hobbs MM.持续性和复发性阴道毛滴虫感染：流行病学、治疗和管理考虑。Expert Rev Anti Infect Ther 2014;12:673-85. PMID:24555561 https://doi.org/10.1586/14787210.2014.887440
1127. Helms DJ, Mosure DJ, Secor WE, Workowski KA.疑似甲硝唑过敏女性中阴道毛滴虫的管理。Am J Obstet Gynecol 2008;198:370.e1-7. PMID:18221927 https://doi.org/10.1016/j.ajog.2007.10.795
1128. Gendelman SR, Pien LC, Gutta RC, Abouhassan SR.改良口服甲硝唑脱敏方案。Allergy Rhinol(Providence) 2014;5:66-9. PMID:24612959 https://doi.org/10.2500/ ar.2014.5.0080
1129. Nyirjesy P, Sobel JD, Weitz MV, Leaman DJ, Gelone SP.难治性滴虫感染：巴龙霉素乳膏治疗结果。Clin Infect Dis 1998;26:986-8. PMID:9564487 https://doi.org/10.1086/513951
1130. Klebanoff MA, Carey JC, Hauth JC, et al.; National Institute of Child Health and Human Development Network of Maternal-Fetal Medicine Units.甲硝唑未能预防无症状阴道毛滴虫感染孕妇的早产。N Engl J Med 2001;345:487-93. PMID:11519502 https:// doi.org/10.1056/NEJMoa003329
1131. Stringer E, Read JS, Hoffman I, Valentine M, Aboud S, Goldenberg RL.撒哈拉以南非洲妊娠期滴虫感染的治疗似乎与低出生体重或早产无关。S Afr Med J 2010;100:58-64. PMID:20429491
1132. Caro-Patón T, Carvajal A, Martin de Diego I, Martin-Arias LH, Alvarez Requejo A, Rodríguez Pinilla E.甲硝唑是否致畸?一项荟萃分析。Br J Clin Pharmacol 1997;44:179-82. PMID:9278206 https://doi.org/10.1046/j.1365-2125.1997.00660.x
1133. Gülmezoglu AM.妊娠期滴虫感染的干预措施。Cochrane Database Syst Rev 2002;(3): CD000220. PMID:12137609
1134. Goldenberg RL, Mwatha A, Read JS, et al.; Hptn024 Team.HPTN 024研究：抗生素预防绒毛膜羊膜炎和早产的疗效。Am J Obstet Gynecol 2006;194:650-61. PMID:16522393 https://doi.org/10.1016/j.ajog.2006.01.004
1135. Mann JR, McDermott S, Zhou L, Barnes TL, Hardin J.妊娠期滴虫感染的治疗与早产：一项观察性研究。J Womens Health(Larchmt) 2009;18:493-7. PMID:19361316 https://doi.org/10.1089/jwh.2008.0964
1136. Carter JE, Whithaus KC.阴道毛滴虫引起的新生儿呼吸道受累：一例病例报告及文献综述。Am J Trop Med Hyg 2008;78:17-9. PMID:18187779 https://doi.org/10.4269/ajtmh.2008.78.17
1137. Trintis J, Epie N, Boss R, Riedel S.新生儿阴道毛滴虫感染：一例病例报告及文献综述。Int J STD AIDS 2010;21:606-7. PMID:20975098 https://doi.org/10.1258/ ijsa.2010.010174
1138. Miller M, Liao Y, Wagner M, Korves C.HIV、性传播感染的聚集与吸毒的非裔美国女性的性风险。Sex Transm Dis 2008;35:696-702. PMID:18418289 https://doi.org/10.1097/OLQ.0b013e31816b1fb8
1139. Anderson BL, Firnhaber C, Liu T, et al.滴虫感染治疗对非洲女性生殖道HIV病毒载量的影响。Sex Transm Dis 2012;39:638-42. PMID:22797689 https://doi.org/10.1097/OLQ.0b013e31825725ad
1140. Masese LN, Graham SM, Gitau R, et al.接受抗逆转录病毒治疗的女性中阴道滴虫感染与HIV-1排毒的前瞻性研究。BMC Infect Dis 2011;11:307. PMID:22047086 https:// doi.org/10.1186/1471-2334-11-307
1141. Balkus JE, Richardson BA, Mochache V, et al.比较单剂2 g甲硝唑对HIV血清阳性与HIV血清阴性女性阴道毛滴虫感染影响的前瞻性队列研究。Sex Transm Dis 2013;40:499-505. PMID:23677023 https://doi.org/10.1097/OLQ.0b013e31828fce34
1142. Gumbo FZ, Duri K, Kandawasvika GQ, et al.资源匮乏地区三家城郊诊所PMTCT项目下女性队列中HIV垂直传播的危险因素。J Perinatol 2010;30:717-23. PMID:20336078 https://doi.org/10.1038/jp.2010.31
1143. Brüggemann RJ, Alffenaar JW, Blijlevens NM, et al.唑类抗真菌药物与其他合用药物药代动力学相互作用的临床相关性。Clin Infect Dis 2009;48:1441-58. PMID:19361301 https://doi.org/10.1086/598327
1144. Shahid Z, Sobel JD.复发性外阴阴道假丝酵母菌病女性中白色念珠菌分离株对氟康唑敏感性降低：长期氟康唑治疗的影响。Diagn Microbiol Infect Dis 2009;64:354-6. PMID:19501794 https://doi.org/10.1016/j.diagmicrobio.2009.03.021
1145. Marchaim D, Lemanek L, Bheemreddy S, Kaye KS, Sobel JD.氟康唑耐药白色念珠菌外阴阴道炎。Obstet Gynecol 2012;120:1407-14. PMID:23168767 https://doi.org/10.1097/ AOG.0b013e31827307b2
1146. Denning DW, Kneale M, Sobel JD, Rautemaa-Richardson R.复发性外阴阴道假丝酵母菌病的全球负担：一项系统综述。Lancet Infect Dis 2018;18:e339-47. PMID:30078662 https://doi.org/10.1016/S1473-3099(18) 30103-8
1147. Crouss T, Sobel JD, Smith K, Nyirjesy P.复发性外阴阴道假丝酵母菌病女性完成一疗程维持抗真菌治疗后的长期结局。J Low Genit Tract Dis 2018;22:382-6. PMID:29975334 https://doi.org/10.1097/LGT.0000000000000413

1148. Kennedy MA, Sobel JD. Vulvovaginal candidiasis caused by non-*albicans Candida* species: new insights. Curr Infect Dis Rep 2010;12:465–70. PMID:21308556 https://doi.org/10.1007/s11908-010-0137-9

1149. Sobel JD, Chaim W, Nagappan V, Leaman D. Treatment of vaginitis caused by *Candida glabrata*: use of topical boric acid and flucytosine. Am J Obstet Gynecol 2003;189:1297–300. PMID:14634557 https://doi.org/10.1067/S0002-9378(03)00726-9

1150. Mølgaard-Nielsen D, Svanström H, Melbye M, Hviid A, Pasternak B. Association between use of oral fluconazole during pregnancy and risk of spontaneous abortion and stillbirth. JAMA 2016;315:58–67. PMID:26746458 https://doi.org/10.1001/jama.2015.17844

1151. Bérard A, Sheehy O, Zhao JP, et al. Associations between low- and high-dose oral fluconazole and pregnancy outcomes: 3 nested case-control studies. CMAJ 2019;191:E179–87. PMID:30782643 https://doi.org/10.1503/cmaj.180963

1152. Ohmit SE, Sobel JD, Schuman P, et al.; HIV Epidemiology Research Study (HERS) Group. Longitudinal study of mucosal *Candida* species colonization and candidiasis among human immunodeficiency virus (HIV)-seropositive and at-risk HIV-seronegative women. J Infect Dis 2003;188:118–27. PMID:12825180 https://doi.org/10.1086/375746

1153. Duerr A, Heilig CM, Meikle SF, et al.; HER Study Group. Incident and persistent vulvovaginal candidiasis among human immunodeficiency virus-infected women: risk factors and severity. Obstet Gynecol 2003;101:548–56. PMID:12636961 https://doi.org/10.1097/00006250-200303000-00022

1154. Vazquez JA, Peng G, Sobel JD, et al. Evolution of antifungal susceptibility among *Candida* species isolates recovered from human immunodeficiency virus-infected women receiving fluconazole prophylaxis. Clin Infect Dis 2001;33:1069–75. PMID:11528582 https://doi.org/10.1086/322641

1155. Darville T; Pelvic Inflammatory Disease Workshop Proceedings Committee. Pelvic inflammatory disease: identifying research gaps—proceedings of a workshop sponsored by Department of Health and Human Services/National Institutes of Health/National Institute of Allergy and Infectious Diseases, November 3–4, 2011. Sex Transm Dis 2013;40:761–7. PMID:24275724 https://doi.org/10.1097/OLQ.0000000000000028

1156. Wiesenfeld HC, Sweet RL, Ness RB, Krohn MA, Amortegui AJ, Hillier SL. Comparison of acute and subclinical pelvic inflammatory disease. Sex Transm Dis 2005;32:400–5. PMID:15976596 https://doi.org/10.1097/01.olq.0000154508.26532.6a

1157. Wiesenfeld HC, Hillier SL, Meyn LA, Amortegui AJ, Sweet RL. Subclinical pelvic inflammatory disease and infertility. Obstet Gynecol 2012;120:37–43. PMID:22678036 https://doi.org/10.1097/AOG.0b013e31825a6bc9

1158. Ness RB, Soper DE, Holley RL, et al. Effectiveness of inpatient and outpatient treatment strategies for women with pelvic inflammatory disease: results from the Pelvic Inflammatory Disease Evaluation and Clinical Health (PEACH) Randomized Trial. Am J Obstet Gynecol 2002;186:929–37. PMID:12015517 https://doi.org/10.1067/mob.2002.121625

1159. Burnett AM, Anderson CP, Zwank MD. Laboratory-confirmed gonorrhea and/or chlamydia rates in clinically diagnosed pelvic inflammatory disease and cervicitis. Am J Emerg Med 2012;30:1114–7. PMID:22030186 https://doi.org/10.1016/j.ajem.2011.07.014

1160. Wiesenfeld HC, Meyn LA, Darville T, Macio IS, Hillier SL. A randomized controlled trial of ceftriaxone and doxycycline, with or without metronidazole, for the treatment of acute pelvic inflammatory disease. Clin Infect Dis 2021;72:1181–9. PMID:32052831 https://doi.org/10.1093/cid/ciaa101

1161. Ness RB, Kip KE, Hillier SL, et al. A cluster analysis of bacterial vaginosis-associated microflora and pelvic inflammatory disease. Am J Epidemiol 2005;162:585–90. PMID:16093289 https://doi.org/10.1093/aje/kwi243

1162. Scholes D, Stergachis A, Heidrich FE, Andrilla H, Holmes KK, Stamm WE. Prevention of pelvic inflammatory disease by screening for cervical chlamydial infection. N Engl J Med 1996;334:1362–6. PMID:8614421 https://doi.org/10.1056/NEJM199605233342103

1163. Oakeshott P, Kerry S, Aghaizu A, et al. Randomised controlled trial of screening for *Chlamydia trachomatis* to prevent pelvic inflammatory disease: the POPI (Prevention of Pelvic Infection) trial. BMJ 2010;340:c1642. PMID:20378636 https://doi.org/10.1136/bmj.c1642

1164. Peipert JF, Ness RB, Blume J, et al.; Pelvic Inflammatory Disease Evaluation and Clinical Health Study Investigators. Clinical predictors of endometritis in women with symptoms and signs of pelvic inflammatory disease. Am J Obstet Gynecol 2001;184:856–64. PMID:11303192 https://doi.org/10.1067/mob.2001.113847

1165. Gaitán H, Angel E, Diaz R, Parada A, Sanchez L, Vargas C. Accuracy of five different diagnostic techniques in mild-to-moderate pelvic inflammatory disease. Infect Dis Obstet Gynecol 2002;10:171–80. PMID:12648310 https://doi.org/10.1155/S1064744902000194

1166. Vicetti Miguel RD, Chivukula M, Krishnamurti U, et al. Limitations of the criteria used to diagnose histologic endometritis in epidemiologic pelvic inflammatory disease research. Pathol Res Pract 2011;207:680–5. PMID:21996319 https://doi.org/10.1016/j.prp.2011.08.007

1167. Jacobson L, Weström L. Objectivized diagnosis of acute pelvic inflammatory disease. Diagnostic and prognostic value of routine laparoscopy. Am J Obstet Gynecol 1969;105:1088–98. PMID:4242830 https://doi.org/10.1016/0002-9378(69)90132-X

1168. Sellors J, Mahony J, Goldsmith C, et al. The accuracy of clinical findings and laparoscopy in pelvic inflammatory disease. Am J Obstet Gynecol 1991;164:113–20. PMID:1824740 https://doi.org/10.1016/0002-9378(91)90639-9

1169. Bevan CD, Johal BJ, Mumtaz G, Ridgway GL, Siddle NC. Clinical, laparoscopic and microbiological findings in acute salpingitis: report on a United Kingdom cohort. Br J Obstet Gynaecol 1995;102:407–14. PMID:7612536 https://doi.org/10.1111/j.1471-0528.1995.tb11294.x

1170. Jaiyeoba O, Soper DE. A practical approach to the diagnosis of pelvic inflammatory disease. Infect Dis Obstet Gynecol 2011;2011:753037. PMID:21822367 https://doi.org/10.1155/2011/753037

1171. Sweet RL. Treatment of acute pelvic inflammatory disease. Infect Dis Obstet Gynecol 2011;2011:561909. PMID:22228985 https://doi.org/10.1155/2011/561909

1172. Smith KJ, Ness RB, Wiesenfeld HC, Roberts MS. Cost-effectiveness of alternative outpatient pelvic inflammatory disease treatment strategies. Sex Transm Dis 2007;34:960–6. PMID:18077847 https://doi.org/10.1097/01.olq.0000225321.61049.13

1173. Petrina MAB, Cosentino LA, Wiesenfeld HC, Darville T, Hillier SL. Susceptibility of endometrial isolates recovered from women with clinical pelvic inflammatory disease or histological endometritis to antimicrobial agents. Anaerobe 2019;56:61–5. PMID:30753898 https://doi.org/10.1016/j.anaerobe.2019.02.005

1174. Haggerty CL, Ness RB, Amortegui A, et al. Endometritis does not predict reproductive morbidity after pelvic inflammatory disease. Am J Obstet Gynecol 2003;188:141–8. PMID:12548208 https://doi.org/10.1067/mob.2003.87

1175. Haggerty CL, Totten PA, Tang G, et al. Identification of novel microbes associated with pelvic inflammatory disease and infertility. Sex Transm Infect 2016;92:441–6. PMID:26825087 https://doi.org/10.1136/sextrans-2015-052285

1148. Kennedy MA, Sobel JD.由非白念珠菌菌种引起的外阴阴道假丝酵母菌病：新见解。Curr Infect Dis Rep 2010;12:465-70. PMID:21308556 https://doi.org/10.1007/ s11908-010-0137-9

1149. Sobel JD, Chaim W, Nagappan V, Leaman D.由光滑念珠菌引起的阴道炎治疗：局部硼酸和氟胞嘧啶的应用。Am J Obstet Gynecol 2003;189:1297-300. PMID:14634557 https:// doi.org/10.1067/S0002-9378(03) 00726-9

1150. Mølgaard-Nielsen D, Svanström H, Melbye M, Hviid A, Pasternak B.妊娠期口服氟康唑使用与自然流产和死产风险之间的关联。JAMA 2016;315:58-67. PMID:26746458 https://doi.org/10.1001/jama.2015.17844

1151. Bérard A, Sheehy O, Zhao JP, et al.低剂量和高剂量口服氟康唑与妊娠结局之间的关联：3项巢式病例对照研究。CMAJ 2019;191:E179-87. PMID:30782643 https:// doi.org/10.1503/cmaj.180963

1152. Ohmit SE, Sobel JD, Schuman P, et al.; HIV Epidemiology Research Study(HERS) Group.人类免疫缺陷病毒(HIV)血清阳性及高危HIV血清阴性女性中黏膜*Candida*菌种定植与念珠菌病的纵向研究。J Infect Dis 2003;188:118-27. PMID:12825180 https://doi.org/10.1086/375746

1153. Duerr A, Heilig CM, Meikle SF, et al.; HER Study Group.人类免疫缺陷病毒感染女性中新发及持续性外阴阴道念珠菌病：危险因素与严重程度。Obstet Gynecol 2003;101:548-56. PMID:12636961 https:// doi.org/10.1097/00006250-200303000-00022

1154. Vazquez JA, Peng G, Sobel JD, et al.接受氟康唑预防治疗的HIV感染女性中分离的*Candida*菌种抗真菌药物敏感性的演变。Clin Infect Dis 2001;33:1069-75. PMID:11528582 https://doi.org/10.1086/322641

1155. Darville T；盆腔炎性疾病研讨会会议记录委员会。盆腔炎性疾病：识别研究空白--由美国卫生与公众服务部/美国国立卫生研究院/美国国家过敏症和传染病研究所主办的研讨会会议记录，2011年11月3-4日。Sex Transm Dis 2013;40:761-7. PMID:24275724 https://doi.org/10.1097/ OLQ.0000000000000028

1156. Wiesenfeld HC, Sweet RL, Ness RB, Krohn MA, Amortegui AJ, Hillier SL.急性与亚临床盆腔炎性疾病的比较。Sex Transm Dis 2005;32:400-5. PMID:15976596 https:// doi.org/10.1097/01.olq.0000154508.26532.6a

1157. Wiesenfeld HC, Hillier SL, Meyn LA, Amortegui AJ, Sweet RL.亚临床盆腔炎性疾病与不孕症。Obstet Gynecol 2012;120:37-43. PMID:22678036 https://doi.org/10.1097/ AOG.0b013e31825a6bc9

1158. Ness RB, Soper DE, Holley RL, et al.住院与门诊治疗策略对盆腔炎性疾病女性的有效性：盆腔炎性疾病评估与临床健康(PEACH)随机试验结果。Am J Obstet Gynecol 2002;186:929-37. PMID:12015517 https:// doi.org/10.1067/ mob.2002.121625

1159. Burnett AM, Anderson CP, Zwank MD.临床诊断盆腔炎和宫颈炎中实验室确诊淋病和/或衣原体感染率。Am J Emerg Med 2012;30:1114-7. PMID:22030186 https://doi.org/10.1016/j.ajem.2011.07.014

1160. Wiesenfeld HC, Meyn LA, Darville T, Macio IS, Hillier SL.头孢曲松和多西环素联合或不联合甲硝唑治疗急性盆腔炎的随机对照试验。Clin Infect Dis 2021;72:1181-9. PMID:32052831 https://doi.org/10.1093/cid/ciaa101

1161. Ness RB, Kip KE, Hillier SL, et al.细菌性阴道病相关微生物群与盆腔炎性疾病的聚类分析。Am J Epidemiol 2005;162:585-90. PMID:16093289 https://doi.org/10.1093/aje/kwi243

1162. Scholes D, Stergachis A, Heidrich FE, Andrilla H, Holmes KK, Stamm WE.通过筛查宫颈衣原体感染预防盆腔炎性疾病。N Engl J Med 1996;334:1362-6. PMID:8614421 https://doi.org/10.1056/NEJM199605233342103

1163. Oakeshott P, Kerry S, Aghaizu A, et al.筛查沙眼衣原体以预防盆腔炎性疾病的随机对照试验：POPI(预防盆腔感染)试验。BMJ 2010;340:c1642. PMID:20378636 c1642

1164. Peipert JF, Ness RB, Blume J, et al.； 盆腔炎性疾病评估与临床健康研究调查员。有盆腔炎性疾病症状和体征的女性中子宫内膜炎的临床预测因素。Am J Obstet Gynecol 2001;184:856-64. PMID:11303192 https://doi.org/10.1067/mob.2001.113847

1165. Gaitán H, Angel E, Diaz R, Parada A, Sanchez L, Vargas C.五种不同诊断技术在轻至中度盆腔炎性疾病中的准确性。Infect Dis Obstet Gynecol 2002;10:171-80. PMID:12648310 https:// doi.org/10.1155/S1064744902000194

1166. Vicetti Miguel RD, Chivukula M, Krishnamurti U, et al.用于流行病学盆腔炎性疾病研究中诊断组织学子宫内膜炎标准的局限性。Pathol Res Pract 2011;207:680-5. PMID:21996319 https:// doi.org/10.1016/j.prp.2011.08.007

1167. Jacobson L, Weström L.急性盆腔炎的客观化诊断。常规腹腔镜检查的诊断和预后价值。Am J Obstet Gynecol 1969;105:1088-98. PMID:4242830 https://doi.org/10.1016/0002-9378(69) 90132-X

1168. Sellors J, Mahony J, Goldsmith C, et al.临床发现与腹腔镜检查在盆腔炎性疾病中的准确性。Am J Obstet Gynecol 1991;164:113-20. PMID:1824740 https://doi.org/10.1016/0002-9378(91) 90639-9

1169. Bevan CD, Johal BJ, Mumtaz G, Ridgway GL, Siddle NC.急性输卵管炎的临床、腹腔镜及微生物学表现：英国队列报告。Br J Obstet Gynaecol 1995;102:407-14. PMID:7612536 https:// doi.org/10.1111/j.1471-0528.1995. tb11294.x

1170. Jaiyeoba O, Soper DE.盆腔炎性疾病诊断的实用方法。Infect Dis Obstet Gynecol 2011;2011:753037. PMID:21822367 https:// doi.org/10.1155/2011/753037

1171. Sweet RL.急性盆腔炎的治疗。Infect Dis Obstet Gynecol 2011;2011:561909. PMID:22228985 https:// doi.org/10.1155/2011/561909

1172. Smith KJ, Ness RB, Wiesenfeld HC, Roberts MS.替代性门诊盆腔炎性疾病治疗策略的成本效益。Sex Transm Dis 2007;34:960-6. PMID:18077847 https:// doi.org/10.1097/01.olq.0000225321.61049.13

1173. Petrina MAB, Cosentino LA, Wiesenfeld HC, Darville T, Hillier SL.从临床盆腔炎性疾病或组织学子宫内膜炎女性中分离的子宫内膜分离株对抗菌药物的敏感性.Anaerobe 2019;56:61-5. PMID:30753898 https://doi.org/10.1016/j.anaerobe.2019.02.005

1174. Haggerty CL, Ness RB, Amortegui A, et al.子宫内膜炎不能预测盆腔炎性疾病后的生殖系统疾病发生率。Am J Obstet Gynecol 2003;188:141-8. PMID:12548208 https:// doi.org/10.1067/mob.2003.87

1175. Haggerty CL, Totten PA, Tang G， 等.与盆腔炎性疾病及不孕相关的新型微生物鉴定.Sex Transm Infect 2016;92:441-6. PMID:26825087 https://doi.org/10.1136/sextrans-2015-052285

1176. Ness RB, Randall H, Richter HE, et al.; Pelvic Inflammatory Disease Evaluation and Clinical Health Study Investigators. Condom use and the risk of recurrent pelvic inflammatory disease, chronic pelvic pain, or infertility following an episode of pelvic inflammatory disease. Am J Public Health 2004;94:1327–9. PMID:15284036 https://doi.org/10.2105/AJPH.94.8.1327
1177. McGregor JA, Crombleholme WR, Newton E, Sweet RL, Tuomala R, Gibbs RS. Randomized comparison of ampicillin-sulbactam to cefoxitin and doxycycline or clindamycin and gentamicin in the treatment of pelvic inflammatory disease or endometritis. Obstet Gynecol 1994;83:998–1004. PMID:8190448 https://doi.org/10.1097/00006250-199406000-00020
1178. Bevan CD, Ridgway GL, Rothermel CD. Efficacy and safety of azithromycin as monotherapy or combined with metronidazole compared with two standard multidrug regimens for the treatment of acute pelvic inflammatory disease. J Int Med Res 2003;31:45–54. PMID:12635534 https://doi.org/10.1177/147323000303100108
1179. Heystek M, Ross JD; PID Study Group. A randomized double-blind comparison of moxifloxacin and doxycycline/metronidazole/ciprofloxacin in the treatment of acute, uncomplicated pelvic inflammatory disease. Int J STD AIDS 2009;20:690–5. PMID:19815913 https://doi.org/10.1258/ijsa.2008.008495
1180. Boothby M, Page J, Pryor R, Ross JD. A comparison of treatment outcomes for moxifloxacin versus ofloxacin/metronidazole for first-line treatment of uncomplicated non-gonococcal pelvic inflammatory disease. Int J STD AIDS 2010;21:195–7. PMID:20215625 https://doi.org/10.1258/ijsa.2009.009374
1181. Judlin P, Liao Q, Liu Z, Reimnitz P, Hampel B, Arvis P. Efficacy and safety of moxifloxacin in uncomplicated pelvic inflammatory disease: the MONALISA study. BJOG 2010;117:1475–84. PMID:20716255 https://doi.org/10.1111/j.1471-0528.2010.02687.x
1182. Korn AP. Pelvic inflammatory disease in women infected with HIV. AIDS Patient Care STDS 1998;12:431–4. PMID:11361990 https://doi.org/10.1089/apc.1998.12.431
1183. Irwin KL, Moorman AC, O'Sullivan MJ, et al. Influence of human immunodeficiency virus infection on pelvic inflammatory disease. Obstet Gynecol 2000;95:525–34. PMID:10725484
1184. Bukusi EA, Cohen CR, Stevens CE, et al. Effects of human immunodeficiency virus 1 infection on microbial origins of pelvic inflammatory disease and on efficacy of ambulatory oral therapy. Am J Obstet Gynecol 1999;181:1374–81. PMID:10601915 https://doi.org/10.1016/S0002-9378(99)70378-9
1185. Mugo NR, Kiehlbauch JA, Nguti R, et al. Effect of human immunodeficiency virus-1 infection on treatment outcome of acute salpingitis. Obstet Gynecol 2006;107:807–12. PMID:16582116 https://doi.org/10.1097/01.AOG.0000207597.70524.e8
1186. Grimes DA. Intrauterine device and upper-genital-tract infection. Lancet 2000;356:1013–9. PMID:11041414 https://doi.org/10.1016/S0140-6736(00)02699-4
1187. Viberga I, Odlind V, Lazdane G, Kroica J, Berglund L, Olofsson S. Microbiology profile in women with pelvic inflammatory disease in relation to IUD use. Infect Dis Obstet Gynecol 2005;13:183–90. PMID:16338777 https://doi.org/10.1155/2005/376830
1188. Jatlaoui TC, Riley HEM, Curtis KM. The safety of intrauterine devices among young women: a systematic review. Contraception 2017;95:17–39. PMID:27771475 https://doi.org/10.1016/j.contraception.2016.10.006
1189. Chen MJ, Kim CR, Whitehouse KC, Berry-Bibee E, Gaffield ME. Development, updates, and future directions of the World Health Organization Selected Practice Recommendations for Contraceptive Use. Int J Gynaecol Obstet 2017;136:113–9. PMID:28099730 https://doi.org/10.1002/ijgo.12064
1190. Tepper NK, Steenland MW, Gaffield ME, Marchbanks PA, Curtis KM. Retention of intrauterine devices in women who acquire pelvic inflammatory disease: a systematic review. Contraception 2013;87:655–60. PMID:23040135 https://doi.org/10.1016/j.contraception.2012.08.011
1191. Louette A, Krahn J, Caine V, Ha S, Lau TTY, Singh AE. Treatment of acute epididymitis: a systematic review and discussion of the implications for treatment based on etiology. Sex Transm Dis 2018;45:e104–8. PMID:30044339 https://doi.org/10.1097/OLQ.0000000000000901
1192. Pilatz A, Hossain H, Kaiser R, et al. Acute epididymitis revisited: impact of molecular diagnostics on etiology and contemporary guideline recommendations. Eur Urol 2015;68:428–35. PMID:25542628 https://doi.org/10.1016/j.eururo.2014.12.005
1193. Hongo H, Kikuchi E, Matsumoto K, et al. Novel algorithm for management of acute epididymitis. Int J Urol 2017;24:82–7. PMID:27714879 https://doi.org/10.1111/iju.13236
1194. de Villiers EM, Fauquet C, Broker TR, Bernard HU, zur Hausen H. Classification of papillomaviruses. Virology 2004;324:17–27. PMID:15183049 https://doi.org/10.1016/j.virol.2004.03.033
1195. Myers ER, McCrory DC, Nanda K, Bastian L, Matchar DB. Mathematical model for the natural history of human papillomavirus infection and cervical carcinogenesis. Am J Epidemiol 2000;151:1158–71. PMID:10905528 https://doi.org/10.1093/oxfordjournals.aje.a010166
1196. Chesson HW, Dunne EF, Hariri S, Markowitz LE. The estimated lifetime probability of acquiring human papillomavirus in the United States. Sex Transm Dis 2014;41:660–4. PMID:25299412 https://doi.org/10.1097/OLQ.0000000000000193
1197. Cogliano V, Baan R, Straif K, Grosse Y, Secretan B, El Ghissassi F; WHO International Agency for Research on Cancer. Carcinogenicity of human papillomaviruses. Lancet Oncol 2005;6:204. PMID:15830458 https://doi.org/10.1016/S1470-2045(05)70086-3
1198. Senkomago V, Henley SJ, Thomas CC, Mix JM, Markowitz LE, Saraiya M. Human papillomavirus-attributable cancers—United States, 2012–2016. MMWR Morb Mortal Wkly Rep 2019;68:724–8. PMID:31437140 https://doi.org/10.15585/mmwr.mm6833a3
1199. Chesson HW, Ekwueme DU, Saraiya M, Watson M, Lowy DR, Markowitz LE. Estimates of the annual direct medical costs of the prevention and treatment of disease associated with human papillomavirus in the United States. Vaccine 2012;30:6016–9. PMID:22867718 https://doi.org/10.1016/j.vaccine.2012.07.056
1200. Markowitz LE, Hariri S, Lin C, et al. Reduction in human papillomavirus (HPV) prevalence among young women following HPV vaccine introduction in the United States, National Health and Nutrition Examination Surveys, 2003–2010. J Infect Dis 2013;208:385–93. PMID:23785124 https://doi.org/10.1093/infdis/jit192
1201. Flagg EW, Schwartz R, Weinstock H. Prevalence of anogenital warts among participants in private health plans in the United States, 2003–2010: potential impact of human papillomavirus vaccination. Am J Public Health 2013;103:1428–35. PMID:23763409 https://doi.org/10.2105/AJPH.2012.301182
1202. McClung NM, Lewis RM, Gargano JW, Querec T, Unger ER, Markowitz LE. Declines in vaccine-type human papillomavirus prevalence in females across racial/ethnic groups: data from a national survey. J Adolesc Health 2019;65:715–22. PMID:31515134 https://doi.org/10.1016/j.jadohealth.2019.07.003
1203. Drolet M, Bénard É, Pérez N, et al.; HPV Vaccination Impact Study Group. Population-level impact and herd effects following the introduction of human papillomavirus vaccination programmes: updated systematic review and meta-analysis. Lancet 2019;394:497–509. PMID:31255301 https://doi.org/10.1016/S0140-6736(19)30298-3

1176. Ness RB, Randall H, Richter HE, et al.； 盆腔炎性疾病评估与临床健康研究调查者.安全套使用与盆腔炎性疾病发作后复发性盆腔炎性疾病、慢性盆腔痛或不孕的风险.Am J Public Health 2004;94:1327-9. PMID:15284036 https://doi.org/10.2105/AJPH.94.8.1327
1177. McGregor JA, Crombleholme WR, Newton E, Sweet RL, Tuomala R, Gibbs RS.氨苄西林-舒巴坦与头孢西丁加多西环素或克林霉素加庆大霉素治疗盆腔炎性疾病或子宫内膜炎的随机比较.Obstet Gynecol 1994;83:998-1004. PMID:8190448 https://doi.org/10.1097/00006250-199406000-00020
1178. Bevan CD, Ridgway GL, Rothermel CD.阿奇霉素单药治疗或联合甲硝唑与两种标准多药方案治疗急性盆腔炎性疾病的疗效和安全性.J Int Med Res 2003;31:45-54. PMID:12635534 https://doi.org/10.1177/147323000303100108
1179. Heystek M, Ross JD; PID研究组.莫西沙星与多西环素/甲硝唑/环丙沙星治疗急性、无并发症盆腔炎性疾病的随机双盲比较.Int J STD AIDS 2009;20:690-5. PMID:19815913 https://doi.org/10.1258/ijsa.2008.008495
1180. Boothby M, Page J, Pryor R, Ross JD.莫西沙星与氧氟沙星/甲硝唑一线治疗无并发症非淋球菌性盆腔炎性疾病的治疗结果比较.Int J STD AIDS 2010;21:195-7. PMID:20215625 https:// doi.org/10.1258/ijsa.2009.009374
1181. Judlin P, Liao Q, Liu Z, Reimnitz P, Hampel B, Arvis P.莫西沙星治疗无并发症盆腔炎性疾病的疗效和安全性：MONALISA研究.BJOG 2010;117:1475-84. PMID:20716255 https://doi.org/10.1111/j.1471-0528.2010.02687.x
1182. Korn AP.感染HIV女性的盆腔炎性疾病.AIDS Patient Care STDS 1998;12:431-4. PMID:11361990 https:// doi.org/10.1089/apc.1998.12.431
1183. Irwin KL, Moorman AC, O'Sullivan MJ, et al.人类免疫缺陷病毒感染对盆腔炎性疾病的影响.Obstet Gynecol 2000;95:525-34. PMID:10725484
1184. Bukusi EA, Cohen CR, Stevens CE, et al.人类免疫缺陷病毒1型感染对盆腔炎性疾病微生物来源及门诊口服治疗疗效的影响.Am J Obstet Gynecol 1999;181:1374-81. PMID:10601915 https://doi.org/10.1016/S0002-9378(99) 70378-9
1185. Mugo NR, Kiehlbauch JA, Nguti R, et al.人类免疫缺陷病毒-1感染对急性输卵管炎治疗结果的影响.Obstet Gynecol 2006;107:807-12. PMID:16582116 https://doi.org/10.1097/01.AOG.0000207597.70524.e8
1186. Grimes DA.宫内节育器与上生殖道感染.Lancet 2000;356:1013-9. PMID:11041414 https://doi.org/10.1016/ S0140-6736(00) 02699-4
1187. Viberga I, Odlind V, Lazdane G, Kroica J, Berglund L, Olofsson S.盆腔炎性疾病女性中与IUD使用相关的微生物学特征.Infect Dis Obstet Gynecol 2005;13:183-90. PMID:16338777 https://doi.org/10.1155/2005/376830
1188. Jatlaoui TC, Riley HEM, Curtis KM.年轻女性中宫内节育器的安全性：系统评价.Contraception 2017;95:17-39. PMID:27771475 https:// doi.org/10.1016/j.Contraception.2016.10.006
1189. Chen MJ, Kim CR, Whitehouse KC, Berry-Bibee E, Gaffield ME.世界卫生组织避孕使用精选实践建议的制定、更新和未来方向.Int J Gynaecol Obstet 2017;136:113-9. PMID:28099730 https://doi.org/10.1002/ijgo.12064
1190. Tepper NK, Steenland MW, Gaffield ME, Marchbanks PA, Curtis KM.发生盆腔炎性疾病女性中宫内节育器的保留：系统评价.Contraception 2013;87:655-60. PMID:23040135 https:// doi.org/10.1016/j.Contraception.2012.08.011
1191. Louette A, Krahn J, Caine V, Ha S, Lau TTY, Singh AE.急性附睾炎的治疗：系统评价及基于病因的治疗意义讨论.Sex Transm Dis 2018;45:e104-8. PMID:30044339 https://doi.org/10.1097/OLQ.0000000000000901
1192. Pilatz A, Hossain H, Kaiser R, et al.急性附睾炎再探讨：分子诊断对病因学及当代指南建议的影响.Eur Urol 2015;68:428-35. PMID:25542628 https://doi.org/10.1016/j.eururo.2014.12.005
1193. Hongo H, Kikuchi E, Matsumoto K, et al.急性附睾炎管理的新算法.Int J Urol 2017;24:82-7. PMID:27714879 https://doi.org/10.1111/iju.13236
1194. 德维利耶 EM，福凯 C，布罗克 TR，伯纳德 HU，祖尔豪森 H.乳头瘤病毒的分类.Virology 2004;324:17-27. PMID:15183049 https://doi.org/10.1016/j.virol.2004.03.033
1195. Myers ER, McCrory DC, Nanda K, Bastian L, Matchar DB.人乳头瘤病毒感染自然史与宫颈癌发生的数学模型.Am J Epidemiol 2000;151:1158-71. PMID:10905528 https://doi.org/10.1093/oxfordjournals.aje.a010166
1196. Chesson HW, Dunne EF, Hariri S, Markowitz LE.美国感染人乳头瘤病毒的估计终生概率.Sex Transm Dis 2014;41:660-4. PMID:25299412 https://doi.org/10.1097/OLQ.0000000000000193
1197. Cogliano V, Baan R, Straif K, Grosse Y, Secretan B, El Ghissassi F; WHO国际癌症研究机构.人乳头瘤病毒的致癌性.Lancet Oncol 2005;6:204. PMID:15830458 https://doi.org/10.1016/S1470-2045(05) 70086-3
1198. Senkomago V, Henley SJ, Thomas CC, Mix JM, Markowitz LE, Saraiya M.人乳头瘤病毒归因癌症--美国，2012-2016. MMWR Morb Mortal Wkly Rep 2019;68:724-8. PMID:31437140 https://doi.org/10.15585/mmwr.mm6833a3
1199. Chesson HW, Ekwueme DU, Saraiya M, Watson M, Lowy DR, Markowitz LE.美国人乳头瘤病毒相关疾病预防和治疗的年度直接医疗费用估计.Vaccine 2012;30:6016-9. PMID:22867718 https://doi.org/10.1016/j.vaccine.2012.07.056
1200. Markowitz LE, Hariri S, Lin C, et al.美国引入HPV疫苗后年轻女性中人乳头瘤病毒(HPV)流行率下降，国家健康与营养调查，2003-2010. J Infect Dis 2013;208:385-93. PMID:23785124 https:// doi.org/10.1093/infdis/ jit192
1201. Flagg EW, Schwartz R, Weinstock H.美国私人健康计划参与者中肛门生殖器疣的患病率，2003-2010：人乳头瘤病毒疫苗接种的潜在影响.Am J Public Health 2013;103:1428-35. PMID:23763409 https:// doi.org/10.2105/AJPH.2012.301182
1202. McClung NM, Lewis RM, Gargano JW, Querec T, Unger ER, Markowitz LE.不同种族/族裔女性中疫苗型人乳头瘤病毒流行率下降：来自全国调查的数据.J Adolesc Health 2019;65:715-22. PMID:31515134 https:// doi.org/10.1016/j.jadohealth.2019.07.003
1203. Drolet M, Bénard É, Pérez N, et al.; HPV疫苗接种影响研究组.引入人乳头瘤病毒疫苗接种规划后的人群水平影响和群体效应：更新的系统评价和荟萃分析.Lancet 2019;394:497-509. PMID:31255301 https://doi.org/10.1016/ S0140-6736(19) 30298-3

1204. Mayhew A, Mullins TL, Ding L, et al. Risk perceptions and subsequent sexual behaviors after HPV vaccination in adolescents. Pediatrics 2014;133:404–11. PMID:24488747 https://doi.org/10.1542/peds.2013-2822
1205. Brouwer AF, Delinger RL, Eisenberg MC, et al. HPV vaccination has not increased sexual activity or accelerated sexual debut in a college-aged cohort of men and women. BMC Public Health 2019;19:821. PMID:31238911 https://doi.org/10.1186/s12889-019-7134-1
1206. Garland SM, Steben M, Sings HL, et al. Natural history of genital warts: analysis of the placebo arm of 2 randomized phase III trials of a quadrivalent human papillomavirus (types 6, 11, 16, and 18) vaccine. J Infect Dis 2009;199:805–14. PMID:19199546 https://doi.org/10.1086/597071
1207. Flagg EW, Torrone EA. Declines in anogenital warts among age groups most likely to be impacted by human papillomavirus vaccination, United States, 2006–2014. Am J Public Health 2018;108:112–9. PMID:29161070 https://doi.org/10.2105/AJPH.2017.304119
1208. Hariri S, Schuler MS, Naleway AL, et al. Human papillomavirus vaccine effectiveness against incident genital warts among female health-plan enrollees, United States. Am J Epidemiol 2018;187:298–305. PMID:28641366 https://doi.org/10.1093/aje/kwx253
1209. Wangu Z, Hsu KK. Impact of HPV vaccination on anogenital warts and respiratory papillomatosis. Hum Vaccin Immunother 2016;12:1357–62. PMID:27217191 https://doi.org/10.1080/21645515.2016.1172754
1210. Swedish KA, Goldstone SE. Prevention of anal condyloma with quadrivalent human papillomavirus vaccination of older men who have sex with men. PLoS One 2014;9:e93393. PMID:24714693 https://doi.org/10.1371/journal.pone.0093393
1211. Sandø N, Kofoed K, Zachariae C, Fouchard J. A reduced national incidence of anogenital warts in young Danish men and women after introduction of a national quadrivalent human papillomavirus vaccination programme for young women—an ecological study. Acta Derm Venereol 2014;94:288–92. PMID:24150529 https://doi.org/10.2340/00015555-1721
1212. Herweijer E, Ploner A, Sparén P. Substantially reduced incidence of genital warts in women and men six years after HPV vaccine availability in Sweden. Vaccine 2018;36:1917–20. PMID:29523448 https://doi.org/10.1016/j.vaccine.2018.02.097
1213. Harrison C, Britt H, Garland S, et al. Decreased management of genital warts in young women in Australian general practice post introduction of national HPV vaccination program: results from a nationally representative cross-sectional general practice study. PLoS One 2014;9:e105967. PMID:25180698 https://doi.org/10.1371/journal.pone.0105967
1214. Canvin M, Sinka K, Hughes G, Mesher D. Decline in genital warts diagnoses among young women and young men since the introduction of the bivalent HPV (16/18) vaccination programme in England: an ecological analysis. Sex Transm Infect 2017;93:125–8. PMID:27365492 https://doi.org/10.1136/sextrans-2016-052626
1215. Chow EP, Read TR, Wigan R, et al. Ongoing decline in genital warts among young heterosexuals 7 years after the Australian human papillomavirus (HPV) vaccination programme. Sex Transm Infect 2015;91:214–9. PMID:25305210 https://doi.org/10.1136/sextrans-2014-051813
1216. Petrosky EY, Liu G, Hariri S, Markowitz LE. Human papillomavirus vaccination and age at first sexual activity, National Health and Nutrition Examination Survey. Clin Pediatr (Phila) 2017;56:363–70. PMID:27609513 https://doi.org/10.1177/0009922816660541
1217. Gotovtseva EP, Kapadia AS, Smolensky MH, Lairson DR. Optimal frequency of imiquimod (aldara) 5% cream for the treatment of external genital warts in immunocompetent adults: a meta-analysis. Sex Transm Dis 2008;35:346–51. PMID:18360317 https://doi.org/10.1097/OLQ.0b013e31815ea8d1
1218. Baker DA, Ferris DG, Martens MG, et al. Imiquimod 3.75% cream applied daily to treat anogenital warts: combined results from women in two randomized, placebo-controlled studies. Infect Dis Obstet Gynecol 2011;2011:806105. PMID:21876641 https://doi.org/10.1155/2011/806105
1219. Mashiah J, Brenner S. Possible mechanisms in the induction of vitiligo-like hypopigmentation by topical imiquimod. Clin Exp Dermatol 2008;33:74–6. PMID:17979992
1220. Domingues E, Chaney KC, Scharf MJ, Wiss K. Imiquimod reactivation of lichen planus. Cutis 2012;89:276–7, 283. PMID:22838091
1221. Patel U, Mark NM, Machler BC, Levine VJ. Imiquimod 5% cream induced psoriasis: a case report, summary of the literature and mechanism. Br J Dermatol 2011;164:670–2. PMID:21062268 https://doi.org/10.1111/j.1365-2133.2010.10124.x
1222. Kumar B, Narang T. Local and systemic adverse effects to topical imiquimod due to systemic immune stimulation. Sex Transm Infect 2011;87:432. PMID:21606474 https://doi.org/10.1136/sextrans-2011-050025
1223. Stockfleth E, Beti H, Orasan R, et al. Topical Polyphenon E in the treatment of external genital and perianal warts: a randomized controlled trial. Br J Dermatol 2008;158:1329–38. PMID:18363746 https://doi.org/10.1111/j.1365-2133.2008.08520.x
1224. Gross G, Meyer KG, Pres H, Thielert C, Tawfik H, Mescheder A. A randomized, double-blind, four-arm parallel-group, placebo-controlled Phase II/III study to investigate the clinical efficacy of two galenic formulations of Polyphenon E in the treatment of external genital warts. J Eur Acad Dermatol Venereol 2007;21:1404–12. PMID:17958849 https://doi.org/10.1111/j.1468-3083.2007.02441.x
1225. Tatti S, Swinehart JM, Thielert C, Tawfik H, Mescheder A, Beutner KR. Sinecatechins, a defined green tea extract, in the treatment of external anogenital warts: a randomized controlled trial. Obstet Gynecol 2008;111:1371–9. PMID:18515521 https://doi.org/10.1097/AOG.0b013e3181719b60
1226. National Institute for Occupational Safety and Health. Control of smoke from laser/electric surgical procedures. Washington, DC: US Department of Health and Human Services, CDC, National Institute for Occupational Safety and Health; 1996. https://www.cdc.gov/niosh/docs/hazardcontrol/pdfs/hc11.pdf?id=10.26616/NIOSHPUB96128
1227. Filley CM, Graff-Richard NR, Lacy JR, Heitner MA, Earnest MP. Neurologic manifestations of podophyllin toxicity. Neurology 1982;32:308–11. PMID:7199647 https://doi.org/10.1212/WNL.32.3.308
1228. Conard PF, Hanna N, Rosenblum M, Gross JB. Delayed recognition of podophyllum toxicity in a patient receiving epidural morphine. Anesth Analg 1990;71:191–3. PMID:2375521 https://doi.org/10.1213/00000539-199008000-00013
1229. Karol MD, Conner CS, Watanabe AS, Murphrey KJ. Podophyllum: suspected teratogenicity from topical application. Clin Toxicol 1980;16:283–6. PMID:7398215 https://doi.org/10.3109/15563658008989950
1230. Silverberg MJ, Thorsen P, Lindeberg H, Grant LA, Shah KV. Condyloma in pregnancy is strongly predictive of juvenile-onset recurrent respiratory papillomatosis. Obstet Gynecol 2003;101:645–52. PMID:12681865
1231. Dolev JC, Maurer T, Springer G, et al. Incidence and risk factors for verrucae in women. AIDS 2008;22:1213–9. PMID:18525267 https://doi.org/10.1097/QAD.0b013e3283021aa3
1232. Silverberg MJ, Ahdieh L, Munoz A, et al. The impact of HIV infection and immunodeficiency on human papillomavirus type 6 or 11 infection and on genital warts. Sex Transm Dis 2002;29:427–35. PMID:12172526 https://doi.org/10.1097/00007435-200208000-00001

1204. Mayhew A, Mullins TL, Ding L, et al.青少年接种HPV疫苗后的风险认知及后续性行为.Pediatrics 2014;133:404-11. PMID:24488747 https://doi.org/10.1542/ peds.2013-2822
1205. Brouwer AF, Delinger RL, Eisenberg MC, et al.HPV疫苗接种未增加大学生年龄段男女的性活动或加速性行为开始.BMC Public Health 2019;19:821. PMID:31238911 https://doi.org/10.1186/s12889-019-7134-1
1206. Garland SM, Steben M, Sings HL， 等.生殖器疣的自然史：四价人乳头瘤病毒(6、11、16和18型)疫苗2项随机III期试验安慰剂组的分析.J Infect Dis 2009;199:805-14. PMID:19199546 https:// doi.org/10.1086/597071
1207. Flagg EW, Torrone EA.美国2006-2014年最可能受人乳头瘤病毒疫苗接种影响年龄组肛门生殖器疣的下降.Am J Public Health 2018;108:112-9. PMID:29161070 https://doi.org/10.2105/AJPH.2017.304119
1208. Hariri S, Schuler MS, Naleway AL， 等.美国女性健康计划参保者中人乳头瘤病毒疫苗对 incident 生殖器疣的有效性.Am J Epidemiol 2018;187:298-305. PMID:28641366 https://doi.org/10.1093/aje/kwx253
1209. Wangu Z, Hsu KK.HPV疫苗接种对肛门生殖器疣和呼吸道乳头状瘤病的影响.Hum Vaccin Immunother 2016;12:1357-62. PMID:27217191 https://doi.org/10.1080/216 45515.2016.1172754
1210. Swedish KA, Goldstone SE.四价人乳头瘤病毒疫苗接种对年长男男性行为人群肛门尖锐湿疣的预防.PLoS One 2014;9:e93393. PMID:24714693 https://doi.org/10.1371/journal.pone.0093393
1211. Sandø N, Kofoed K, Zachariae C, Fouchard J.丹麦年轻女性国家四价人乳头瘤病毒疫苗接种规划引入后年轻丹麦男女肛门生殖器疣全国发病率下降--一项生态学研究.Acta Derm Venereol 2014;94:288-92. PMID:24150529 https://doi.org/10.2340/00015555-1721
1212. Herweijer E, Ploner A, Sparén P.瑞典HPV疫苗可及六年后男女生殖器疣发病率显著降低.Vaccine 2018;36:1917-20. PMID:29523448 https://doi.org/10.1016/j.vaccine.2018.02.097
1213. Harrison C, Britt H, Garland S， 等.国家HPV疫苗接种规划引入后澳大利亚全科诊所年轻女性生殖器疣管理减少：来自全国代表性横断面全科诊所研究的结果.PLoS One 2014;9:e105967. PMID:25180698 https:// doi.org/10.1371/ journal.pone.0105967
1214. Canvin M, Sinka K, Hughes G, Mesher D.英格兰引入二价HPV(16/18)疫苗接种规划以来年轻男女生殖器疣诊断下降：一项生态学分析.Sex Transm Infect 2017;93:125-8. PMID:27365492 https://doi.org/10.1136/sextrans-2016-052626
1215. Chow EP, Read TR, Wigan R， 等.澳大利亚人乳头瘤病毒(HPV)疫苗接种规划7年后年轻异性恋者生殖器疣持续下降.Sex Transm Infect 2015;91:214-9. PMID:25305210 https://doi.org/10.1136/sextrans-2014-051813
1216. Petrosky EY, Liu G, Hariri S, Markowitz LE.人乳头瘤病毒疫苗接种与首次性行为年龄，国家健康与营养调查.Clin Pediatr(Phila) 2017;56:363-70. PMID:27609513 https://doi.org/10.1177/0009922816660541
1217. Gotovtseva EP, Kapadia AS, Smolensky MH, Lairson DR.咪喹莫特(aldara)5%乳膏治疗免疫功能正常成人外生殖器疣的最佳频率：一项meta分析.Sex Transm Dis 2008;35:346-51. PMID:18360317 https://doi.org/10.1097/OLQ.0b013e31815ea8d1
1218. Baker DA, Ferris DG, Martens MG， 等.咪喹莫特3.75%乳膏每日涂抹治疗肛门生殖器疣：两项随机安慰剂对照研究中女性结果的合并分析.Infect Dis Obstet Gynecol 2011;2011:806105. PMID:21876641 https://doi.org/10.1155/2011/806105
1219. Mashiah J, Brenner S.局部咪喹莫特诱导白癜风样色素减退的可能机制.Clin Exp Dermatol 2008;33:74-6. PMID:17979992
1220. Domingues E, Chaney KC, Scharf MJ, Wiss K.咪喹莫特再激活扁平苔藓.Cutis 2012;89:276-7, 283. PMID:22838091
1221. Patel U, Mark NM, Machler BC, Levine VJ.咪喹莫特5%乳膏诱发银屑病：一例病例报告、文献总结及机制.Br J Dermatol 2011;164:670-2. PMID:21062268 https://doi.org/10.1111/j.1365-2133.2010.10124.x
1222. Kumar B, Narang T.局部咪喹莫特因全身免疫刺激导致的局部和全身不良反应.Sex Transm Infect 2011;87:432. PMID:21606474 https://doi.org/10.1136/ sextrans-2011-050025
1223. Stockfleth E, Beti H, Orasan R， 等.局部茶多酚E治疗外生殖器和肛周疣：一项随机对照试验.Br J Dermatol 2008;158:1329-38. PMID:18363746 https://doi.org/10.1111/j.1365-2133.2008.08520.x
1224. Gross G, Meyer KG, Pres H, Thielert C, Tawfik H, Mescheder A.一项随机、双盲、四臂平行组、安慰剂对照II/III期研究，探讨两种茶多酚E盖伦制剂治疗外生殖器疣的临床疗效.J Eur Acad Dermatol Venereol 2007;21:1404-12. PMID:17958849 https://doi.org/10.1111/j.1468-3083.2007.02441.x
1225. Tatti S, Swinehart JM, Thielert C, Tawfik H, Mescheder A, Beutner KR.Sinecatechins，一种明确的绿茶提取物，治疗外肛门生殖器疣：一项随机对照试验.Obstet Gynecol 2008;111:1371-9. PMID:18515521 https://doi.org/10.1097/AOG.0b013e3181719b60
1226. 国家职业安全与健康研究所.激光/电外科手术烟雾的控制.华盛顿特区：美国卫生与公众服务部，CDC，国家职业安全与健康研究所；1996. https://www.cdc.gov/niosh/docs/hazardcontrol/pdfs/hc11.pdf?id=10.26616/ NIOSHPUB96128
1227. Filley CM, Graff-Richard NR, Lacy JR, Heitner MA, Earnest MP 鬼臼树脂毒性的神经系统表现.Neurology 1982;32:308-11. PMID:7199647 https://doi.org/10.1212/ WNL.32.3.308
1228. Conard PF, Hanna N, Rosenblum M, Gross JB.接受硬膜外吗啡患者中鬼臼属毒性的延迟识别.Anesth Analg 1990;71:191-3. PMID:2375521 https://doi.org/10.1213/00000539-199008000-00013
1229. Karol MD, Conner CS, Watanabe AS, Murphrey KJ.鬼臼属：局部应用可疑致畸性.Clin Toxicol 1980;16:283-6. PMID:7398215 https://doi.org/10.3109/15563658008989950
1230. Silverberg MJ, Thorsen P, Lindeberg H, Grant LA, Shah KV.妊娠期尖锐湿疣强烈预测幼年型复发性呼吸道乳头状瘤病.Obstet Gynecol 2003;101:645-52. PMID:12681865
1231. Dolev JC, Maurer T, Springer G， 等.女性疣的发病率和危险因素.AIDS 2008;22:1213-9. PMID:18525267 https://doi.org/10.1097/ QAD.0b013e3283021aa3
1232. Silverberg MJ, Ahdieh L, Munoz A， 等.HIV感染和免疫缺陷对人乳头瘤病毒6型或11型感染及生殖器疣的影响.Sex Transm Dis 2002;29:427-35. PMID:12172526 https://doi.org/10.1097/00007435-200208000-00001

1233. De Panfilis G, Melzani G, Mori G, Ghidini A, Graifemberghi S. Relapses after treatment of external genital warts are more frequent in HIV-positive patients than in HIV-negative controls. Sex Transm Dis 2002;29:121–5. PMID:11875372 https://doi.org/10.1097/00007435-200203000-00001
1234. Conley LJ, Ellerbrock TV, Bush TJ, Chiasson MA, Sawo D, Wright TC. HIV-1 infection and risk of vulvovaginal and perianal condylomata acuminata and intraepithelial neoplasia: a prospective cohort study. Lancet 2002;359:108–13. PMID:11809252 https://doi.org/10.1016/S0140-6736(02)07368-3
1235. Schlecht HP, Fugelso DK, Murphy RK, et al. Frequency of occult high-grade squamous intraepithelial neoplasia and invasive cancer within anal condylomata in men who have sex with men. Clin Infect Dis 2010;51:107–10. PMID:20482370 https://doi.org/10.1086/653426
1236. Maniar KP, Ronnett BM, Vang R, Yemelyanova A. Coexisting high-grade vulvar intraepithelial neoplasia (VIN) and condyloma acuminatum: independent lesions due to different HPV types occurring in immunocompromised patients. Am J Surg Pathol 2013;37:53–60. PMID:23026935 https://doi.org/10.1097/PAS.0b013e318263cda6
1237. Massad LS, Xie X, Darragh T, et al.; Women's Interagency HIV Study Collaborative Study Group. Genital warts and vulvar intraepithelial neoplasia: natural history and effects of treatment and human immunodeficiency virus infection. Obstet Gynecol 2011;118:831–9. PMID:21934446 https://doi.org/10.1097/AOG.0b013e31821a0f4d
1238. Forman D, de Martel C, Lacey CJ, et al. Global burden of human papillomavirus and related diseases. Vaccine 2012;30(Suppl 5):F12–23. PMID:23199955 https://doi.org/10.1016/j.vaccine.2012.07.055
1239. Darragh TM, Colgan TJ, Cox JT, et al.; Members of LAST Project Work Groups. The lower anogenital squamous terminology standardization project for HPV-associated lesions: background and consensus recommendations from the College of American Pathologists and the American Society for Colposcopy and Cervical Pathology. Arch Pathol Lab Med 2012;136:1266–97. PMID:22742517 https://doi.org/10.5858/arpa.LGT200570
1240. Committee on Practice Bulletins—Gynecology. Practice Bulletin No. 168 Summary: Cervical cancer screening and prevention. Obstet Gynecol 2016;128:923–5. PMID:27661643 https://doi.org/10.1097/AOG.0000000000001699
1241. Perkins RB, Guido RL, Saraiya M, et al. Summary of current guidelines for cervical cancer screening and management of abnormal test results: 2016–2020. J Womens Health (Larchmt) 2021;30:5–13. PMID:33464997 https://doi.org/10.1089/jwh.2020.8918
1242. Kim JJ, Burger EA, Regan C, Sy S. Screening for cervical cancer in primary care: a decision analysis for the US Preventive Services Task Force. JAMA 2018;320:706–14. PMID:30140882 https://doi.org/10.1001/jama.2017.19872
1243. Sawaya GF, Sanstead E, Alarid-Escudero F, et al. Estimated quality of life and economic outcomes associated with 12 cervical cancer screening strategies: a cost-effectiveness analysis. JAMA Intern Med 2019;179:867–78. PMID:31081851 https://doi.org/10.1001/jamainternmed.2019.0299
1244. Saslow D, Solomon D, Lawson HW, et al.; ACS-ASCCP-ASCP Cervical Cancer Guideline Committee. American Cancer Society, American Society for Colposcopy and Cervical Pathology, and American Society for Clinical Pathology screening guidelines for the prevention and early detection of cervical cancer. CA Cancer J Clin 2012;62:147–72. PMID:22422631 https://doi.org/10.3322/caac.21139
1245. Committee on Practice Bulletins—Gynecology. ACOG Practice Bulletin No. 131: Screening for cervical cancer. Obstet Gynecol 2012;120:1222–38. PMID:23090560 https://doi.org/10.1097/AOG.0b013e318277c92a
1246. Meyerson BE, Sayegh MA, Davis A, et al. Cervical cancer screening in a sexually transmitted disease clinic: screening adoption experiences from a midwestern clinic. Am J Public Health 2015;105(Suppl 2):e8–14. PMID:25689199 https://doi.org/10.2105/AJPH.2014.302272
1247. Perkins RB, Guido RS, Castle PE, et al.; 2019 ASCCP Risk-Based Management Consensus Guidelines Committee. 2019 ASCCP risk-based management consensus guidelines for abnormal cervical cancer screening tests and cancer precursors. J Low Genit Tract Dis 2020;24:102–31. PMID:32243307 https://doi.org/10.1097/LGT.0000000000000525
1248. Saraiya M, Lee NC, Blackman D, Smith MJ, Morrow B, McKenna MA. Self-reported Papanicolaou smears and hysterectomies among women in the United States. Obstet Gynecol 2001;98:269–78. PMID:11506844
1249. Sirovich BE, Welch HG. Cervical cancer screening among women without a cervix. JAMA 2004;291:2990–3. PMID:15213211 https://doi.org/10.1001/jama.291.24.2990
1250. Stokes-Lampard H, Wilson S, Waddell C, Ryan A, Holder R, Kehoe S. Vaginal vault smears after hysterectomy for reasons other than malignancy: a systematic review of the literature. BJOG 2006;113:1354–65. PMID:17081187 https://doi.org/10.1111/j.1471-0528.2006.01099.x
1251. Arbyn M, Herbert A, Schenck U, et al. European guidelines for quality assurance in cervical cancer screening: recommendations for collecting samples for conventional and liquid-based cytology. Cytopathology 2007;18:133–9. PMID:17573762 https://doi.org/10.1111/j.1365-2303.2007.00464.x
1252. Daley E, Perrin K, Vamos C, et al. Confusion about Pap smears: lack of knowledge among high-risk women. J Womens Health (Larchmt) 2013;22:67–74. PMID:23215902 https://doi.org/10.1089/jwh.2012.3667
1253. Drolet M, Bénard É, Boily MC, et al. Population-level impact and herd effects following human papillomavirus vaccination programmes: a systematic review and meta-analysis. Lancet Infect Dis 2015;15:565–80. PMID:25744474 https://doi.org/10.1016/S1473-3099(14)71073-4
1254. Ogbechie OA, Hacker MR, Dodge LE, Patil MM, Ricciotti HA. Confusion regarding cervical cancer screening and chlamydia screening among sexually active young women. Sex Transm Infect 2012;88:35–7. PMID:22123163 https://doi.org/10.1136/sextrans-2011-050289
1255. Dunne EF, Friedman A, Datta SD, Markowitz LE, Workowski KA. Updates on human papillomavirus and genital warts and counseling messages from the 2010 Sexually Transmitted Diseases Treatment Guidelines. Clin Infect Dis 2011;53(Suppl 3):S143–52. PMID:22080267 https://doi.org/10.1093/cid/cir703
1256. Fry AM, Ferries-Rowe EA, Learman LA, Haas DM. Pap smear versus speculum examination: can we teach providers to educate patients? J Womens Health (Larchmt) 2010;19:1715–9. PMID:20662627 https://doi.org/10.1089/jwh.2009.1862
1257. Adab P, Marshall T, Rouse A, Randhawa B, Sangha H, Bhangoo N. Randomised controlled trial of the effect of evidence based information on women's willingness to participate in cervical cancer screening. J Epidemiol Community Health 2003;57:589–93. PMID:12883063 https://doi.org/10.1136/jech.57.8.589
1258. Drolet M, Brisson M, Maunsell E, et al. The psychosocial impact of an abnormal cervical smear result. Psychooncology 2012;21:1071–81. PMID:21695747 https://doi.org/10.1002/pon.2003
1259. McCaffery KJ, Irwig L, Turner R, et al. Psychosocial outcomes of three triage methods for the management of borderline abnormal cervical smears: an open randomised trial. BMJ 2010;340(feb23 1):b4491. PMID:20179125 https://doi.org/10.1136/bmj.b4491

1233. 德潘菲利斯·G，梅尔扎尼·G，莫里·G，吉迪尼·A，格拉伊芬贝吉S.外生殖器疣治疗后复发在HIV阳性患者中比HIV阴性对照更频繁.Sex Transm Dis 2002;29:121-5. PMID:11875372 https://doi.org/10.1097/00007435-200203000-00001
1234. Conley LJ, Ellerbrock TV, Bush TJ, Chiasson MA, Sawo D, Wright TC.HIV-1感染与外阴阴道及肛周尖锐湿疣和上皮内瘤变风险：一项前瞻性队列研究.Lancet 2002;359:108-13. PMID:11809252 https://doi.org/10.1016/S0140-6736(02) 07368-3
1235. Schlecht HP, Fugelso DK, Murphy RK， 等.男男性行为人群肛门尖锐湿疣内隐匿性高级别鳞状上皮内瘤变和浸润性癌的频率.Clin Infect Dis 2010;51:107-10. PMID:20482370 https://doi.org/10.1086/653426
1236. Maniar KP, Ronnett BM, Vang R, Yemelyanova A.共存的高级别外阴上皮内瘤变(VIN)与尖锐湿疣：免疫功能低下患者中由不同HPV型别引起的独立病变。Am J Surg Pathol 2013;37:53-60. PMID:23026935 https://doi.org/10.1097/ PAS.0b013e318263cda6
1237. Massad LS, Xie X, Darragh T, et al.; Women's Interagency HIV Study Collaborative Study Group.生殖器疣与外阴上皮内瘤变：自然史及治疗与人类免疫缺陷病毒感染的影响。Obstet Gynecol 2011;118:831-9. PMID:21934446 https://doi.org/10.1097/AOG.0b013e31821a0f4d
1238. Forman D, de Martel C, Lacey CJ, et al.人乳头瘤病毒及相关疾病的全球负担。Vaccine 2012;30(Suppl 5): F12-23. PMID:23199955 https://doi.org/10.1016/j.vaccine.2012.07.055
1239. Darragh TM, Colgan TJ, Cox JT, et al.; Members of LAST Project Work Groups.下生殖道肛门鳞状上皮术语标准化项目(针对HPV相关病变)：背景及来自美国病理学家学会与美国阴道镜和宫颈病理学会的共识建议。Arch Pathol Lab Med 2012;136:1266-97. PMID:22742517 https://doi.org/10.5858/arpa.LGT200570
1240. Committee on Practice Bulletins-Gynecology.实践简报第168号摘要：宫颈癌筛查与预防。Obstet Gynecol 2016;128:923-5. PMID:27661643 https://doi.org/10.1097/AOG.0000000000001699
1241. Perkins RB, Guido RL, Saraiya M, et al.当前宫颈癌筛查及异常检测结果管理指南摘要：2016-2020。J Womens Health(Larchmt) 2021;30:5-13. PMID:33464997 https://doi.org/10.1089/jwh.2020.8918
1242. Kim JJ, Burger EA, Regan C, Sy S.初级保健中的宫颈癌筛查：为美国预防服务工作组所做的决策分析。JAMA 2018;320:706-14. PMID:30140882 https://doi.org/10.1001/jama.2017.19872
1243. Sawaya GF, Sanstead E, Alarid-Escudero F, et al.与12种宫颈癌筛查策略相关的估计生活质量与经济结局：成本效果分析。JAMA Intern Med 2019;179:867-78. PMID:31081851 https://doi.org/10.1001/ JAMA Intern Med.2019.0299
1244. Saslow D, Solomon D, Lawson HW, et al.; ACS-ASCCP-ASCP Cervical Cancer Guideline Committee.美国癌症学会、美国阴道镜和宫颈病理学会及美国临床病理学会宫颈癌预防与早期检测筛查指南。CA Cancer J Clin 2012;62:147-72. PMID:22422631 https://doi.org/10.3322/ caac.21139
1245. Committee on Practice Bulletins-Gynecology.ACOG实践简报第131号：宫颈癌筛查。Obstet Gynecol 2012;120:1222-38. PMID:23090560 https://doi.org/10.1097/ AOG.0b013e318277c92a
1246. Meyerson BE, Sayegh MA, Davis A, et al.性传播疾病门诊中的宫颈癌筛查：来自中西部一家门诊的筛查采纳经验。Am J Public Health 2015;105(Suppl 2): e8-14. PMID:25689199 https://doi.org/10.2105/AJPH.2014.302272
1247. Perkins RB, Guido RS, Castle PE, et al.; 2019 ASCCP Risk-Based Management Consensus Guidelines Committee.2019 ASCCP基于风险的异常宫颈癌筛查检测及癌前病变管理共识指南。J Low Genit Tract Dis 2020;24:102-31. PMID:32243307 https://doi.org/10.1097/ LGT.0000000000000525
1248. Saraiya M, Lee NC, Blackman D, Smith MJ, Morrow B, McKenna MA.美国女性自报巴氏涂片检查及子宫切除术情况。Obstet Gynecol 2001;98:269-78. PMID:11506844
1249. Sirovich BE, Welch HG.无宫颈女性的宫颈癌筛查。JAMA 2004;291:2990-3. PMID:15213211 https:// doi.org/10.1001/ jama.291.24.2990
1250. Stokes-Lampard H, Wilson S, Waddell C, Ryan A, Holder R, Kehoe S.因非恶性原因行子宫切除术后阴道穹窿涂片：文献系统评价。BJOG 2006;113:1354-65. PMID:17081187 https://doi.org/10.1111/j.1471-0528.2006.01099.x
1251. Arbyn M, Herbert A, Schenck U, et al.欧洲宫颈癌筛查质量保证指南：传统与液基细胞学样本采集建议。Cytopathology 2007;18:133-9. PMID:17573762 https://doi.org/10.1111/ j.1365-2303.2007.00464.x
1252. Daley E, Perrin K, Vamos C, et al.对巴氏涂片的困惑：高危女性知识缺乏。J Womens Health(Larchmt) 2013;22:67-74. PMID:23215902 https://doi.org/10.1089/ jwh.2012.3667
1253. Drolet M, Bénard É, Boily MC, et al.人乳头瘤病毒疫苗接种规划后的人群水平影响与群体效应：系统评价与荟萃分析。Lancet Infect Dis 2015;15:565-80. PMID:25744474 https://doi.org/10.1016/ S1473-3099(14) 71073-4
1254. Ogbechie OA, Hacker MR, Dodge LE, Patil MM, Ricciotti HA.性活跃年轻女性对宫颈癌筛查与衣原体筛查的困惑。Sex Transm Infect 2012;88:35-7. PMID:22123163 https://doi.org/10.1136/ sextrans-2011-050289
1255. Dunne EF, Friedman A, Datta SD, Markowitz LE, Workowski KA.人乳头瘤病毒与生殖器疣的最新进展及2010年性传播疾病治疗指南中的咨询信息。Clin Infect Dis 2011;53(Suppl 3): S143-52. PMID:22080267 https://doi.org/10.1093/cid/cir703
1256. Fry AM, Ferries-Rowe EA, Learman LA, Haas DM.巴氏涂片与窥器检查：我们能否教会医务人员教育患者?J Womens Health(Larchmt) 2010;19:1715-9. PMID:20662627 https://doi.org/10.1089/jwh.2009.1862
1257. 阿达布·P，马歇尔·T，劳斯·A，兰德哈瓦·B，桑加·H，班古N.基于证据的信息对女性参与宫颈癌筛查意愿影响的随机对照试验。J Epidemiol Community Health 2003;57:589-93. PMID:12883063 https://doi.org/10.1136/jech.57.8.589
1258. Drolet M, Brisson M, Maunsell E, et al.宫颈涂片异常结果的心理社会影响。Psychooncology 2012;21:1071-81. PMID:21695747 https://doi.org/10.1002/pon.2003
1259. McCaffery KJ, Irwig L, Turner R, et al.三种分流方法管理临界异常宫颈涂片的心理社会结局：一项开放随机试验。BMJ 2010;340(feb23 1): b4491. PMID:20179125 https://doi.org/10.1136/bmj.b4491

1260. Daley EM, Perrin KM, McDermott RJ, et al. The psychosocial burden of HPV: a mixed-method study of knowledge, attitudes and behaviors among HPV+ women. J Health Psychol 2010;15:279–90. PMID:20207671 https://doi.org/10.1177/1359105309351249
1261. Pirotta M, Ung L, Stein A, et al. The psychosocial burden of human papillomavirus related disease and screening interventions. Sex Transm Infect 2009;85:508–13. PMID:19703844 https://doi.org/10.1136/sti.2009.037028
1262. Lin L, Benard VB, Greek A, Roland KB, Hawkins NA, Saraiya M. Communication practices about HPV testing among providers in Federally Qualified Health Centers. Prev Med Rep 2015;2:436–9. PMID:26213683 https://doi.org/10.1016/j.pmedr.2015.05.006
1263. Kapeu AS, Luostarinen T, Jellum E, et al. Is smoking an independent risk factor for invasive cervical cancer? A nested case-control study within Nordic biobanks. Am J Epidemiol 2009;169:480–8. PMID:19074773 https://doi.org/10.1093/aje/kwn354
1264. Plummer M, Herrero R, Franceschi S, et al.; IARC Multi-centre Cervical Cancer Study Group. Smoking and cervical cancer: pooled analysis of the IARC multi-centric case-control study. Cancer Causes Control 2003;14:805–14. PMID:14682438 https://doi.org/10.1023/B:CACO.0000003811.98261.3e
1265. de Sanjosé S, Brotons M, Pavón MA. The natural history of human papillomavirus infection. Best Pract Res Clin Obstet Gynaecol 2018;47:2–13. PMID:28964706 https://doi.org/10.1016/j.bpobgyn.2017.08.015
1266. Louie KS, Castellsague X, de Sanjose S, et al.; International Agency for Research on Cancer Multicenter Cervical Cancer Study Group. Smoking and passive smoking in cervical cancer risk: pooled analysis of couples from the IARC multicentric case-control studies. Cancer Epidemiol Biomarkers Prev 2011;20:1379–90. PMID:21610224 https://doi.org/10.1158/1055-9965.EPI-11-0284
1267. Nelson HD, Cantor A, Wagner J, et al. Effectiveness of patient navigation to increase cancer screening in populations adversely affected by health disparities: a meta-analysis. J Gen Intern Med 2020;35:3026–35. PMID:32700218 https://doi.org/10.1007/s11606-020-06020-9
1268. Stillson T, Knight AL, Elswick RK Jr. The effectiveness and safety of two cervical cytologic techniques during pregnancy. J Fam Pract 1997;45:159–63. PMID:9267375
1269. Foster JC, Smith HL. Use of the Cytobrush for Papanicolaou smear screens in pregnant women. J Nurse Midwifery 1996;41:211–7. PMID:8708804 https://doi.org/10.1016/0091-2182(96)00013-4
1270. Paraiso MF, Brady K, Helmchen R, Roat TW. Evaluation of the endocervical Cytobrush and Cervex-Brush in pregnant women. Obstet Gynecol 1994;84:539–43. PMID:8090390
1271. Silverberg MJ, Leyden WA, Chi A, et al. Human immunodeficiency virus (HIV)- and non-HIV-associated immunosuppression and risk of cervical neoplasia. Obstet Gynecol 2018;131:47–55. PMID:29215531 https://doi.org/10.1097/AOG.0000000000002371
1272. Videla S, Tarrats A, Ornelas A, et al. Incidence of cervical high-grade squamous intraepithelial lesions in HIV-1-infected women with no history of cervical pathology: up to 17 years of follow-up. Int J STD AIDS 2019;30:56–63. PMID:30170532 https://doi.org/10.1177/0956462418792653
1273. Liu G, Sharma M, Tan N, Barnabas RV. HIV-positive women have higher risk of human papilloma virus infection, precancerous lesions, and cervical cancer. AIDS 2018;32:795–808. PMID:29369827 https://doi.org/10.1097/QAD.0000000000001765
1274. Sawaya GF, Lamar R, Perkins RB. Managing minimally abnormal cervical cancer screening test results. JAMA 2020;324:1557. PMID:32975557 https://doi.org/10.1001/jama.2020.12488
1275. Silverberg MJ, Lau B, Justice AC, et al.; North American AIDS Cohort Collaboration on Research and Design (NA-ACCORD) of IeDEA. Risk of anal cancer in HIV-infected and HIV-uninfected individuals in North America. Clin Infect Dis 2012;54:1026–34. PMID:22291097 https://doi.org/10.1093/cid/cir1012
1276. Tomassi MJ, Abbas MA, Klaristenfeld DD. Expectant management surveillance for patients at risk for invasive squamous cell carcinoma of the anus: a large US healthcare system experience. Int J Colorectal Dis 2019;34:47–54. PMID:30244347 https://doi.org/10.1007/s00384-018-3167-7
1277. Colón-López V, Shiels MS, Machin M, et al. Anal cancer risk among people with HIV infection in the United States. J Clin Oncol 2018;36:68–75. PMID:29140774 https://doi.org/10.1200/JCO.2017.74.9291
1278. Machalek DA, Grulich AE, Jin F, Templeton DJ, Poynten IM. The epidemiology and natural history of anal human papillomavirus infection in men who have sex with men. Sex Health 2012;9:527–37. PMID:23380235 https://doi.org/10.1071/SH12043
1279. Deshmukh AA, Suk R, Shiels MS, et al. Recent trends in squamous cell carcinoma of the anus incidence and mortality in the United States, 2001–2015. J Natl Cancer Inst 2020;112:829–38. PMID:31742639 https://doi.org/10.1093/jnci/djz219
1280. Edgren G, Sparén P. Risk of anogenital cancer after diagnosis of cervical intraepithelial neoplasia: a prospective population-based study. Lancet Oncol 2007;8:311–6. PMID:17395104 https://doi.org/10.1016/S1470-2045(07)70043-8
1281. Chaturvedi AK, Engels EA, Gilbert ES, et al. Second cancers among 104,760 survivors of cervical cancer: evaluation of long-term risk. J Natl Cancer Inst 2007;99:1634–43. PMID:17971527 https://doi.org/10.1093/jnci/djm201
1282. Suk R, Mahale P, Sonawane K, et al. Trends in risks for second primary cancers associated with index human papillomavirus-associated cancers. JAMA Netw Open 2018;1:e181999. PMID:30646145 https://doi.org/10.1001/jamanetworkopen.2018.1999
1283. Hillman RJ, Berry-Lawhorn JM, Ong JJ, et al.; International Anal Neoplasia Society. International Anal Neoplasia Society guidelines for the practice of digital anal rectal examination. J Low Genit Tract Dis 2019;23:138–46. PMID:30907777 https://doi.org/10.1097/LGT.0000000000000458
1284. Ong JJ, Grulich A, Walker S, et al. Baseline findings from the Anal Cancer Examination (ACE) study: screening using digital ano-rectal examination in HIV-positive men who have sex with men. J Med Screen 2016;23:70–6. PMID:26462726 https://doi.org/10.1177/0969141315604658
1285. Read TR, Vodstrcil L, Grulich AE, et al. Acceptability of digital anal cancer screening examinations in HIV-positive homosexual men. HIV Med 2013;14:491–6. PMID:23590621 https://doi.org/10.1111/hiv.12035
1286. Jin F, Grulich AE, Poynten IM, et al.; SPANC Study Team. The performance of anal cytology as a screening test for anal HSILs in homosexual men. Cancer Cytopathol 2016;124:415–24. PMID:26915346 https://doi.org/10.1002/cncy.21702
1287. Silva M, Peixoto A, Sarmento JA, Coelho R, Macedo G. Anal cytology, histopathology and anoscopy in an anal dysplasia screening program: is anal cytology enough? Rev Esp Enferm Dig 2018;110:109–14. PMID:29168646 https://doi.org/10.17235/reed.2018.5678/2018
1288. Iribarren Díaz M, Ocampo Hermida A, González-Carreró Fojón J, et al. Preliminary results of a screening program for anal cancer and its precursors for HIV-infected men who have sex with men in Vigo-Spain [Spanish]. Rev Esp Enferm Dig 2017;109:242–9. PMID:28229612 https://doi.org/10.17235/reed.2017.4274/2016

1260. Daley EM, Perrin KM, McDermott RJ, et al.HPV的心理社会负担：对HPV阳性女性知识、态度与行为的混合方法研究。J Health Psychol 2010;15:279-90. PMID:20207671 https://doi.org/10.1177/1359105309351249
1261. Pirotta M, Ung L, Stein A, et al.人乳头瘤病毒相关疾病及筛查干预的心理社会负担。Sex Transm Infect 2009;85:508-13. PMID:19703844 https://doi.org/10.1136/ sti.2009.037028
1262. Lin L, Benard VB, Greek A, Roland KB, Hawkins NA, Saraiya M.联邦合格健康中心医务人员关于HPV检测的沟通实践。Prev Med Rep 2015;2:436-9. PMID:26213683 https://doi.org/10.1016/j.pmedr.2015.05.006
1263. Kapeu AS, Luostarinen T, Jellum E, et al.吸烟是浸润性宫颈癌的独立危险因素吗?北欧生物样本库内的巢式病例对照研究。Am J Epidemiol 2009;169:480-8. PMID:19074773 https://doi.org/10.1093/aje/kwn354
1264. Plummer M, Herrero R, Franceschi S, et al.; IARC Multi-centre Cervical Cancer Study Group.吸烟与宫颈癌：IARC多中心病例对照研究的汇总分析。Cancer Causes Control 2003;14:805-14. PMID:14682438 https://doi.org/10.1023/B:CACO.0000003811.98261.3e
1265. de Sanjosé S, Brotons M, Pavón MA.人乳头瘤病毒感染的自然史。Best Pract Res Clin Obstet Gynaecol 2018;47:2-13. PMID:28964706 https://doi.org/10.1016/j.bpobgyn.2017.08.015
1266. Louie KS, Castellsague X, de Sanjose S, et al.; International Agency for Research on Cancer Multicenter Cervical Cancer Study Group.吸烟与被动吸烟在宫颈癌风险中的作用：来自IARC多中心病例对照研究夫妇的汇总分析.Cancer Epidemiol Biomarkers Prev 2011;20:1379-90. PMID:21610224 https://doi.org/10.1158/1055-9965.EPI-11-0284
1267. Nelson HD, Cantor A, Wagner J, et al.患者导航在受健康差异不利影响人群中提高癌症筛查有效性的meta分析.J Gen Intern Med 2020;35:3026-35. PMID:32700218 https://doi.org/10.1007/s11606-020-06020-9
1268. Stillson T, Knight AL, Elswick RK Jr.妊娠期两种宫颈细胞学技术的有效性和安全性。J Fam Pract 1997;45:159-63. PMID:9267375
1269. Foster JC, Smith HL.使用细胞刷进行孕妇巴氏涂片筛查。J Nurse Midwifery 1996;41:211-7. PMID:8708804 https://doi.org/10.1016/0091-2182(96) 00013-4
1270. Paraiso MF, Brady K, Helmchen R, Roat TW.妊娠妇女宫颈管内Cytobrush与Cervex-Brush的评估。Obstet Gynecol 1994;84:539-43. PMID:8090390
1271. Silverberg MJ, Leyden WA, Chi A, et al.人类免疫缺陷病毒(HIV)相关及非HIV相关免疫抑制与宫颈肿瘤风险。Obstet Gynecol 2018;131:47-55. PMID:29215531 https://doi.org/10.1097/AOG.0000000000002371
1272. Videla S, Tarrats A, Ornelas A, et al.无宫颈病变史的HIV-1感染女性中宫颈高级别鳞状上皮内病变的发病率：长达17年的随访。Int J STD AIDS 2019;30:56-63. PMID:30170532 https://doi.org/10.1177/0956462418792653
1273. Liu G, Sharma M, Tan N, Barnabas RV.HIV阳性女性感染人乳头瘤病毒、癌前病变及宫颈癌的风险更高。AIDS 2018;32:795-808. PMID:29369827 https://doi.org/10.1097/QAD.0000000000001765
1274. Sawaya GF, Lamar R, Perkins RB.管理轻微异常的宫颈癌筛查结果。JAMA 2020;324:1557. PMID:32975557 https://doi.org/10.1001/jama.2020.12488
1275. 西尔弗伯格 MJ，刘 B，贾斯蒂斯 AC，等； 北美艾滋病研究与设计队列合作组织(NA-ACCORD)隶属于IeDEA。北美HIV感染者和未感染者肛门癌风险。《临床感染病》2012年； 54:1026-34. PMID:22291097 https://doi.org/10.1093/cid/cir1012
1276. Tomassi MJ, Abbas MA, Klaristenfeld DD.对肛门浸润性鳞状细胞癌风险患者的期待管理监测：美国大型医疗系统经验。Int J Colorectal Dis 2019;34:47-54. PMID:30244347 https://doi.org/10.1007/ s00384-018-3167-7
1277. Colón-López V, Shiels MS, Machin M, et al.美国HIV感染者肛门癌风险。J Clin Oncol 2018;36:68-75. PMID:29140774 https://doi.org/10.1200/ JCO.2017.74.9291
1278. Machalek DA, Grulich AE, Jin F, Templeton DJ, Poynten IM.男男性行为者肛门人乳头瘤病毒感染的流行病学与自然史。Sex Health 2012;9:527-37. PMID:23380235 https://doi.org/10.1071/SH12043
1279. Deshmukh AA, Suk R, Shiels MS, et al.2001-2015年美国肛门鳞状细胞癌发病率和死亡率的最新趋势。J Natl Cancer Inst 2020;112:829-38. PMID:31742639 https://doi.org/10.1093/jnci/djz219
1280. Edgren G, Sparén P.宫颈上皮内瘤变诊断后肛门生殖器癌的风险：一项基于人群的前瞻性研究。Lancet Oncol 2007;8:311-6. PMID:17395104 https://doi.org/10.1016/ S1470-2045(07) 70043-8
1281. Chaturvedi AK, Engels EA, Gilbert ES, et al.104,760例子宫颈癌幸存者中的第二原发癌：长期风险评估。J Natl Cancer Inst 2007;99:1634-43. PMID:17971527 https://doi.org/10.1093/jnci/djm201
1282. Suk R, Mahale P, Sonawane K, et al.与索引人乳头瘤病毒相关癌症相关的第二原发癌风险趋势。JAMA Netw Open 2018;1:e181999. PMID:30646145 https://doi.org/10.1001/jamanetworkopen.2018.1999
1283. Hillman RJ, Berry-Lawhorn JM, Ong JJ， 等； 国际肛门肿瘤学会。国际肛门肿瘤学会肛门直肠指检实践指南。J Low Genit Tract Dis 2019; 23:138-46。PMID:30907777 https://doi.org/10.1097/LGT.0000000000000458
1284. Ong JJ, Grulich A, Walker S, et al.肛门癌检查(ACE)研究的基线发现：在HIV阳性男男性行为者中使用数字肛门-直肠检查进行筛查。J Med Screen 2016;23:70-6. PMID:26462726 https://doi.org/10.1177/0969141315604658
1285. Read TR, Vodstrcil L, Grulich AE, et al.在HIV阳性男同性恋者中对数字肛门癌筛查检查的接受度。HIV Med 2013;14:491-6. PMID:23590621 https://doi.org/10.1111/ hiv.12035
1286. Jin F, Grulich AE, Poynten IM, et al.; SPANC研究团队.肛门细胞学作为同性恋男性肛门高度鳞状上皮内病变(HSILs)筛查测试的性能.Cancer Cytopathol 2016;124:415-24. PMID:26915346 https://doi.org/10.1002/cncy.21702
1287. Silva M, Peixoto A, Sarmento JA, Coelho R, Macedo G.肛门细胞学、组织病理学与肛门镜检查在肛门发育不良筛查项目中的应用：肛门细胞学是否足够?Rev Esp Enferm Dig 2018;110:109-14. PMID:29168646 https://doi.org/10.17235/reed.2018.5678/2018
1288. Iribarren Díaz M、Ocampo Hermida A、González-Carreró Fojón J等。西班牙维戈地区 HIV 感染男男性行为者肛门癌及其癌前病变筛查项目的初步结果[西班牙语]。Rev Esp Enferm Dig 2017;109:242-9。PMID:28229612 https://doi.org/10.17235/reed.2017.4274/2016

1289. Burgos J, Hernández-Losa J, Landolfi S, et al. The role of oncogenic human papillomavirus determination for diagnosis of high-grade anal intraepithelial neoplasia in HIV-infected MSM. AIDS 2017;31:2227–33. PMID:28723712 https://doi.org/10.1097/QAD.0000000000001605

1290. Cheng SH, Wang CC, Chang SL, Chu FY, Hsueh YM. Oncogenic human papillomavirus is not helpful for cytology screening of the precursor lesions of anal cancers in Taiwanese men who are infected with human immunodeficiency virus. Int J Clin Oncol 2015;20:943–51. PMID:25712159 https://doi.org/10.1007/s10147-015-0804-9

1291. Hidalgo-Tenorio C, Rivero-Rodriguez M, Gil-Anguita C, et al. The role of polymerase chain reaction of high-risk human papilloma virus in the screening of high-grade squamous intraepithelial lesions in the anal mucosa of human immunodeficiency virus-positive males having sex with males. PLoS One 2015;10:e0123590. PMID:25849412 https://doi.org/10.1371/journal.pone.0123590

1292. Richel O, de Vries HJ, van Noesel CJ, Dijkgraaf MG, Prins JM. Comparison of imiquimod, topical fluorouracil, and electrocautery for the treatment of anal intraepithelial neoplasia in HIV-positive men who have sex with men: an open-label, randomised controlled trial. Lancet Oncol 2013;14:346–53. PMID:23499546 https://doi.org/10.1016/S1470-2045(13)70067-6

1293. Goldstone SE, Johnstone AA, Moshier EL. Long-term outcome of ablation of anal high-grade squamous intraepithelial lesions: recurrence and incidence of cancer. Dis Colon Rectum 2014;57:316–23. PMID:24509453 https://doi.org/10.1097/DCR.0000000000000058

1294. Tong WW, Shepherd K, Garland S, et al.; Study of the Prevention of Anal Cancer (SPANC) team. Human papillomavirus 16-specific T-cell responses and spontaneous regression of anal high-grade squamous intraepithelial lesions. J Infect Dis 2015;211:405–15. PMID:25139018 https://doi.org/10.1093/infdis/jiu461

1295. Tong WW, Jin F, McHugh LC, et al. Progression to and spontaneous regression of high-grade anal squamous intraepithelial lesions in HIV-infected and uninfected men. AIDS 2013;27:2233–43. PMID:24157904 https://doi.org/10.1097/QAD.0b013e3283633111

1296. Shin EC, Jeong SH. Natural history, clinical manifestations, and pathogenesis of hepatitis A. Cold Spring Harb Perspect Med 2018;8:a031708. PMID:29440324 https://doi.org/10.1101/cshperspect.a031708

1297. Nelson NP, Weng MK, Hofmeister MG, et al. Prevention of hepatitis A virus infection in the United States: recommendations of the Advisory Committee on Immunization Practices, 2020. MMWR Recomm Rep 2020;69(No. RR-5). PMID:32614811 https://doi.org/10.15585/mmwr.rr6905a1

1298. Foster MA, Hofmeister MG, Kupronis BA, et al. Increase in hepatitis A virus infections—United States, 2013–2018. MMWR Morb Mortal Wkly Rep 2019;68:413–5. PMID:31071072 https://doi.org/10.15585/mmwr.mm6818a2

1299. Bower WA, Nainan OV, Han X, Margolis HS. Duration of viremia in hepatitis A virus infection. J Infect Dis 2000;182:12–7. PMID:10882576 https://doi.org/10.1086/315701

1300. Clemens R, Safary A, Hepburn A, Roche C, Stanbury WJ, André FE. Clinical experience with an inactivated hepatitis A vaccine. J Infect Dis 1995;171(Suppl 1):S44–9. PMID:7876648 https://doi.org/10.1093/infdis/171.Supplement_1.S44

1301. Sharapov UM, Bulkow LR, Negus SE, et al. Persistence of hepatitis A vaccine induced seropositivity in infants and young children by maternal antibody status: 10-year follow-up. Hepatology 2012;56:516–22. PMID:22371069 https://doi.org/10.1002/hep.25687

1302. Mosites E, Gounder P, Snowball M, et al. Hepatitis A vaccine immune response 22 years after vaccination. J Med Virol 2018;90:1418–22. PMID:29663458 https://doi.org/10.1002/jmv.25197

1303. Theeten H, Van Herck K, Van Der Meeren O, Crasta P, Van Damme P, Hens N. Long-term antibody persistence after vaccination with a 2-dose Havrix (inactivated hepatitis A vaccine): 20 years of observed data, and long-term model-based predictions. Vaccine 2015;33:5723–7. PMID:26190091 https://doi.org/10.1016/j.vaccine.2015.07.008

1304. Hens N, Habteab Ghebretinsae A, Hardt K, Van Damme P, Van Herck K. Model based estimates of long-term persistence of inactivated hepatitis A vaccine-induced antibodies in adults. Vaccine 2014;32:1507–13. PMID:24508042 https://doi.org/10.1016/j.vaccine.2013.10.088

1305. Mosites E, Seeman S, Negus S, et al. Immunogenicity of the hepatitis A vaccine 20 years after infant immunization. Vaccine 2020;38:4940–3. PMID:32535018 https://doi.org/10.1016/j.vaccine.2020.05.069

1306. Yin S, Barker L, Ly KN, et al. Susceptibility to hepatitis A virus infection in the United States, 2007–2016. Clin Infect Dis 2020;71:e571–9. PMID:32193542 https://doi.org/10.1093/cid/ciaa298

1307. Moro PL, Arana J, Marquez PL, et al. Is there any harm in administering extra-doses of vaccine to a person? Excess doses of vaccine reported to the Vaccine Adverse Event Reporting System (VAERS), 2007–2017. Vaccine 2019;37:3730–4. PMID:31155414 https://doi.org/10.1016/j.vaccine.2019.04.088

1308. Winokur PL, Stapleton JT. Immunoglobulin prophylaxis for hepatitis A. Clin Infect Dis 1992;14:580–6. PMID:1554845 https://doi.org/10.1093/clinids/14.2.580

1309. Alter HJ, Purcell RH, Gerin JL, et al. Transmission of hepatitis B to chimpanzees by hepatitis B surface antigen-positive saliva and semen. Infect Immun 1977;16:928–33. PMID:892901 https://doi.org/10.1128/IAI.16.3.928-933.1977

1310. Villarejos VM, Visoná KA, Gutiérrez A, Rodríguez A. Role of saliva, urine and feces in the transmission of type B hepatitis. N Engl J Med 1974;291:1375–8. PMID:4427641 https://doi.org/10.1056/NEJM197412262912602

1311. Busch K, Thimme R. Natural history of chronic hepatitis B virus infection. Med Microbiol Immunol (Berl) 2015;204:5–10. PMID:25540037 https://doi.org/10.1007/s00430-014-0369-7

1312. Hyams KC. Risks of chronicity following acute hepatitis B virus infection: a review. Clin Infect Dis 1995;20:992–1000. PMID:7795104 https://doi.org/10.1093/clinids/20.4.992

1313. Goldstein ST, Zhou F, Hadler SC, Bell BP, Mast EE, Margolis HS. A mathematical model to estimate global hepatitis B disease burden and vaccination impact. Int J Epidemiol 2005;34:1329–39. PMID:16249217 https://doi.org/10.1093/ije/dyi206

1314. Thompson ND, Perz JF, Moorman AC, Holmberg SD. Nonhospital health care-associated hepatitis B and C virus transmission: United States, 1998–2008. Ann Intern Med 2009;150:33–9. PMID:19124818 https://doi.org/10.7326/0003-4819-150-1-200901060-00007

1315. Davis LG, Weber DJ, Lemon SM. Horizontal transmission of hepatitis B virus. Lancet 1989;1:889–93. PMID:2564960 https://doi.org/10.1016/S0140-6736(89)92876-6

1316. Martinson FE, Weigle KA, Royce RA, Weber DJ, Suchindran CM, Lemon SM. Risk factors for horizontal transmission of hepatitis B virus in a rural district in Ghana. Am J Epidemiol 1998;147:478–87. PMID:9525535 https://doi.org/10.1093/oxfordjournals.aje.a009474

1317. CDC. Healthcare-associated hepatitis B and C outbreaks (≥2 cases) reported to the CDC 2008–2019. Atlanta, GA: US Department of Health and Human Services, CDC; 2019. https://www.cdc.gov/hepatitis/outbreaks/pdfs/HealthcareInvestigationTable.pdf

1318. Schillie S, Harris A, Link-Gelles R, Romero J, Ward J, Nelson N. Recommendations of the Advisory Committee on Immunization Practices for use of a hepatitis B vaccine with a novel adjuvant. MMWR Morb Mortal Wkly Rep 2018;67:455–8. PMID:29672472 https://doi.org/10.15585/mmwr.mm6715a5

1289. Burgos J, Hernández-Losa J, Landolfi S, et al.致癌性人乳头瘤病毒检测在HIV感染MSM中诊断高级别肛门上皮内瘤变的作用。AIDS 2017;31:2227-33. PMID:28723712 https://doi.org/10.1097/QAD.0000000000001605

1290. Cheng SH, Wang CC, Chang SL, Chu FY, Hsueh YM.致癌型人乳头瘤病毒对感染人类免疫缺陷病毒的台湾男性肛门癌前病变的细胞学筛查无帮助。Int J Clin Oncol 2015;20:943-51. PMID:25712159 https://doi.org/10.1007/s10147-015-0804-9

1291. Hidalgo-Tenorio C, Rivero-Rodriguez M, Gil-Anguita C, et al.高危型人乳头瘤病毒聚合酶链反应在HIV阳性男男性行为者肛管黏膜高级别鳞状上皮内病变筛查中的作用。PLoS One 2015;10:e0123590. PMID:25849412 https://doi.org/10.1371/journal.pone.0123590

1292. Richel O, de Vries HJ, van Noesel CJ, Dijkgraaf MG, Prins JM.比较 imiquimod、局部 fluorouracil 和电灼术治疗 HIV 阳性男男性行为者肛门上皮内瘤变的疗效：一项开放标签、随机对照试验。Lancet Oncol 2013;14:346-53. PMID:23499546 https://doi.org/10.1016/S1470-2045(13) 70067-6

1293. Goldstone SE, Johnstone AA, Moshier EL.肛门高级别鳞状上皮内病变消融术的长期结局：复发与癌症发生率。Dis Colon Rectum 2014;57:316-23. PMID:24509453 https://doi.org/10.1097/DCR.0000000000000058

1294. Tong WW, Shepherd K, Garland S, et al.； 肛门癌预防研究(SPANC)团队.人乳头瘤病毒16型特异性T细胞应答与肛门高度鳞状上皮内病变的自发消退.J Infect Dis 2015;211:405-15. PMID:25139018 https://doi.org/10.1093/infdis/jiu461

1295. Tong WW, Jin F, McHugh LC, et al.HIV感染与未感染男性中高度肛门鳞状上皮内病变的进展与自然消退。AIDS 2013;27:2233-43. PMID:24157904 https://doi.org/10.1097/QAD.0b013e3283633111

1296. Shin EC, Jeong SH.甲型肝炎的自然史、临床表现和发病机制。Cold Spring Harb Perspect Med 2018; 8:a031708. PMID:29440324 https://doi.org/10.1101/ cshperspect.a031708

1297. Nelson NP, Weng MK, Hofmeister MG, et al.美国甲型肝炎病毒感染的预防：免疫实践咨询委员会建议，2020年。MMWR Recomm Rep 2020;69(No.RR-5)。PMID:32614811 https://doi.org/10.15585/mmwr.rr6905a1

1298. Foster MA, Hofmeister MG, Kupronis BA, et al.甲型肝炎病毒感染增加--美国，2013-2018。MMWR Morb Mortal Wkly Rep 2019;68:413-5. PMID:31071072 https://doi.org/10.15585/mmwr.mm6818a2

1299. Bower WA, Nainan OV, Han X, Margolis HS.甲型肝炎病毒感染的病毒血症持续时间。J Infect Dis 2000;182:12-7. PMID:10882576 https://doi.org/10.1086/315701

1300. Clemens R, Safary A, Hepburn A, Roche C, Stanbury WJ, André FE.灭活甲型肝炎疫苗的临床经验。J Infect Dis 1995;171(Suppl 1): S44-9. PMID:7876648 https://doi.org/10.1093/ infdis/171.Supplement_1.S44

1301. Sharapov UM, Bulkow LR, Negus SE, et al.按母体抗体状态划分的婴幼儿甲型肝炎疫苗诱导血清阳性持久性：10年随访。Hepatology 2012;56:516-22. PMID:22371069 https://doi.org/10.1002/ hep.25687

1302. Mosites E, Gounder P, Snowball M, et al.接种甲型肝炎疫苗22年后的免疫应答。J Med Virol 2018;90:1418-22. PMID:29663458 https://doi.org/10.1002/jmv.25197

1303. Theeten H, Van Herck K, Van Der Meeren O, Crasta P, Van Damme P, Hens N.接种2剂Havrix(甲型肝炎灭活疫苗)后的长期抗体持久性：20年观察数据及基于模型的长期预测。Vaccine 2015;33:5723-7. PMID:26190091 https://doi.org/10.1016/j.vaccine.2015.07.008

1304. Hens N, Habteab Ghebretinsae A, Hardt K, Van Damme P, Van Herck K.基于模型的成人灭活甲型肝炎疫苗诱导抗体长期持久性估计。Vaccine 2014;32:1507-13. PMID:24508042 https://doi.org/10.1016/j.vaccine.2013.10.088

1305. Mosites E, Seeman S, Negus S, et al.婴儿免疫接种20年后甲型肝炎疫苗的免疫原性。Vaccine 2020;38:4940-3. PMID:32535018 https://doi.org/10.1016/j.vaccine.2020.05.069

1306. Yin S, Barker L, Ly KN, et al.美国2007-2016年甲型肝炎病毒感染易感性.Clin Infect Dis 2020;71:e571-9. PMID:32193542 https://doi.org/10.1093/cid/ ciaa298

1307. Moro PL, Arana J, Marquez PL, et al.给个人接种额外剂量疫苗是否有任何危害?2007-2017年向疫苗不良事件报告系统(VAERS)报告的疫苗过量剂量。Vaccine 2019;37:3730-4. PMID:31155414 https://doi.org/10.1016/j.vaccine.2019.04.088

1308. Winokur PL, Stapleton JT.免疫球蛋白预防肝炎 A.《临床传染病》1992年； 14:580-6. PMID:1554845 https://doi.org/10.1093/clinids/14.2.580

1309. Alter HJ, Purcell RH, Gerin JL, et al.通过乙型肝炎表面抗原阳性唾液和精液将乙型肝炎传播给黑猩猩。Infect Immun 1977;16:928-33. PMID:892901 https://doi.org/10.1128/IAI.16.3.928-933.1977

1310. Villarejos VM, Visoná KA, Gutiérrez A, Rodríguez A.唾液、尿液和粪便在乙型肝炎传播中的作用。N Engl J Med 1974;291:1375-8. PMID:4427641 https://doi.org/10.1056/ NEJM197412262912602

1311. Busch K, Thimme R.慢性乙型肝炎病毒感染的天然史。Med Microbiol Immunol(Berl) 2015;204:5-10. PMID:25540037 https://doi.org/10.1007/s00430-014-0369-7

1312. Hyams KC.急性乙型肝炎病毒感染后慢性化风险：综述.Clin Infect Dis 1995;20:992-1000. PMID:7795104 https://doi.org/10.1093/clinids/20.4.992

1313. Goldstein ST, Zhou F, Hadler SC, Bell BP, Mast EE, Margolis HS.用于估算全球乙型肝炎疾病负担和疫苗接种影响的数学模型。Int J Epidemiol 2005;34:1329-39. PMID:16249217 https://doi.org/10.1093/ije/dyi206

1314. Thompson ND, Perz JF, Moorman AC, Holmberg SD.非医院医疗保健相关乙型和丙型肝炎病毒传播：美国，1998-2008年。Ann Intern Med 2009;150:33-9. PMID:19124818 https://doi.org/10.7326/0003-4819-150-1-200901060-00007

1315. Davis LG, Weber DJ, Lemon SM.乙型肝炎病毒的水平传播。Lancet 1989;1:889-93. PMID:2564960 https:// doi.org/10.1016/ S0140-6736(89) 92876-6

1316. Martinson FE, Weigle KA, Royce RA, Weber DJ, Suchindran CM, Lemon SM.加纳农村地区乙型肝炎病毒水平传播的危险因素。Am J Epidemiol 1998;147:478-87. PMID:9525535 https://doi.org/10.1093/oxfordjournals.aje.a009474

1317. CDC。《2008-2019年向CDC报告的医疗相关乙型和丙型肝炎暴发(≥2例)》。佐治亚州亚特兰大：美国卫生与公众服务部，CDC;2019年。https://www.cdc.gov/ hepatitis/outbreaks/pdfs/HealthcareInvestigationTable.pdf

1318. Schillie S, Harris A, Link-Gelles R, Romero J, Ward J, Nelson N.免疫实践咨询委员会关于使用含新型佐剂乙型肝炎疫苗的建议。MMWR Morb Mortal Wkly Rep 2018;67:455-8. PMID:29672472 https://doi.org/10.15585/mmwr.mm6715a5

1319. Lu PJ, Byrd KK, Murphy TV, Weinbaum C. Hepatitis B vaccination coverage among high-risk adults 18–49 years, U.S., 2009. Vaccine 2011;29:7049–57. PMID:21782873 https://doi.org/10.1016/j.vaccine.2011.07.030
1320. Williams WW, Lu PJ, O'Halloran A, et al. Surveillance of vaccination coverage among adult populations—United States, 2015. MMWR Surveill Summ 2017;66(No. SS-11). PMID:28472027 https://doi.org/10.15585/mmwr.ss6611a1
1321. CDC. Hepatitis B vaccination coverage among adults—United States, 2004. MMWR Morb Mortal Wkly Rep 2006;55:509–11. PMID:16691181
1322. MacKellar DA, Valleroy LA, Secura GM, et al.; Young Men's Survey Study Group. Two decades after vaccine license: hepatitis B immunization and infection among young men who have sex with men. Am J Public Health 2001;91:965–71. PMID:11392942 https://doi.org/10.2105/AJPH.91.6.965
1323. Terrault NA, Lok ASF, McMahon BJ, et al. Update on prevention, diagnosis, and treatment of chronic hepatitis B: AASLD 2018 hepatitis B guidance. Hepatology 2018;67:1560–99. PMID:29405329 https://doi.org/10.1002/hep.29800
1324. Ezeanolue E, Harriman K, Hunter P, Kroger A, Pellegrini C. General best practice guidelines for immunization: best practices guidance of the Advisory Committee on Immunization Practices (ACIP) [Internet]. Atlanta, GA: US Department of Health and Human Services, CDC, Advisory Committee on Immunization Practices; 2020. https://www.cdc.gov/vaccines/hcp/acip-recs/general-recs/downloads/general-recs.pdf
1325. Bruce MG, Bruden D, Hurlburt D, et al. Antibody levels and protection after hepatitis B vaccine: results of a 30-year follow-up study and response to a booster dose. J Infect Dis 2016;214:16–22. PMID:26802139 https://doi.org/10.1093/infdis/jiv748
1326. McMahon BJ, Bulkow LR, Singleton RJ, et al. Elimination of hepatocellular carcinoma and acute hepatitis B in children 25 years after a hepatitis B newborn and catch-up immunization program. Hepatology 2011;54:801–7. PMID:21618565 https://doi.org/10.1002/hep.24442
1327. Simons BC, Spradling PR, Bruden DJ, et al. A longitudinal hepatitis B vaccine cohort demonstrates long-lasting hepatitis B virus (HBV) cellular immunity despite loss of antibody against HBV surface antigen. J Infect Dis 2016;214:273–80. PMID:27056956 https://doi.org/10.1093/infdis/jiw142
1328. Bohlke K, Davis RL, Marcy SM, et al.; Vaccine Safety Datalink Team. Risk of anaphylaxis after vaccination of children and adolescents. Pediatrics 2003;112:815–20. PMID:14523172 https://doi.org/10.1542/peds.112.4.815
1329. André FE. Summary of safety and efficacy data on a yeast-derived hepatitis B vaccine. Am J Med 1989;87(3A):14S–20. PMID:2528292 https://doi.org/10.1016/0002-9343(89)90525-1
1330. Abara WE, Qaseem A, Schillie S, McMahon BJ, Harris AM; High Value Care Task Force of the American College of Physicians and the Centers for Disease Control and Prevention. Hepatitis B vaccination, screening, and linkage to care: best practice advice from the American College of Physicians and the Centers for Disease Control and Prevention. Ann Intern Med 2017;167:794–804. PMID:29159414 https://doi.org/10.7326/M17-1106
1331. Minuk GY, Bohme CE, Bowen TJ, et al. Efficacy of commercial condoms in the prevention of hepatitis B virus infection. Gastroenterology 1987;93:710–4. PMID:3040512 https://doi.org/10.1016/0016-5085(87)90431-8
1332. Hofmeister MG, Rosenthal EM, Barker LK, et al. Estimating prevalence of hepatitis C virus infection in the United States, 2013–2016. Hepatology 2019;69:1020–31. PMID:30398671 https://doi.org/10.1002/hep.30297
1333. Lockart I, Matthews GV, Danta M. Sexually transmitted hepatitis C infection: the evolving epidemic in HIV-positive and HIV-negative MSM. Curr Opin Infect Dis 2019;32:31–7. PMID:30531370 https://doi.org/10.1097/QCO.0000000000000515
1334. Terrault NA, Dodge JL, Murphy EL, et al. Sexual transmission of hepatitis C virus among monogamous heterosexual couples: the HCV partners study. Hepatology 2013;57:881–9. PMID:23175457 https://doi.org/10.1002/hep.26164
1335. Price JC, McKinney JE, Crouch PC, et al. Sexually acquired hepatitis C infection in HIV-uninfected men who have sex with men using preexposure prophylaxis against HIV. J Infect Dis 2019;219:1373–6. PMID:30462305 https://doi.org/10.1093/infdis/jiy670
1336. Tohme RA, Holmberg SD. Transmission of hepatitis C virus infection through tattooing and piercing: a critical review. Clin Infect Dis 2012;54:1167–78. PMID:22291098 https://doi.org/10.1093/cid/cir991
1337. Brettler DB, Mannucci PM, Gringeri A, et al. The low risk of hepatitis C virus transmission among sexual partners of hepatitis C-infected hemophilic males: an international, multicenter study. Blood 1992;80:540–3. PMID:1627805 https://doi.org/10.1182/blood.V80.2.540.540
1338. Kao JH, Hwang YT, Chen PJ, et al. Transmission of hepatitis C virus between spouses: the important role of exposure duration. Am J Gastroenterol 1996;91:2087–90. PMID:8855726
1339. Fierer DS, Mullen MP, Dieterich DT, Isabel Fiel M, Branch AD. Early-onset liver fibrosis due to primary hepatitis C virus infection is higher over time in HIV-infected men. Clin Infect Dis 2012;55:887–8, author reply 888–9. PMID:22677713 https://doi.org/10.1093/cid/cis538
1340. van de Laar TJ, van der Bij AK, Prins M, et al. Increase in HCV incidence among men who have sex with men in Amsterdam most likely caused by sexual transmission. J Infect Dis 2007;196:230–8. PMID:17570110 https://doi.org/10.1086/518796
1341. Nijmeijer BM, Koopsen J, Schinkel J, Prins M, Geijtenbeek TB. Sexually transmitted hepatitis C virus infections: current trends, and recent advances in understanding the spread in men who have sex with men. J Int AIDS Soc 2019;22(Suppl 6):e25348. PMID:31468692 https://doi.org/10.1002/jia2.25348
1342. Todesco E, Day N, Amiel C, et al. High clustering of acute HCV infections and high rate of associated STIs among Parisian HIV-positive male patients. Int J Antimicrob Agents 2019;53:678–81. PMID:30742957 https://doi.org/10.1016/j.ijantimicag.2019.02.002
1343. Jin F, Matthews GV, Grulich AE. Sexual transmission of hepatitis C virus among gay and bisexual men: a systematic review. Sex Health 2017;14:28–41. PMID:27712618 https://doi.org/10.1071/SH16141
1344. Hegazi A, Lee MJ, Whittaker W, et al. Chemsex and the city: sexualised substance use in gay bisexual and other men who have sex with men attending sexual health clinics. Int J STD AIDS 2017;28:362–6. Erratum in: Int J STD AIDS 2017;28:423. PMID:27178067 https://doi.org/10.1177/0956462416651229
1345. Page EE, Nelson M. Hepatitis C and sex. Clin Med (Lond) 2016;16:189–92. PMID:27037392 https://doi.org/10.7861/clinmedicine.16-2-189
1346. Apers L, Vanden Berghe W, De Wit S, et al. Risk factors for HCV acquisition among HIV-positive MSM in Belgium. J Acquir Immune Defic Syndr 2015;68:585–93. PMID:25763786 https://doi.org/10.1097/QAI.0000000000000528
1347. Daskalopoulou M, Rodger AJ, Phillips AN, et al.; ASTRA Study Group. Condomless sex in HIV-diagnosed men who have sex with men in the UK: prevalence, correlates, and implications for HIV transmission. Sex Transm Infect 2017;93:590–8. PMID:28679630 https://doi.org/10.1136/sextrans-2016-053029

1319. Lu PJ, Byrd KK, Murphy TV, Weinbaum C.2009年美国18-49岁高危成人乙型肝炎疫苗接种覆盖率.Vaccine 2011;29:7049-57. PMID:21782873 https://doi.org/10.1016/j.vaccine.2011.07.030
1320. Williams WW, Lu PJ, O'Halloran A, et al.2015年美国成年人群疫苗接种覆盖率监测.MMWR Surveill Summ 2017;66(No.SS-11).PMID:28472027 https://doi.org/10.15585/mmwr.ss6611a1
1321. CDC。成人乙型肝炎疫苗接种覆盖率--美国，2004年。MMWR Morb Mortal Wkly Rep 2006;55:509-11。PMID:16691181
1322. 麦凯勒 DA，瓦勒罗伊 LA，塞库拉 GM，等； 青年男性调查研究组。疫苗许可二十年后：与男性发生性行为的年轻男性中的乙型肝炎免疫接种与感染。《美国公共卫生杂志》2001年； 91:965-71. PMID:11392942 https:// doi.org/10.2105/AJPH.91.6.965
1323. Terrault NA, Lok ASF, McMahon BJ, et al.慢性乙型肝炎预防、诊断和治疗的更新：AASLD 2018 乙型肝炎指南。Hepatology 2018;67:1560-99. PMID:29405329 https:// doi.org/10.1002/hep.29800
1324. Ezeanolue E, Harriman K, Hunter P, Kroger A, Pellegrini C.免疫接种通用最佳实践指南：免疫实践咨询委员会(ACIP)最佳实践指导[Internet]。佐治亚州亚特兰大：美国卫生与公众服务部，CDC，免疫实践咨询委员会；2020。https://www.cdc.gov/vaccines/hcp/acip-recs/general-recs/downloads/general-recs.pdf
1325. Bruce MG, Bruden D, Hurlburt D, et al.乙型肝炎疫苗后的抗体水平与保护作用：一项30年随访研究的结果及对加强剂量的应答。J Infect Dis 2016;214:16-22. PMID:26802139 https://doi.org/10.1093/infdis/jiv748
1326. McMahon BJ, Bulkow LR, Singleton RJ, et al.在新生儿和补种乙型肝炎免疫规划实施25年后，儿童肝细胞癌和急性乙型肝炎的消除。Hepatology 2011;54:801-7. PMID:21618565 https://doi.org/10.1002/hep.24442
1327. Simons BC, Spradling PR, Bruden DJ, et al.一项纵向乙型肝炎疫苗队列研究表明，尽管针对HBV表面抗原的抗体消失，但仍存在持久的乙型肝炎病毒(HBV)细胞免疫。J Infect Dis 2016;214:273-80. PMID:27056956 https:// doi.org/10.1093/infdis/jiw142
1328. Bohlke K, Davis RL, Marcy SM, et al.; Vaccine Safety Datalink Team.儿童和青少年接种疫苗后发生过敏反应的风险。Pediatrics 2003;112:815-20. PMID:14523172 https://doi.org/10.1542/peds.112.4.815
1329. André FE.酵母来源乙型肝炎疫苗安全性和有效性数据摘要。Am J Med 1989;87(3A): 14S-20. PMID:2528292 https:// doi.org/10.1016/0002-9343(89) 90525-1
1330. Abara WE, Qaseem A, Schillie S, McMahon BJ, Harris AM; High Value Care Task Force of the American College of Physicians and the Centers for Disease Control and Prevention.乙型肝炎疫苗接种、筛查及与照护的衔接：美国内科医师学会与美国疾病控制与预防中心的最佳实践建议。Ann Intern Med 2017;167:794-804. PMID:29159414 https:// doi.org/10.7326/M17-1106
1331. Minuk GY, Bohme CE, Bowen TJ, et al.市售避孕套预防乙型肝炎病毒感染的有效性。Gastroenterology 1987;93:710-4. PMID:3040512 https:// doi.org/10.1016/0016-5085(87) 90431-8
1332. Hofmeister MG, Rosenthal EM, Barker LK, et al.估计2013-2016年美国丙型肝炎病毒感染的患病率。Hepatology 2019;69:1020-31. PMID:30398671 https://doi.org/10.1002/hep.30297
1333. Lockart I, Matthews GV, Danta M.性传播丙型肝炎感染：HIV阳性和HIV阴性MSM中不断演变的流行。Curr Opin Infect Dis 2019;32:31-7. PMID:30531370 https:// doi.org/10.1097/QCO.0000000000000515
1334. Terrault NA, Dodge JL, Murphy EL, et al.单一性伴异性恋夫妇之间丙型肝炎病毒的性传播：HCV伴侣研究。Hepatology 2013;57:881-9. PMID:23175457 https:// doi.org/10.1002/hep.26164
1335. Price JC, McKinney JE, Crouch PC, et al.使用HIV暴露前预防的HIV未感染男男性行为人群中经性获得性丙型肝炎感染。J Infect Dis 2019;219:1373-6. PMID:30462305 https://doi.org/10.1093/infdis/jiy670
1336. Tohme RA, Holmberg SD.通过纹身和穿孔传播丙型肝炎病毒感染：一项批判性综述。Clin Infect Dis 2012;54:1167-78. PMID:22291098 https://doi.org/10.1093/cid/ cir991
1337. Brettler DB, Mannucci PM, Gringeri A, et al.丙型肝炎感染血友病男性的性伴之间丙型肝炎病毒传播风险低：一项国际多中心研究。Blood 1992;80:540-3. PMID:1627805 https://doi.org/10.1182/blood.V80.2.540.540
1338. Kao JH, Hwang YT, Chen PJ, et al.配偶之间丙型肝炎病毒的传播：暴露持续时间的重要作用。Am J Gastroenterol 1996;91:2087-90. PMID:8855726
1339. Fierer DS, Mullen MP, Dieterich DT, Isabel Fiel M, Branch AD.原发性丙型肝炎病毒感染所致的早发性肝纤维化在HIV感染男性中随时间推移更高。Clin Infect Dis 2012;55:887-8, author reply 888-9. PMID:22677713 https://doi.org/10.1093/cid/ cis538
1340. van de Laar TJ, van der Bij AK, Prins M, et al.阿姆斯特丹男男性行为人群中HCV发病率增加最可能由性传播引起。J Infect Dis 2007;196:230-8. PMID:17570110 https://doi.org/10.1086/518796
1341. Nijmeijer BM, Koopsen J, Schinkel J, Prins M, Geijtenbeek TB.性传播丙型肝炎病毒感染：当前趋势及对男男性行为人群中传播认识的最新进展。J Int AIDS Soc 2019;22(Suppl 6): e25348. PMID:31468692 https://doi.org/10.1002/jia2.25348
1342. Todesco E, Day N, Amiel C, et al.巴黎HIV阳性男性患者中急性HCV感染高度聚集及相关STI高发。Int J Antimicrob Agents 2019;53:678-81. PMID:30742957 https://doi.org/10.1016/j.ijantimicag.2019.02.002
1343. Jin F, Matthews GV, Grulich AE.男同性恋和双性恋男性中丙型肝炎病毒的性传播：一项系统综述。Sex Health 2017;14:28-41. PMID:27712618 https://doi.org/10.1071/SH16141
1344. Hegazi A, Lee MJ, Whittaker W, et al.化学性爱(chemsex)与城市：就诊于性健康门诊的男同性恋、双性恋及其他男男性行为人群中的性化物质使用。Int J STD AIDS 2017;28:362-6. Erratum in: Int J STD AIDS 2017;28:423. PMID:27178067 https:// doi.org/10.1177/0956462416651229
1345. Page EE, Nelson M.丙型肝炎与性。Clin Med(Lond) 2016;16:189-92. PMID:27037392 https://doi.org/10.7861/ clinmedicine.16-2-189
1346. Apers L, Vanden Berghe W, De Wit S, et al.比利时HIV阳性MSM中HCV获得的风险因素。J Acquir Immune Defic Syndr 2015;68:585-93. PMID:25763786 https:// doi.org/10.1097/QAI.0000000000000528
1347. Daskalopoulou M, Rodger AJ, Phillips AN, et al.; ASTRA Study Group.英国HIV确诊男男性行为人群中的无套性行为：患病率、相关因素及对HIV传播的影响。Sex Transm Infect 2017;93:590-8. PMID:28679630 https://doi.org/10.1136/sextrans-2016-053029

1348. Vanhommerig JW, Lambers FA, Schinkel J, et al.; MOSAIC (MSM Observational Study of Acute Infection With Hepatitis C) Study Group. Risk factors for sexual transmission of hepatitis C virus among human immunodeficiency virus-infected men who have sex with men: a case-control study. Open Forum Infect Dis 2015;2:ofv115. PMID:26634219 https://doi.org/10.1093/ofid/ofv115
1349. Turner SS, Gianella S, Yip MJ, et al. Shedding of hepatitis C virus in semen of human immunodeficiency virus-infected men. Open Forum Infect Dis 2016;3:ofw057.
1350. Foster AL, Gaisa MM, Hijdra RM, et al. Shedding of hepatitis C virus into the rectum of HIV-infected men who have sex with men. Clin Infect Dis 2017;64:284–8. PMID:28013267 https://doi.org/10.1093/cid/ciw740
1351. Hammer GP, Kellogg TA, McFarland WC, et al. Low incidence and prevalence of hepatitis C virus infection among sexually active non-intravenous drug-using adults, San Francisco, 1997–2000. Sex Transm Dis 2003;30:919–24. PMID:14646642 https://doi.org/10.1097/01.OLQ.0000091152.31366.E6
1352. Roy KM, Goldberg DJ, Hutchinson S, Cameron SO, Wilson K, MacDonald L. Hepatitis C virus among self declared non-injecting sexual partners of injecting drug users. J Med Virol 2004;74:62–6. PMID:15258969 https://doi.org/10.1002/jmv.20146
1353. Mele A, Stroffolini T, Tosti ME, et al. Heterosexual transmission of hepatitis C in Italy. J Med Virol 1999;57:111–3. PMID:9892393 https://doi.org/10.1002/(SICI)1096-9071(199902)57:2<111::AID-JMV4>3.0.CO;2-C
1354. Rauch A, Rickenbach M, Weber R, et al.; Swiss HIV Cohort Study. Unsafe sex and increased incidence of hepatitis C virus infection among HIV-infected men who have sex with men: the Swiss HIV Cohort Study. Clin Infect Dis 2005;41:395–402. PMID:16007539 https://doi.org/10.1086/431486
1355. Browne R, Asboe D, Gilleece Y, et al. Increased numbers of acute hepatitis C infections in HIV positive homosexual men; is sexual transmission feeding the increase? Sex Transm Infect 2004;80:326–7. PMID:15295139 https://doi.org/10.1136/sti.2003.008532
1356. Danta M, Brown D, Bhagani S, et al.; HIV and Acute HCV (HAAC) group. Recent epidemic of acute hepatitis C virus in HIV-positive men who have sex with men linked to high-risk sexual behaviours. AIDS 2007;21:983–91. PMID:17457092 https://doi.org/10.1097/QAD.0b013e3281053a0c
1357. Ghosn J, Pierre-François S, Thibault V, et al. Acute hepatitis C in HIV-infected men who have sex with men. HIV Med 2004;5:303–6. PMID:15236621 https://doi.org/10.1111/j.1468-1293.2004.00225.x
1358. van de Laar T, Pybus O, Bruisten S, et al. Evidence of a large, international network of HCV transmission in HIV-positive men who have sex with men. Gastroenterology 2009;136:1609–17. PMID:19422083 https://doi.org/10.1053/j.gastro.2009.02.006
1359. Hoornenborg E, Achterbergh RCA, Schim van der Loeff MF, et al.; Amsterdam PrEP Project team in the HIV Transmission Elimination AMsterdam Initiative, MOSAIC study group. MSM starting preexposure prophylaxis are at risk of hepatitis C virus infection. AIDS 2017;31:1603–10. PMID:28657964 https://doi.org/10.1097/QAD.0000000000001522
1360. Gras J, Mahjoub N, Charreau I, et al.; IPERGAY Study Group. Early diagnosis and risk factors of acute hepatitis C in high-risk MSM on preexposure prophylaxis. AIDS 2020;34:47–52. PMID:31789889 https://doi.org/10.1097/QAD.0000000000002364
1361. Hoofnagle JH. Hepatitis C: the clinical spectrum of disease. Hepatology 1997;26(Suppl 1):15S–20S. PMID:9305658 https://doi.org/10.1002/hep.510260703
1362. Orland JR, Wright TL, Cooper S. Acute hepatitis C. Hepatology 2001;33:321–7. PMID:11172332 https://doi.org/10.1053/jhep.2001.22112
1363. Alter MJ, Margolis HS, Krawczynski K, et al. The natural history of community-acquired hepatitis C in the United States. The Sentinel Counties Chronic non-A, non-B Hepatitis Study Team. N Engl J Med 1992;327:1899–905. PMID:1280771 https://doi.org/10.1056/NEJM199212313272702
1364. Farci P, Alter HJ, Wong D, et al. A long-term study of hepatitis C virus replication in non-A, non-B hepatitis. N Engl J Med 1991;325:98–104. PMID:1646962 https://doi.org/10.1056/NEJM199107113250205
1365. Liang TJ, Rehermann B, Seeff LB, Hoofnagle JH. Pathogenesis, natural history, treatment, and prevention of hepatitis C. Ann Intern Med 2000;132:296–305. PMID:10681285 https://doi.org/10.7326/0003-4819-132-4-200002150-00008
1366. Thomas DL, Seeff LB. Natural history of hepatitis C. Clin Liver Dis 2005;9:383–98, vi. PMID:16023972 https://doi.org/10.1016/j.cld.2005.05.003
1367. Westbrook RH, Dusheiko G. Natural history of hepatitis C. J Hepatol 2014;61(Suppl):S58–68. PMID:25443346 https://doi.org/10.1016/j.jhep.2014.07.012
1368. Zou S, Stramer SL, Dodd RY. Donor testing and risk: current prevalence, incidence, and residual risk of transfusion-transmissible agents in US allogeneic donations. Transfus Med Rev 2012;26:119–28. PMID:21871776 https://doi.org/10.1016/j.tmrv.2011.07.007
1369. Bixler D, Annambholta P, Abara WE, et al. Hepatitis B and C virus infections transmitted through organ transplantation investigated by CDC, United States, 2014–2017. Am J Transplant 2019;19:2570–82. PMID:30861300 https://doi.org/10.1111/ajt.15352
1370. CDC. Testing for HCV infection: an update of guidance for clinicians and laboratorians. MMWR Morb Mortal Wkly Rep 2013;62:362–5. PMID:23657112
1371. Marincovich B, Castilla J, del Romero J, et al. Absence of hepatitis C virus transmission in a prospective cohort of heterosexual serodiscordant couples. Sex Transm Infect 2003;79:160–2. PMID:12690143 https://doi.org/10.1136/sti.79.2.160
1372. Tahan V, Karaca C, Yildirim B, et al. Sexual transmission of HCV between spouses. Am J Gastroenterol 2005;100:821–4. PMID:15784025 https://doi.org/10.1111/j.1572-0241.2005.40879.x
1373. Vandelli C, Renzo F, Romanò L, et al. Lack of evidence of sexual transmission of hepatitis C among monogamous couples: results of a 10-year prospective follow-up study. Am J Gastroenterol 2004;99:855–9. PMID:15128350 https://doi.org/10.1111/j.1572-0241.2004.04150.x
1374. Fierer DS, Uriel AJ, Carriero DC, et al. Liver fibrosis during an outbreak of acute hepatitis C virus infection in HIV-infected men: a prospective cohort study. J Infect Dis 2008;198:683–6. PMID:18627270 https://doi.org/10.1086/590430
1375. Cottrell EB, Chou R, Wasson N, Rahman B, Guise JM. Reducing risk for mother-to-infant transmission of hepatitis C virus: a systematic review for the U.S. Preventive Services Task Force. Ann Intern Med 2013;158:109–13. PMID:23437438 https://doi.org/10.7326/0003-4819-158-2-201301150-00575
1376. Mast EE, Hwang LY, Seto DS, et al. Risk factors for perinatal transmission of hepatitis C virus (HCV) and the natural history of HCV infection acquired in infancy. J Infect Dis 2005;192:1880–9. PMID:16267758 https://doi.org/10.1086/497701
1377. Barbosa C, Fraser H, Hoerger TJ, et al. Cost-effectiveness of scaling-up HCV prevention and treatment in the United States for people who inject drugs. Addiction 2019;114:2267–78. PMID:31307116 https://doi.org/10.1111/add.14731
1378. Lambers FA, Prins M, Thomas X, et al.; MOSAIC (MSM Observational Study of Acute Infection with hepatitis C) study group. Alarming incidence of hepatitis C virus re-infection after treatment of sexually acquired acute hepatitis C virus infection in HIV-infected MSM. AIDS 2011;25:F21–7. PMID:21857492 https://doi.org/10.1097/QAD.0b013e32834bac44

1348. Vanhommerig JW, Lambers FA, Schinkel J, et al.; MOSAIC(MSM Observational Study of Acute Infection With Hepatitis C) Study Group.人类免疫缺陷病毒感染男男性行为人群中丙型肝炎病毒性传播的风险因素：一项病例对照研究。Open Forum Infect Dis 2015;2:ofv115. PMID:26634219 https://doi.org/10.1093/ofid/ofv115
1349. Turner SS, Gianella S, Yip MJ, et al.人类免疫缺陷病毒感染男性精液中丙型肝炎病毒的排放。Open Forum Infect Dis 2016;3:ofw057.
1350. Foster AL, Gaisa MM, Hijdra RM, et al.HIV感染男男性行为人群直肠中丙型肝炎病毒的排放。Clin Infect Dis 2017;64:284-8. PMID:28013267 https://doi.org/10.1093/cid/ciw740
1351. Hammer GP, Kellogg TA, McFarland WC, et al.旧金山1997-2000年性活跃的非静脉吸毒成人中丙型肝炎病毒感染的低发病率和患病率。Sex Transm Dis 2003;30:919-24. PMID:14646642 https://doi.org/10.1097/01. OLQ.0000091152.31366.E6
1352. Roy KM, Goldberg DJ, Hutchinson S, Cameron SO, Wilson K, MacDonald L.自述非注射吸毒的注射吸毒者性伴中的丙型肝炎病毒。J Med Virol 2004;74:62-6. PMID:15258969 https://doi.org/10.1002/jmv.20146
1353. Mele A, Stroffolini T, Tosti ME, et al.意大利丙型肝炎的异性传播。J Med Virol 1999;57:111-3. PMID:9892393 https://doi.org/10.1002/(SICI) 1096-9071(199902) 57:2<111::AID-JMV4>3.0.CO;2-C
1354. Rauch A, Rickenbach M, Weber R, et al.; Swiss HIV Cohort Study.不安全性行为与HIV感染男男性行为人群中丙型肝炎病毒感染发病率增加：瑞士HIV队列研究。Clin Infect Dis 2005;41:395-402. PMID:16007539 https://doi.org/10.1086/431486
1355. Browne R, Asboe D, Gilleece Y, et al.HIV阳性同性恋男性中急性丙型肝炎感染数量增加；性传播是否助长了这一增加?Sex Transm Infect 2004;80:326-7. PMID:15295139 https://doi.org/10.1136/sti.2003.008532
1356. Danta M, Brown D, Bhagani S, et al.; HIV and Acute HCV(HAAC) group.近期HIV阳性男男性行为人群中急性丙型肝炎病毒流行与高风险性行为相关。AIDS 2007;21:983-91. PMID:17457092 https://doi.org/10.1097/ QAD.0b013e3281053a0c
1357. Ghosn J, Pierre-François S, Thibault V, et al.HIV感染男男性行为人群中的急性丙型肝炎。HIV Med 2004;5:303-6. PMID:15236621 https://doi.org/10.1111/j.1468-1293.2004.00225.x
1358. van de Laar T, Pybus O, Bruisten S, et al.HIV阳性男男性行为人群中HCV传播的大型国际网络的证据。Gastroenterology 2009;136:1609-17. PMID:19422083 https://doi.org/10.1053/j.gastro.2009.02.006
1359. Hoornenborg E, Achterbergh RCA, Schim van der Loeff MF, et al.; Amsterdam PrEP Project team in the HIV Transmission Elimination AMsterdam Initiative, MOSAIC study group.开始暴露前预防的MSM有感染丙型肝炎病毒的风险。AIDS 2017;31:1603-10. PMID:28657964 https://doi.org/10.1097/ QAD.0000000000001522
1360. Gras J, Mahjoub N, Charreau I, et al.; IPERGAY Study Group.接受暴露前预防的高风险MSM中急性丙型肝炎的早期诊断和危险因素。AIDS 2020;34:47-52. PMID:31789889 https://doi.org/10.1097/ QAD.0000000000002364
1361. Hoofnagle JH.丙型肝炎：疾病的临床谱。Hepatology 1997;26(Suppl 1): 15S-20S.PMID:9305658 https:// doi.org/10.1002/hep.510260703
1362. Orland JR, Wright TL, Cooper S.急性丙型肝炎。Hepatology 2001;33:321-7. PMID:11172332 https://doi.org/10.1053/ jhep.2001.22112
1363. Alter MJ, Margolis HS, Krawczynski K, et al.美国社区获得性丙型肝炎的自然史。The Sentinel Counties Chronic non-A, non-B Hepatitis Study Team.N Engl J Med 1992;327:1899-905. PMID:1280771 https://doi.org/10.1056/ NEJM199212313272702
1364. Farci P, Alter HJ, Wong D, et al.非甲非乙型肝炎中丙型肝炎病毒复制的长期研究。N Engl J Med 1991;325:98-104. PMID:1646962 https://doi.org/10.1056/ NEJM199107113250205
1365. Liang TJ, Rehermann B, Seeff LB, Hoofnagle JH.丙型肝炎的发病机制、自然史、治疗和预防。Ann Intern Med 2000;132:296-305. PMID:10681285 https:// doi.org/10.7326/0003-4819-132-4-200002150-00008
1366. Thomas DL, Seeff LB.丙型肝炎的自然史。Clin Liver Dis 2005;9:383-98, vi.PMID:16023972 https://doi.org/10.1016/j.cld.2005.05.003
1367. Westbrook RH, Dusheiko G.丙型肝炎的自然史。J Hepatol 2014;61(增刊): S58-68. PMID:25443346 https://doi.org/10.1016/j.jhep.2014.07.012
1368. Zou S, Stramer SL, Dodd RY.献血者检测与风险：美国同种异体献血中输血传播病原体的当前患病率、发病率及残余风险。Transfus Med Rev 2012;26:119-28. PMID:21871776 https:// doi.org/10.1016/j.tmrv.2011.07.007
1369. Bixler D, Annambholta P, Abara WE, et al.2014-2017年美国CDC调查的经器官移植传播的乙型和丙型肝炎病毒感染.Am J transplant 2019;19:2570-82. PMID:30861300 https://doi.org/10.1111/ajt.15352
1370. CDC。《HCV感染检测：临床医生和实验室人员指南更新》。MMWR Morb Mortal Wkly Rep 2013;62:362-5. PMID:23657112
1371. Marincovich B, Castilla J, del Romero J ，等.异性血清不一致伴侣前瞻性队列中丙型肝炎病毒传播的缺失.Sex Transm Infect 2003;79:160-2. PMID:12690143 https://doi.org/10.1136/sti.79.2.160
1372. Tahan V, Karaca C, Yildirim B ，等. 配偶间HCV的性传播. Am J Gastroenterol 2005;100:821-4. PMID:15784025 https:// doi.org/10.1111/j.1572-0241.2005.40879.x
1373. Vandelli C, Renzo F, Romanò L ，等.单一配偶夫妇间丙型肝炎性传播缺乏证据：一项10年前瞻性随访研究结果.Am J Gastroenterol 2004;99:855-9. PMID:15128350 https://doi.org/10.1111/ j.1572-0241.2004.04150.x
1374. Fierer DS, Uriel AJ, Carriero DC ，等.HIV感染男性急性丙型肝炎病毒感染暴发期间的肝纤维化：一项前瞻性队列研究.J Infect Dis 2008;198:683-6. PMID:18627270 https://doi.org/10.1086/590430
1375. Cottrell EB, Chou R, Wasson N, Rahman B, Guise JM.降低丙型肝炎病毒母婴传播风险：为美国预防服务工作组所作的系统综述。Ann Intern Med 2013;158:109-13. PMID:23437438 https:// doi.org/10.7326/0003-4819-158-2-201301150-00575
1376. Mast EE, Hwang LY, Seto DS, et al.围产期丙型肝炎病毒(HCV)传播的危险因素及婴儿期获得性HCV感染的自然史。J Infect Dis 2005;192:1880-9. PMID:16267758 https://doi.org/10.1086/497701
1377. Barbosa C, Fraser H, Hoerger TJ, et al.在美国为注射吸毒者扩大HCV预防和治疗的成本效益。Addiction 2019;114:2267-78. PMID:31307116 https:// doi.org/10.1111/add.14731
1378. Lambers FA, Prins M, Thomas X ，等； MOSAIC(MSM急性丙型肝炎感染观察性研究)研究组.HIV感染MSM人群中性获得性急性丙型肝炎病毒感染治疗后丙型肝炎病毒再感染发生率令人担忧.AIDS 2011;25:F21-7. PMID:21857492 https://doi.org/10.1097/ QAD.0b013e32834bac44

1379. Martin TC, Singh GJ, McClure M, Nelson M. HCV reinfection among HIV-positive men who have sex with men: a pragmatic approach. Hepatology 2015;61:1437. PMID:25147047 https://doi.org/10.1002/hep.27391
1380. Ingiliz P, Martin TC, Rodger A, et al.; NEAT study group. HCV reinfection incidence and spontaneous clearance rates in HIV-positive men who have sex with men in Western Europe. J Hepatol 2017;66:282–7. PMID:27650285 https://doi.org/10.1016/j.jhep.2016.09.004
1381. Briat A, Dulioust E, Galimand J, et al. Hepatitis C virus in the semen of men coinfected with HIV-1: prevalence and origin. AIDS 2005;19:1827–35. PMID:16227790 https://doi.org/10.1097/01.aids.0000189847.98569.2d
1382. Bissessor M, Fairley CK, Read T, Denham I, Bradshaw C, Chen M. The etiology of infectious proctitis in men who have sex with men differs according to HIV status. Sex Transm Dis 2013;40:768–70. PMID:24275725 https://doi.org/10.1097/OLQ.0000000000000022
1383. Gutierrez-Fernandez J, Medina V, Hidalgo-Tenorio C, Abad R. Two cases of *Neisseria meningitidis* proctitis in HIV-positive men who have sex with men. Emerg Infect Dis 2017;23:542–3. PMID:28221124 https://doi.org/10.3201/eid2303.161039
1384. Levy I, Gefen-Halevi S, Nissan I, et al. Delayed diagnosis of colorectal sexually transmitted diseases due to their resemblance to inflammatory bowel diseases. Int J Infect Dis 2018;75:34–8. PMID:30125691 https://doi.org/10.1016/j.ijid.2018.08.004
1385. Lebari D. Syphilis presenting as colorectal cancer [Abstract 34216]. Sex Transm Dis 2014;41(Suppl 1):S4.
1386. Hines JZ, Pinsent T, Rees K, et al. Notes from the field: shigellosis outbreak among men who have sex with men and homeless persons—Oregon, 2015–2016. MMWR Morb Mortal Wkly Rep 2016;65:812–3. PMID:27513523 https://doi.org/10.15585/mmwr.mm6531a5
1387. Marchand-Senécal X, Bekal S, Pilon PA, Sylvestre JL, Gaudreau C. Campylobacter fetus cluster among men who have sex with men, Montreal, Quebec, Canada, 2014–2016. Clin Infect Dis 2017;65:1751–3. PMID:29020280 https://doi.org/10.1093/cid/cix610
1388. Klausner JD, Kohn R, Kent C. Etiology of clinical proctitis among men who have sex with men. Clin Infect Dis 2004;38:300–2. PMID:14699467 https://doi.org/10.1086/380838
1389. Stoner BP, Cohen SE. Lymphogranuloma venereum 2015: clinical presentation, diagnosis, and treatment. Clin Infect Dis 2015;61(Suppl 8):S865–73. PMID:26602624 https://doi.org/10.1093/cid/civ756
1390. Mohrmann G, Noah C, Sabranski M, Sahly H, Stellbrink HJ. Ongoing epidemic of lymphogranuloma venereum in HIV-positive men who have sex with men: how symptoms should guide treatment. J Int AIDS Soc 2014;17(Suppl 3):19657. PMID:25394161 https://doi.org/10.7448/IAS.17.4.19657
1391. Hoffmann C, Sahly H, Jessen A, et al. High rates of quinolone-resistant strains of *Shigella sonnei* in HIV-infected MSM. Infection 2013;41:999–1003. PMID:23852945 https://doi.org/10.1007/s15010-013-0501-4
1392. Heiman KE, Karlsson M, Grass J, et al.; CDC. Notes from the field: *Shigella* with decreased susceptibility to azithromycin among men who have sex with men—United States, 2002–2013. MMWR Morb Mortal Wkly Rep 2014;63:132–3. PMID:24522098
1393. Galiczynski EM Jr, Elston DM. What's eating you? Pubic lice (*Pthirus pubis*). Cutis 2008;81:109–14. PMID:18441761
1394. Meinking TL, Serrano L, Hard B, et al. Comparative in vitro pediculicidal efficacy of treatments in a resistant head lice population in the United States. Arch Dermatol 2002;138:220–4. PMID:11843643 https://doi.org/10.1001/archderm.138.2.220
1395. Yoon KS, Gao JR, Lee SH, Clark JM, Brown L, Taplin D. Permethrin-resistant human head lice, *Pediculus capitis*, and their treatment. Arch Dermatol 2003;139:994–1000. PMID:12925385 https://doi.org/10.1001/archderm.139.8.994
1396. Burkhart CG, Burkhart CN. Oral ivermectin for *Phthirus pubis*. J Am Acad Dermatol 2004;51:1037–8. PMID:15583618 https://doi.org/10.1016/j.jaad.2004.04.041
1397. Scott GR, Chosidow O; IUSTI/WHO. European guideline for the management of pediculosis pubis, 2010. Int J STD AIDS 2011;22:304–5. PMID:21680662 https://doi.org/10.1258/ijsa.2011.011114
1398. Goldust M, Rezaee E, Raghifar R, Hemayat S. Comparing the efficacy of oral ivermectin vs malathion 0.5% lotion for the treatment of scabies. Skinmed 2014;12:284–7. PMID:25632646
1399. Veraldi S, Schianchi R, Ramoni S, Nazzaro G. Pubic hair removal and *Phthirus pubis* infestation. Int J STD AIDS 2018;29:103–4. PMID:29130406 https://doi.org/10.1177/0956462417740292
1400. Leung AKC, Lam JM, Leong KF. Scabies: a neglected global disease. Curr Pediatr Rev 2020;16:33–42. PMID:31544694 https://doi.org/10.2174/1573396315666190717114131
1401. Engelman D, Cantey PT, Marks M, et al. The public health control of scabies: priorities for research and action. Lancet 2019;394:81–92. PMID:31178154 https://doi.org/10.1016/S0140-6736(19)31136-5
1402. Shimose L, Munoz-Price LS. Diagnosis, prevention, and treatment of scabies. Curr Infect Dis Rep 2013;15:426–31. PMID:23904181 https://doi.org/10.1007/s11908-013-0354-0
1403. Walter B, Heukelbach J, Fengler G, Worth C, Hengge U, Feldmeier H. Comparison of dermoscopy, skin scraping, and the adhesive tape test for the diagnosis of scabies in a resource-poor setting. Arch Dermatol 2011;147:468–73. PMID:21482897 https://doi.org/10.1001/archdermatol.2011.51
1404. Micali G, Lacarrubba F, Verzì AE, Chosidow O, Schwartz RA. Scabies: advances in noninvasive diagnosis. PLoS Negl Trop Dis 2016;10:e0004691. PMID:27311065 https://doi.org/10.1371/journal.pntd.0004691
1405. Strong M, Johnstone P. Interventions for treating scabies. Cochrane Database Syst Rev 2007;(3):CD000320. PMID:17636630
1406. Abdel-Raheem TA, Méabed EM, Nasef GA, Abdel Wahed WY, Rohaim RM. Efficacy, acceptability and cost effectiveness of four therapeutic agents for treatment of scabies. J Dermatolog Treat 2016;27:473–9. PMID:27027929 https://doi.org/10.3109/09546634.2016.1151855
1407. Alipour H, Goldust M. The efficacy of oral ivermectin vs. sulfur 10% ointment for the treatment of scabies. Ann Parasitol 2015;61:79–84. PMID:26342502
1408. Al Jaff DAA, Amin MHM. Comparison of the effectiveness of sulphur ointment, permethrin and oral ivermectin in treatment of scabies. Res J Pharm Biol Chem Sci 2018;9:670–6.
1409. Goldust M, Rezaee E, Raghifar R, Hemayat S. Treatment of scabies: the topical ivermectin vs. permethrin 2.5% cream. Ann Parasitol 2013;59:79–84. PMID:24171301
1410. Ahmad HM, Abdel-Azim ES, Abdel-Aziz RT. Clinical efficacy and safety of topical versus oral ivermectin in treatment of uncomplicated scabies. Dermatol Ther (Heidelb) 2016;29:58–63. PMID:26555785 https://doi.org/10.1111/dth.12310
1411. Currie BJ, McCarthy JS. Permethrin and ivermectin for scabies. N Engl J Med 2010;362:717–25. PMID:20181973 https://doi.org/10.1056/NEJMct0910329
1412. Chiu S, Argaez C. Ivermectin for parasitic skin infections of scabies: a review of comparative clinical effectiveness, cost-effectiveness, and guidelines. Ottawa, ON: Canadian Agency for Drugs and Technologies in Health; 2019. https://www.ncbi.nlm.nih.gov/books/NBK545083/

1379. Martin TC, Singh GJ, McClure M, Nelson M.HIV阳性男男性行为者中的HCV再感染：一种务实的方法。Hepatology 2015; 61:1437. PMID:25147047 https://doi.org/10.1002/hep.27391
1380. 英格利斯 P，马丁 TC，罗杰 A，等； NEAT研究组。西欧HIV阳性男男性行为者中HCV再感染发生率及自发清除率。J Hepatol 2017; 66:282-7. PMID:27650285 https://doi.org/10.1016/j.jhep.2016.09.004
1381. Briat A, Dulioust E, Galimand J, et al.合并HIV-1感染男性精液中的丙型肝炎病毒：流行率与来源。AIDS 2005;19:1827-35. PMID:16227790 https://doi.org/10.1097/01. aids.0000189847.98569.2d
1382. Bissessor M, Fairley CK, Read T, Denham I, Bradshaw C, Chen M.男男性行为者感染性直肠炎的病因因HIV状态而异。Sex Transm Dis 2013;40:768-70. PMID:24275725 https://doi.org/10.1097/OLQ.0000000000000022
1383. Gutierrez-Fernandez J, Medina V, Hidalgo-Tenorio C, Abad R.两例HIV阳性男男性行为者中的脑膜炎奈瑟菌直肠炎。Emerg Infect Dis 2017; 23:542-3。PMID:28221124 https://doi.org/10.3201/eid2303.161039
1384. Levy I, Gefen-Halevi S, Nissan I, et al.因与炎症性肠病相似而导致结直肠性传播疾病诊断延迟。Int J Infect Dis 2018;75:34-8. PMID:30125691 https://doi.org/10.1016/j.ijid.2018.08.004
1385. Lebari D.梅毒表现为结直肠癌[摘要34216]。Sex Transm Dis 2014;41(Suppl 1): S4。
1386. Hines JZ, Pinsent T, Rees K, et al.现场笔记：2015-2016年俄勒冈州男男性行为者与无家可归人群中暴发的志贺菌病。MMWR Morb Mortal Wkly Rep 2016;65:812-3. PMID:27513523 https://doi.org/10.15585/mmwr.mm6531a5
1387. Marchand-Senécal X, Bekal S, Pilon PA, Sylvestre JL, Gaudreau C.2014-2016年加拿大魁北克省蒙特利尔男男性行为者中的胎儿弯曲杆菌聚集性感染。Clin Infect Dis 2017;65:1751-3. PMID:29020280 https://doi.org/10.1093/cid/ cix610
1388. Klausner JD, Kohn R, Kent C.男男性行为者临床直肠炎的病因学.Clin Infect Dis 2004;38:300-2. PMID:14699467 https://doi.org/10.1086/380838
1389. Stoner BP, Cohen SE.性病性淋巴肉芽肿2015：临床表现、诊断和治疗。Clin Infect Dis 2015;61(Suppl 8): S865-73. PMID:26602624 https://doi.org/10.1093/cid/civ756
1390. Mohrmann G, Noah C, Sabranski M, Sahly H, Stellbrink HJ.HIV阳性男男性行为者中持续流行的性病性淋巴肉芽肿：症状应如何指导治疗。J Int AIDS Soc 2014;17(Suppl 3): 19657. PMID:25394161 https://doi.org/10.7448/IAS.17.4.19657
1391. Hoffmann C, Sahly H, Jessen A, et al.HIV 感染的男男性行为人群中高耐喹诺酮类*Shigella sonnei*菌株感染率。Infection 2013;41:999-1003. PMID:23852945 https://doi.org/10.1007/ s15010-013-0501-4
1392. Heiman KE, Karlsson M, Grass J, et al.; CDC.现场笔记：2002-2013 年美国男男性行为人群中对阿奇霉素敏感性下降的*Shigella*。MMWR Morb Mortal Wkly Rep 2014;63:132-3. PMID:24522098
1393. 小加利琴斯基 EM， 埃尔斯顿 DM.什么在咬你?阴虱(耻阴虱)。《Cutis》2008;81:109-14。PMID:18441761
1394. Meinking TL, Serrano L, Hard B, et al.美国一个耐药头虱种群中治疗方法的体外杀虱效力比较。Arch Dermatol 2002;138:220-4. PMID:11843643 https://doi.org/10.1001/archderm.138.2.220
1395. Yoon KS, Gao JR, Lee SH, Clark JM, Brown L, Taplin D. 耐氯菊酯的人头虱，头虱，及其治疗. Arch Dermatol 2003;139:994-1000. PMID:12925385 https://doi. org/10.1001/archderm.139.8.994
1396. Burkhart CG, Burkhart CN.口服伊维菌素治疗阴虱。 J Am Acad Dermatol 2004;51:1037-8. PMID:15583618 https://doi.org/10.1016/j.jaad.2004.04.041
1397. Scott GR, Chosidow O; IUSTI/WHO.欧洲阴虱病管理指南，2010。Int J STD AIDS 2011;22:304-5. PMID:21680662 https://doi.org/10.1258/ ijsa.2011.011114
1398. Goldust M, Rezaee E, Raghifar R, Hemayat S.口服伊维菌素与0.5%马拉硫磷洗剂治疗疥疮的疗效比较。Skinmed 2014;12:284-7. PMID:25632646
1399. Veraldi S, Schianchi R, Ramoni S, Nazzaro G.阴毛去除与阴虱感染。Int J STD AIDS 2018;29:103-4. PMID:29130406 https://doi.org/10.1177/0956462417740292
1400. Leung AKC, Lam JM, Leong KF.疥疮：一种被忽视的全球性疾病。Curr Pediatr Rev 2020;16:33-42. PMID:31544694 https://doi.org /10.2174/1573396315666190717114131
1401. Engelman D, Cantey PT, Marks M, et al.疥疮的公共卫生控制：研究与行动的优先事项。Lancet 2019;394:81-92. PMID:31178154 https://doi.org/10.1016/S0140-6736(19) 31136-5
1402. Shimose L, Munoz-Price LS.疥疮的诊断、预防和治疗。Curr Infect Dis Rep 2013;15:426-31. PMID:23904181 https://doi.org/10.1007/s11908-013-0354-0
1403. Walter B, Heukelbach J, Fengler G, Worth C, Hengge U, Feldmeier H.皮肤镜检查、皮肤刮取和胶带试验在资源匮乏环境中诊断疥疮的比较。Arch Dermatol 2011;147:468-73. PMID:21482897 https://doi.org/10.1001/ Arch Dermatol.2011.51
1404. Micali G, Lacarrubba F, Verzì AE, Chosidow O, Schwartz RA.疥疮：无创诊断的进展。PLoS Negl Trop Dis 2016;10:e0004691. PMID:27311065 https://doi.org/10.1371/ journal.pntd.0004691
1405. Strong M, Johnstone P.疥疮治疗的干预措施。Cochrane Database Syst Rev 2007;(3): CD000320. PMID:17636630
1406. Abdel-Raheem TA, Méabed EM, Nasef GA, Abdel Wahed WY, Rohaim RM.四种治疗药物治疗疥疮的疗效、可接受性和成本效益。J Dermatolog Treat 2016;27:473-9. PMID:27027929 https://doi.org/10.3109/09546 634.2016.1151855
1407. Alipour H, Goldust M.口服伊维菌素与10%硫磺软膏治疗疥疮的疗效。Ann Parasitol 2015;61:79-84. PMID:26342502
1408. Al Jaff DAA, Amin MHM.硫磺软膏、氯菊酯和口服伊维菌素治疗疥疮的效果比较。Res J Pharm Biol Chem Sci 2018;9:670-6.
1409. Goldust M, Rezaee E, Raghifar R, Hemayat S.疥疮的治疗：外用伊维菌素与2.5%氯菊酯乳膏。Ann Parasitol 2013;59:79-84. PMID:24171301
1410. Ahmad HM, Abdel-Azim ES, Abdel-Aziz RT.外用与口服伊维菌素治疗无并发症疥疮的临床疗效和安全性。Dermatol Ther(Heidelb) 2016;29:58-63. PMID:26555785 https://doi.org/10.1111/dth.12310
1411. Currie BJ, McCarthy JS.氯菊酯和伊维菌素治疗疥疮。N Engl J Med 2010;362:717-25. PMID:20181973 https://doi.org/10.1056/NEJMct0910329
1412. Chiu S, Argaez C.伊维菌素用于疥疮寄生虫性皮肤感染：比较临床有效性、成本效益和指南综述。Ottawa, ON: Canadian Agency for Drugs and Technologies in Health; 2019. https://www.ncbi.nlm.nih.gov/books/ NBK545083/

1413. Nolan K, Kamrath J, Levitt J. Lindane toxicity: a comprehensive review of the medical literature. Pediatr Dermatol 2012;29:141–6. PMID:21995612 https://doi.org/10.1111/j.1525-1470.2011.01519.x
1414. Mounsey KE, Holt DC, McCarthy J, Currie BJ, Walton SF. Scabies: molecular perspectives and therapeutic implications in the face of emerging drug resistance. Future Microbiol 2008;3:57–66. PMID:18230034 https://doi.org/10.2217/17460913.3.1.57
1415. Mounsey KE, Holt DC, McCarthy JS, Currie BJ, Walton SF. Longitudinal evidence of increasing in vitro tolerance of scabies mites to ivermectin in scabies-endemic communities. Arch Dermatol 2009;145:840–1. PMID:19620572 https://doi.org/10.1001/archdermatol.2009.125
1416. Mounsey KE, McCarthy JS, Walton SF. Scratching the itch: new tools to advance understanding of scabies. Trends Parasitol 2013;29:35–42. PMID:23088958 https://doi.org/10.1016/j.pt.2012.09.006
1417. van der Linden N, van Gool K, Gardner K, et al. A systematic review of scabies transmission models and data to evaluate the cost-effectiveness of scabies interventions. PLoS Negl Trop Dis 2019;13:e0007182. PMID:30849124 https://doi.org/10.1371/journal.pntd.0007182
1418. Roberts LJ, Huffam SE, Walton SF, Currie BJ. Crusted scabies: clinical and immunological findings in seventy-eight patients and a review of the literature. J Infect 2005;50:375–81. PMID:15907543 https://doi.org/10.1016/j.jinf.2004.08.033
1419. Ortega-Loayza AG, McCall CO, Nunley JR. Crusted scabies and multiple dosages of ivermectin. J Drugs Dermatol 2013;12:584–5. PMID:23652958
1420. Bouvresse S, Chosidow O. Scabies in healthcare settings. Curr Opin Infect Dis 2010;23:111–8. PMID:20075729 https://doi.org/10.1097/QCO.0b013e328336821b
1421. Marotta M, Toni F, Dallolio L, Toni G, Leoni E. Management of a family outbreak of scabies with high risk of spread to other community and hospital facilities. Am J Infect Control 2018;46:808–13. PMID:29397231 https://doi.org/10.1016/j.ajic.2017.12.004
1422. Romani L, Whitfeld MJ, Koroivueta J, et al. Mass drug administration for scabies control in a population with endemic disease. N Engl J Med 2015;373:2305–13. PMID:26650152 https://doi.org/10.1056/NEJMoa1500987
1423. Ackerman DR, Sugar NF, Fine DN, Eckert LO. Sexual assault victims: factors associated with follow-up care. Am J Obstet Gynecol 2006;194:1653–9. PMID:16635464 https://doi.org/10.1016/j.ajog.2006.03.014
1424. Parekh V, Beaumont Brown C. Follow up of patients who have been recently sexually assaulted. Sex Transm Infect 2003;79:349. PMID:12902602 https://doi.org/10.1136/sti.79.4.349-a
1425. Vrees RA. Evaluation and management of female victims of sexual assault. Obstet Gynecol Surv 2017;72:39–53. PMID:28134394 https://doi.org/10.1097/OGX.0000000000000390
1426. Unger ER, Fajman NN, Maloney EM, et al. Anogenital human papillomavirus in sexually abused and nonabused children: a multicenter study. Pediatrics 2011;128:e658–65. PMID:21844060 https://doi.org/10.1542/peds.2010-2247
1427. Kreimer AR, Rodriguez AC, Hildesheim A, et al.; CVT Vaccine Group. Proof-of-principle evaluation of the efficacy of fewer than three doses of a bivalent HPV16/18 vaccine. J Natl Cancer Inst 2011;103:1444–51. PMID:21908768 https://doi.org/10.1093/jnci/djr319
1428. Claydon E, Murphy S, Osborne EM, Kitchen V, Smith JR, Harris JR. Rape and HIV. Int J STD AIDS 1991;2:200–1. PMID:1863649 https://doi.org/10.1177/095646249100200310
1429. Murphy S, Kitchen V, Harris JR, Forster SM. Rape and subsequent seroconversion to HIV. BMJ 1989;299:718. PMID:2508885 https://doi.org/10.1136/bmj.299.6701.718
1430. Cardo DM, Culver DH, Ciesielski CA, et al.; CDC Needlestick Surveillance Group. A case-control study of HIV seroconversion in health care workers after percutaneous exposure. N Engl J Med 1997;337:1485–90. PMID:9366579 https://doi.org/10.1056/NEJM199711203372101
1431. Kuhar DT, Henderson DK, Struble KA, et al.; US Public Health Service Working Group. Updated US Public Health Service guidelines for the management of occupational exposures to human immunodeficiency virus and recommendations for postexposure prophylaxis. Infect Control Hosp Epidemiol 2013;34:875–92. PMID:23917901 https://doi.org/10.1086/672271
1432. Du Mont J, Myhr TL, Husson H, Macdonald S, Rachlis A, Loutfy MR. HIV postexposure prophylaxis use among Ontario female adolescent sexual assault victims: a prospective analysis. Sex Transm Dis 2008;35:973–8. PMID:18836390
1433. Neu N, Heffernan-Vacca S, Millery M, Stimell M, Brown J. Postexposure prophylaxis for HIV in children and adolescents after sexual assault: a prospective observational study in an urban medical center. Sex Transm Dis 2007;34:65–8. PMID:16794560 https://doi.org/10.1097/01.olq.0000225329.07765.d8
1434. Loutfy MR, Macdonald S, Myhr T, et al. Prospective cohort study of HIV post-exposure prophylaxis for sexual assault survivors. Antivir Ther 2008;13:87–95. PMID:18389902
1435. Inciarte A, Leal L, Masfarre L, et al.; Sexual Assault Victims Study Group. Post-exposure prophylaxis for HIV infection in sexual assault victims. HIV Med 2020;21:43–52. PMID:31603619 https://doi.org/10.1111/hiv.12797
1436. Announcement: Updated guidelines for antiretroviral postexposure prophylaxis after sexual, injection-drug use, or other nonoccupational exposure to HIV—United States, 2016. MMWR Morb Mortal Wkly Rep 2016;65:458. PMID:27149423 https://doi.org/10.15585/mmwr.mm6517a5
1437. Ford N, Venter F, Irvine C, Beanland RL, Shubber Z. Starter packs versus full prescription of antiretroviral drugs for postexposure prophylaxis: a systematic review. Clin Infect Dis 2015;60(Suppl 3):S182–6. PMID:25972501 https://doi.org/10.1093/cid/civ093
1438. Jenny C, Crawford-Jakubiak JE; Committee on Child Abuse and Neglect; American Academy of Pediatrics. The evaluation of children in the primary care setting when sexual abuse is suspected. Pediatrics 2013;132:e558–67. PMID:23897912 https://doi.org/10.1542/peds.2013-1741
1439. Girardet RG, Lahoti S, Howard LA, et al. Epidemiology of sexually transmitted infections in suspected child victims of sexual assault. Pediatrics 2009;124:79–86. PMID:19564286 https://doi.org/10.1542/peds.2008-2947
1440. Black CM, Driebe EM, Howard LA, et al. Multicenter study of nucleic acid amplification tests for detection of *Chlamydia trachomatis* and *Neisseria gonorrhoeae* in children being evaluated for sexual abuse. Pediatr Infect Dis J 2009;28:608–13. PMID:19451856 https://doi.org/10.1097/INF.0b013e31819b592e
1441. Trotman GE, Young-Anderson C, Deye KP. Acute sexual assault in the pediatric and adolescent population. J Pediatr Adolesc Gynecol 2016;29:518–26. PMID:26702774 https://doi.org/10.1016/j.jpag.2015.05.001
1442. Schwandt A, Williams C, Beigi RH. Perinatal transmission of *Trichomonas vaginalis*: a case report. J Reprod Med 2008;53:59–61. PMID:18251366
1443. Bell TA, Stamm WE, Wang SP, Kuo CC, Holmes KK, Grayston JT. Chronic *Chlamydia trachomatis* infections in infants. JAMA 1992;267:400–2. PMID:1727964 https://doi.org/10.1001/jama.1992.03480030078041

1413. Nolan K, Kamrath J, Levitt J.林丹毒性：医学文献的综合综述。Pediatr Dermatol 2012;29:141-6. PMID:21995612 https://doi.org/10.1111/j.1525-1470.2011.01519.x
1414. Mounsey KE, Holt DC, McCarthy J, Currie BJ, Walton SF.疥疮：面对新出现的耐药性的分子视角和治疗意义。Future Microbiol 2008;3:57-66. PMID:18230034 https://doi.org/10.2217/17460913.3.1.57
1415. Mounsey KE, Holt DC, McCarthy JS, Currie BJ, Walton SF.疥疮流行社区中疥螨对伊维菌素体外耐受性增加的纵向证据。Arch Dermatol 2009;145:840-1. PMID:19620572 https://doi.org/10.1001/ Arch Dermatol.2009.125
1416. Mounsey KE, McCarthy JS, Walton SF.挠痒：推进对疥疮理解的新工具。Trends Parasitol 2013;29:35-42. PMID:23088958 https://doi.org/10.1016/j.pt.2012.09.006
1417. van der Linden N, van Gool K, Gardner K, et al.疥疮传播模型和数据的系统综述，以评估疥疮干预措施的成本效益。PLoS Negl Trop Dis 2019;13:e0007182. PMID:30849124 https://doi.org/10.1371/journal.pntd.0007182
1418. Roberts LJ, Huffam SE, Walton SF, Currie BJ.结痂性疥疮：78例患者的临床和免疫学发现及文献综述。J Infect 2005;50:375-81. PMID:15907543 https:// doi.org/10.1016/j.jinf.2004.08.033
1419. Ortega-Loayza AG, McCall CO, Nunley JR.结痂性疥疮与多次剂量伊维菌素。J Drugs Dermatol 2013;12:584-5. PMID:23652958
1420. Bouvresse S, Chosidow O.医疗机构环境中的疥疮。Curr Opin Infect Dis 2010;23:111-8. PMID:20075729 https://doi.org/10.1097/QCO.0b013e328336821b
1421. Marotta M, Toni F, Dallolio L, Toni G, Leoni E.一起具有高传播至其他社区和医院设施风险的家族性疥疮暴发的管理。Am J Infect Control 2018;46:808-13. PMID:29397231 https://doi.org/10.1016/j.ajic.2017.12.004
1422. Romani L, Whitfeld MJ, Koroivueta J, et al.在地方性流行病人群中开展大规模药物给药控制疥疮。N Engl J Med 2015;373:2305-13. PMID:26650152 https://doi.org/10.1056/ NEJMoa1500987
1423. Ackerman DR, Sugar NF, Fine DN, Eckert LO.性侵犯受害者：与随访护理相关的因素。Am J Obstet Gynecol 2006;194:1653-9. PMID:16635464 https://doi.org/10.1016/j.ajog.2006.03.014
1424. Parekh V, Beaumont Brown C.近期遭受性侵犯患者的随访。Sex Transm Infect 2003;79:349. PMID:12902602 https://doi.org/10.1136/sti.79.4.349-a
1425. Vrees RA.女性性侵犯受害者的评估和管理。Obstet Gynecol Surv 2017;72:39-53. PMID:28134394 https://doi.org/10.1097/OGX.0000000000000390
1426. Unger ER, Fajman NN, Maloney EM, et al.遭受性虐待与未遭受性虐待儿童肛门生殖器人乳头瘤病毒感染：一项多中心研究。Pediatrics 2011;128:e658-65. PMID:21844060 https://doi.org/10.1542/peds.2010-2247
1427. Kreimer AR, Rodriguez AC, Hildesheim A, et al.; CVT Vaccine Group.二价HPV16/18疫苗少于三剂次效力的原理验证评价。J Natl Cancer Inst 2011;103:1444-51. PMID:21908768 https://doi.org/10.1093/jnci/ djr319
1428. Claydon E, Murphy S, Osborne EM, Kitchen V, Smith JR, Harris JR. 强奸与HIV. IntJSTDAIDS 1991;2:200-1. PMID:1863649 https://doi.org/10.1177/095646249100200310
1429. Murphy S, Kitchen V, Harris JR, Forster SM.强奸及随后的HIV血清阳转。BMJ 1989;299:718. PMID:2508885 https:// doi.org/10.1136/bmj.299.6701.718
1430. Cardo DM, Culver DH, Ciesielski CA, et al.; CDC Needlestick Surveillance Group.医务人员经皮暴露后HIV血清阳转的病例对照研究。N Engl J Med 1997;337:1485-90. PMID:9366579 https://doi.org/10.1056/ NEJM199711203372101
1431. Kuhar DT, Henderson DK, Struble KA, et al.; US Public Health Service Working Group.更新的美国公共卫生服务署职业暴露于人类免疫缺陷病毒管理指南及暴露后预防建议。Infect Control Hosp Epidemiol 2013;34:875-92. PMID:23917901 https://doi.org/10.1086/672271
1432. Du Mont J, Myhr TL, Husson H, Macdonald S, Rachlis A, Loutfy MR.安大略省女性青少年性侵受害者中HIV暴露后预防的使用：一项前瞻性分析。Sex Transm Dis 2008;35:973-8. PMID:18836390
1433. Neu N, Heffernan-Vacca S, Millery M, Stimell M, Brown J.儿童和青少年性侵后HIV暴露后预防：一项在城市医疗中心进行的前瞻性观察研究。Sex Transm Dis 2007;34:65-8. PMID:16794560 https://doi.org/10.1097/01.olq.0000225329.07765.d8
1434. Loutfy MR, Macdonald S, Myhr T, et al.性侵幸存者HIV暴露后预防的前瞻性队列研究。Antivir Ther 2008;13:87-95. PMID:18389902
1435. Inciarte A, Leal L, Masfarre L, et al.; Sexual Assault Victims Study Group.性侵受害者HIV感染暴露后预防。HIV Med 2020;21:43-52. PMID:31603619 https://doi.org/10.1111/hiv.12797
1436. 公告：更新的美国性行为、注射吸毒或其他非职业性暴露于HIV后抗逆转录病毒暴露后预防指南，2016。MMWR Morb Mortal Wkly Rep 2016;65:458. PMID:27149423 https://doi.org/10.15585/mmwr.mm6517a5
1437. Ford N, Venter F, Irvine C, Beanland RL, Shubber Z.暴露后预防起始包装与完整处方抗逆转录病毒药物的比较：一项系统评价。Clin Infect Dis 2015;60(Suppl 3): S182-6. PMID:25972501 https://doi.org/10.1093/cid/civ093
1438. Jenny C, Crawford-Jakubiak JE; Committee on Child Abuse and Neglect; American Academy of Pediatrics.怀疑性虐待时在初级保健环境中对儿童的评估。Pediatrics 2013;132:e558-67. PMID:23897912 https://doi.org/10.1542/ peds.2013-1741
1439. Girardet RG, Lahoti S, Howard LA, et al.疑似儿童性侵受害者中性传播感染的流行病学。Pediatrics 2009;124:79-86. PMID:19564286 https://doi.org/10.1542/peds.2008-2947
1440. Black CM, Driebe EM, Howard LA, et al.核酸扩增检测在因性虐待接受评估的儿童中检测沙眼衣原体和淋病奈瑟菌的多中心研究。Pediatr Infect Dis J 2009;28:608-13. PMID:19451856 https://doi.org/10.1097/INF.0b013e31819b592e
1441. Trotman GE, Young-Anderson C, Deye KP.儿科和青少年人群中的急性性侵。J Pediatr Adolesc Gynecol 2016;29:518-26. PMID:26702774 https://doi.org/10.1016/j.jpag.2015.05.001
1442. Schwandt A, Williams C, Beigi RH.阴道毛滴虫的围产期传播：一例病例报告。J Reprod Med 2008;53:59-61. PMID:18251366
1443. Bell TA, Stamm WE, Wang SP, Kuo CC, Holmes KK, Grayston JT.婴儿慢性沙眼衣原体感染。JAMA 1992;267:400-2. PMID:1727964 https://doi.org/10.1001/ jama.1992.03480030078041

1444. Adachi K, Nielsen-Saines K, Klausner JD. *Chlamydia trachomatis* infection in pregnancy: the global challenge of preventing adverse pregnancy and infant outcomes in sub-Saharan Africa and Asia. BioMed Res Int 2016;2016:9315757. PMID:27144177 https://doi.org/10.1155/2016/9315757

1445. Schachter J, Grossman M, Sweet RL, Holt J, Jordan C, Bishop E. Prospective study of perinatal transmission of *Chlamydia trachomatis.* JAMA 1986;255:3374–7. PMID:3712696 https://doi.org/10.1001/jama.1986.03370240044034

1446. Smith EM, Swarnavel S, Ritchie JM, Wang D, Haugen TH, Turek LP. Prevalence of human papillomavirus in the oral cavity/oropharynx in a large population of children and adolescents. Pediatr Infect Dis J 2007;26:836–40. PMID:17721381 https://doi.org/10.1097/INF.0b013e318124a4ae

1447. Sabeena S, Bhat P, Kamath V, Arunkumar G. Possible non-sexual modes of transmission of human papilloma virus. J Obstet Gynaecol Res 2017;43:429–35. PMID:28165175 https://doi.org/10.1111/jog.13248

1448. Adams JA, Farst KJ, Kellogg ND. Interpretation of medical findings in suspected child sexual abuse: an update for 2018. J Pediatr Adolesc Gynecol 2018;31:225–31. PMID:29294380 https://doi.org/10.1016/j.jpag.2017.12.011

1449. Kellogg ND, Melville JD, Lukefahr JL, Nienow SM, Russell EL. Genital and extragenital gonorrhea and chlamydia in children and adolescents evaluated for sexual abuse. Pediatr Emerg Care 2018;34:761–6. PMID:28072668 https://doi.org/10.1097/PEC.0000000000001014

1450. Gavril AR, Kellogg ND, Nair P. Value of follow-up examinations of children and adolescents evaluated for sexual abuse and assault. Pediatrics 2012;129:282–9. PMID:22291113 https://doi.org/10.1542/peds.2011-0804

1451. Bandea CI, Joseph K, Secor EW, et al. Development of PCR assays for detection of *Trichomonas vaginalis* in urine specimens. J Clin Microbiol 2013;51:1298–300. PMID:23390274 https://doi.org/10.1128/JCM.03101-12

1452. Gallion HR, Dupree LJ, Scott TA, Arnold DH. Diagnosis of *Trichomonas vaginalis* in female children and adolescents evaluated for possible sexual abuse: a comparison of the InPouch TV culture method and wet mount microscopy. J Pediatr Adolesc Gynecol 2009;22:300–5. PMID:19576816 https://doi.org/10.1016/j.jpag.2008.12.006

1453. Lalor K, McElvaney R. Child sexual abuse, links to later sexual exploitation/high-risk sexual behavior, and prevention/treatment programs. Trauma Violence Abuse 2010;11:159–77. PMID:20679329 https://doi.org/10.1177/1524838010378299

1454. Girardet RG, Lemme S, Biason TA, Bolton K, Lahoti S. HIV post-exposure prophylaxis in children and adolescents presenting for reported sexual assault. Child Abuse Negl 2009;33:173–8. PMID:19324415 https://doi.org/10.1016/j.chiabu.2008.05.010

1455. Panel on Antiretroviral Therapy and Medical Management of HIV-Infected Children. Guidelines for the use of antiretroviral agents in pediatric HIV infection. Washington, DC: US Department of Health and Human Services, National Institutes of Health, AIDSinfo; 2020. https://aidsinfo.nih.gov/contentfiles/lvguidelines/pediatricguidelines.pdf

1444. Adachi K, Nielsen-Saines K, Klausner JD.妊娠期沙眼衣原体感染：撒哈拉以南非洲和亚洲预防不良妊娠及婴儿结局的全球挑战。BioMed Res Int 2016;2016:9315757. PMID:27144177 https://doi.org/10.1155/2016/9315757

1445. Schachter J, Grossman M, Sweet RL, Holt J, Jordan C, Bishop E.沙眼衣原体围产期传播的前瞻性研究。JAMA 1986;255:3374-7. PMID:3712696 https://doi.org/10.1001/ jama.1986.03370240044034

1446. Smith EM, Swarnavel S, Ritchie JM, Wang D, Haugen TH, Turek LP.大量儿童和青少年人群口腔/口咽部人乳头瘤病毒的患病率。Pediatr Infect Dis J 2007;26:836-40. PMID:17721381 https://doi.org/10.1097/INF.0b013e318124a4ae

1447. Sabeena S, Bhat P, Kamath V, Arunkumar G.人乳头瘤病毒可能的非性传播途径。J Obstet Gynaecol Res 2017;43:429-35. PMID:28165175 https://doi.org/10.1111/ jog.13248

1448. Adams JA, Farst KJ, Kellogg ND.疑似儿童性虐待医学发现的解读：2018年更新。J Pediatr Adolesc Gynecol 2018;31:225-31. PMID:29294380 https://doi.org/10.1016/j.jpag.2017.12.011

1449. Kellogg ND, Melville JD, Lukefahr JL, Nienow SM, Russell EL.因性虐待接受评估的儿童和青少年生殖器及生殖器外淋病和衣原体感染。Pediatr Emerg Care 2018;34:761-6. PMID:28072668 https://doi.org/10.1097/PEC.0000000000001014

1450. Gavril AR, Kellogg ND, Nair P.因性虐待和性侵接受评估的儿童和青少年随访检查的价值。Pediatrics 2012;129:282-9. PMID:22291113 https://doi.org/10.1542/peds.2011-0804

1451. Bandea CI, Joseph K, Secor EW, et al.检测尿液标本中阴道毛滴虫的PCR方法开发。J Clin Microbiol 2013;51:1298-300. PMID:23390274 https://doi.org/10.1128/JCM.03101-12

1452. Gallion HR, Dupree LJ, Scott TA, Arnold DH.因可能遭受性虐待接受评估的女性儿童和青少年中阴道毛滴虫的诊断：InPouch TV培养法与湿片显微镜检查的比较。J Pediatr Adolesc Gynecol 2009;22:300-5. PMID:19576816 https://doi.org/10.1016/j.jpag.2008.12.006

1453. Lalor K, McElvaney R.儿童性虐待与日后性剥削/高危性行为的关联及预防/治疗方案。Trauma Violence Abuse 2010;11:159-77. PMID:20679329 https://doi.org/10.1177/1524838010378299

1454. Girardet RG, Lemme S, Biason TA, Bolton K, Lahoti S.因报告性侵就诊的儿童和青少年HIV暴露后预防。Child Abuse Negl 2009;33:173-8. PMID:19324415 https://doi.org/10.1016/j.chiabu.2008.05.010

1455. Panel on Antiretroviral Therapy and Medical Management of HIV-Infected Children.儿童HIV感染抗逆转录病毒药物使用指南。Washington, DC: US Department of Health and Human Services, National Institutes of Health, AIDSinfo; 2020. https://aidsinfo.nih.gov/contentfiles/lvguidelines/pediatricguidelines.pdf

STI Treatment Guidelines, 2021, Work Group Members

Chairperson: Kimberly A. Workowski, MD, National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention, CDC, and Emory University, Atlanta, Georgia.

Work Group Members: Elizabeth Alderman, MD, The Children's Hospital at Montefiore, The Pediatric Hospital for Albert Einstein College of Medicine, Bronx, New York; Lindley Barbee, MD, University of Washington and Public Health Seattle and King County STD Clinic, Seattle, Washington; Luis Barroso, MD, Wake Forest Baptist Health, Winston-Salem, North Carolina; Gale Burstein, MD, Erie County Department of Health, Buffalo, New York; Virginia A. Caine, MD, Marion County Public Health Department, Indiana University, Indianapolis, Indiana; Carla Chibwesha, MD, University of North Carolina at Chapel Hill, Chapel Hill, North Carolina; Stephanie Cohen, MD, San Francisco Department of Public Health, San Francisco, California; Susan Cu-Uvin, MD, Brown University, Providence, Rhode Island; Jodie Dionne-Odom, MD, University of Alabama at Birmingham, Birmingham, Alabama; Julia Dombrowski, MD, Public Health Seattle and King County, University of Washington, Seattle, Washington; Carolyn Gardella, MD, Veterans Affairs Puget Sound University of Washington, Seattle, Washington; William M. Geisler, MD, University of Alabama at Birmingham, Birmingham, Alabama; Khalil G. Ghanem, MD, PhD, Johns Hopkins University, Baltimore, Maryland; Matthew Golden, MD, Seattle and King County STD/HIV Program University of Washington, Seattle, Washington; Margaret R. Hammerschlag, MD, SUNY Downstate Medical Center, Brooklyn, New York; H. Hunter Handsfield, MD, University of Washington Center for AIDS and STD, Seattle, Washington; King K. Holmes, MD, PhD, University of Washington, Seattle, Washington; Edward W. Hook, III, MD, University of Alabama at Birmingham, Birmingham, Alabama; Katherine Hsu, MD, Ratelle STD/HIV Prevention Training Center, Massachusetts Department of Public Health, Boston, Massachusetts; Christine Johnston, MD, University of Washington, Seattle, Washington; Patricia Kissinger, PhD, Tulane University School of Public Health and Tropical Medicine, New Orleans, Louisiana; Jeffrey D. Klausner, MD, University of California Los Angeles, Los Angeles, California; Lisa E. Manhart, PhD, University of Washington, Seattle, Washington; Jeanne Marrazzo, MD, University of Alabama at Birmingham, Birmingham, Alabama; David H. Martin, MD, Tulane University, Louisiana State University Health Sciences Center, New Orleans, Louisiana; Leslie Massad, MD, Washington University, St. Louis, Missouri; Kenneth H. Mayer, MD, Fenway Health, The Fenway Institute, Harvard Medical School, Beth Israel Deaconess Hospital, Boston, Massachusetts; Candice McNeil, MD, Wake Forest Baptist Health, Alabama/North Carolina HIV/STD Prevention Training Center, Forsyth County Department of Public Health, Winston-Salem, North Carolina; Leandro Mena, MD, University of Mississippi Medical Center, Jackson, Mississippi; Caroline Mitchell, MD, Vincent Center for Reproductive Biology, Boston, Massachusetts; Okeoma Mmeje, MD, University of Michigan, Ann Arbor, Michigan; Anna-Barbara Moscicki, MD, University of California Los Angeles, Los Angeles, California; Christina A. Muzny, MD, University of Alabama at Birmingham, Birmingham, Alabama; Natalie Neu, MD, Columbia University, New York, New York; Paul Nyirjesy, MD, Sidney Kimmel Medical College at Thomas Jefferson University, Philadelphia, Pennsylvania; Jeff Peipert, MD, PhD, Indiana University, Indianapolis, Indiana; Rebecca Perkins, MD, Boston University, Boston, Massachusetts; Susan Philip, MD, San Francisco Department of Public Health, San Francisco, California; Asa Radix, MD, PhD, Callen-Lorde Community Health Center, New York, New York; Anne Rompalo, MD, Johns Hopkins University, Baltimore, Maryland; Sarah Rudman, MD, County of Santa Clara Public Health Department, San Jose, California; Pablo J. Sanchez, MD, The Ohio State University Nationwide Children's Hospital, Columbus, Ohio; George Sawaya, MD, University of San Francisco, San Francisco, California; Arlene Seña, MD, University of North Carolina at Chapel Hill and Durham County Department of Public Health, Durham, North Carolina; Jeanne Sheffield, MD, Johns Hopkins University, Baltimore, Maryland; Jack Sobel, MD, Wayne State University, Detroit, Michigan; David Soper, MD, Medical University of South Carolina, Charleston, South Carolina; Anne Spaulding, MD, Emory University, Atlanta, Georgia; Bradley Stoner, MD, PhD, Washington University, St. Louis, Missouri; Stephanie Taylor, MD, Louisiana State University Crescent Care Sexual Health Center, New Orleans, Louisiana; Susan Tuddenham, MD, Johns Hopkins University School of Medicine, Baltimore, Maryland; Karen Wendel, MD, Denver Public Health, Denver, Colorado; Harold C. Wiesenfeld, MD, University of Pittsburgh, Pittsburgh, Pennsylvania; Jonathan Zenilman, MD, Johns Hopkins University, Baltimore, Maryland.

Moderators: Philip Chan, MD, Brown University, Providence, Rhode Island; Edward W. Hook, III, MD, University of Alabama at Birmingham, Birmingham, Alabama; Christine Johnston, MD, University of Washington, Seattle, Washington; David H. Martin, MD, Tulane University, Louisiana State University Health Sciences Center, New Orleans, Louisiana; Jeanne Marrazzo, MD, University of Alabama at Birmingham, Birmingham, Alabama; Christina A. Muzny, MD, University of Alabama at Birmingham, Birmingham, Alabama; Ina Park, MD, University of California San Francisco, San Francisco, California; Hilary Reno, MD, PhD, Washington University, St. Louis, Missouri; Jonathan Zenilman, MD, Johns Hopkins University, Baltimore, Maryland.

Rapporteurs: Philip Chan, MD, Brown University, Providence, Rhode Island; Hilary Reno, MD, PhD, Washington University, St. Louis, Missouri; Christine Johnston, MD, University of Washington, Seattle, Washington; Christina A. Muzny, MD, University of Alabama at Birmingham, Birmingham, Alabama; Ina Park, MD, University of California San Francisco, San Francisco, California; Jonathan Zenilman, MD, Johns Hopkins University, Baltimore, Maryland.

Liaison Participants: Jean Anderson, MD, CDC/HRSA Advisory Committee on HIV, Viral Hepatitis and STD Prevention and Treatment, Johns Hopkins University, Baltimore, Maryland; Kevin Ault, MD, American College of Obstetricians and Gynecologists, University of Kansas, Lawrence, Kansas; Himani Bisht, PhD, Food and Drug Administration, Silver Spring, Maryland; J. Quentin Clemens, MD, American Urological Association, University of Michigan, Ann Arbor, Michigan; Gina Coleman, MD, Public Health Agency of Canada, Ottawa, Ontario; Carolyn Deal, PhD, National Institute of Allergy and Infectious Diseases, Bethesda, Maryland; Maeve B. Mello, PhD, Pan American Health Organization/World Health Organization, Washington, DC; Diane Foley, MD, U.S. Department of Health and Human Services, Washington, DC; Michael Ganio, PharmD, American Society of Health-System Pharmacists, Bethesda, Maryland; Eric Garges, MD, U.S. Department of Defense, Arlington, Virginia, and Uniformed Services University, Bethesda, Maryland; Brent Gibson, MD, National Commission on Correctional Health Care, Chicago, Illinois; William A. Glover, II, PhD, Association of Public Health Laboratories, Silver Spring, Maryland; W. David Hardy, MD, HIV Medical Association, Johns Hopkins University, Baltimore, Maryland; David Harvey, National Coalition of STD Directors, Washington, DC; Letha Healey, MD, Health Resources and Services Administration (HIV/AIDS Bureau), Rockville, Maryland; Michael Huey, MD, American College Health Association, Silver Spring, Maryland, and Emory University, Atlanta, Georgia; Gal Mayer, MD, GLMA: Health Professionals Advancing LGBTQ Equality, Washington, DC; Sumathi Nambiar, MD, Food and Drug Administration, Silver Spring, Maryland; Seema Nayak, MD, National Institutes of Health, Rockville, Maryland; Lori Newman, MD, National Institute of Allergy and Infectious Diseases, Bethesda, Maryland; Samantha Ritter, MPH, National Association of County and City Health Officials, Washington, DC; Elizabeth Ruebush, Association of State and Territorial Health Officials, Arlington, Virginia; Bisan Salhi, MD, PhD, American College of Emergency Physicians, Irving, Texas, Emory University, Atlanta, Georgia; Natasha Travis, MD, National Medical Association, Silver Spring, Maryland, and Johns Hopkins University, Baltimore, Maryland; Maria Trent, MD, Society for Adolescent Health and Medicine, Chicago, Illinois, and Johns Hopkins University, Baltimore, Maryland; Julie Vaishampayan, MD, Infectious Disease Society of America, Arlington, Virginia; Barbara Van Der Pol, PhD, American Sexually Transmitted Diseases Association, Research Triangle Park, North Carolina, and University of Alabama at Birmingham, Birmingham, Alabama; Teodora Elvira Wi, MD, Department of Global HIV, Hepatitis and STI Programmes, World Health Organization, Geneva, Switzerland.

2021年性传播感染治疗指南工作组成员

主席： Kimberly A.Workowski，医学博士，CDC 国家 HIV/AIDS、病毒性肝炎、性传播疾病与结核病预防中心，以及佐治亚州亚特兰大埃默里大学。

工作组成员：Elizabeth Alderman，医学博士，蒙特菲奥雷儿童医院，阿尔伯特·爱因斯坦医学院儿科医院，纽约州布朗克斯；Lindley Barbee，医学博士，华盛顿大学及西雅图与金县公共卫生局性传播疾病诊所，华盛顿州西雅图；Luis Barroso，医学博士，维克森林浸信会健康中心，北卡罗来纳州温斯顿-塞勒姆；Gale Burstein，医学博士，伊利县卫生局，纽约州布法罗；Virginia A. Caine，医学博士，马里昂县公共卫生局，印第安纳大学，印第安纳州印第安纳波利斯；Carla Chibwesha，医学博士，北卡罗来纳大学教堂山分校，北卡罗来纳州教堂山；Stephanie Cohen，医学博士，旧金山公共卫生局，加利福尼亚州旧金山；Susan Cu-Uvin，医学博士，布朗大学，罗德岛州普罗维登斯；Jodie Dionne-Odom，医学博士，阿拉巴马大学伯明翰分校，阿拉巴马州伯明翰；Julia Dombrowski，医学博士，西雅图与金县公共卫生局，华盛顿大学，华盛顿州西雅图；Carolyn Gardella，医学博士，退伍军人事务部普吉特海湾华盛顿大学，华盛顿州西雅图；William M. Geisler，医学博士，阿拉巴马大学伯明翰分校，阿拉巴马州伯明翰；Khalil G. Ghanem，医学博士、哲学博士，约翰斯·霍普金斯大学，马里兰州巴尔的摩；Matthew Golden，医学博士，西雅图与金县性传播疾病/艾滋病项目，华盛顿大学，华盛顿州西雅图；Margaret R. Hammerschlag，医学博士，纽约州立大学下州医学中心，纽约州布鲁克林；H. Hunter Handsfield，医学博士，华盛顿大学艾滋病与性传播疾病中心，华盛顿州西雅图；King K. Holmes，医学博士、哲学博士，华盛顿大学，华盛顿州西雅图；Edward W. Hook, III，医学博士，阿拉巴马大学伯明翰分校，阿拉巴马州伯明翰；Katherine Hsu，医学博士，拉特尔性传播疾病/艾滋病预防培训中心，马萨诸塞州公共卫生部，马萨诸塞州波士顿；Christine Johnston，医学博士，华盛顿大学，华盛顿州西雅图；Patricia Kissinger，哲学博士，杜兰大学公共卫生与热带医学院，路易斯安那州新奥尔良；Jeffrey D. Klausner，医学博士，加利福尼亚大学洛杉矶分校，加利福尼亚州洛杉矶；Lisa E. Manhart，哲学博士，华盛顿大学，华盛顿州西雅图；Jeanne Marrazzo，医学博士，阿拉巴马大学伯明翰分校，阿拉巴马州伯明翰；David H. Martin，医学博士，杜兰大学，路易斯安那州立大学健康科学中心，路易斯安那州新奥尔良；Leslie Massad，医学博士，华盛顿大学，密苏里州圣路易斯；Kenneth H. Mayer，医学博士，芬威健康，芬威研究所，哈佛医学院，贝斯以色列女执事医院，马萨诸塞州波士顿；Candice McNeil，医学博士，维克森林浸信会健康中心，阿拉巴马/北卡罗来纳州艾滋病/性传播疾病预防培训中心，福赛斯县公共卫生局，北卡罗来纳州温斯顿-塞勒姆；Leandro Mena，医学博士，密西西比大学医学中心，密西西比州杰克逊；Caroline Mitchell，医学博士，文森特生殖生物学中心，马萨诸塞州波士顿；Okeoma Mmeje，医学博士，密歇根大学，密歇根州安娜堡；Anna-Barbara Moscicki，医学博士，加利福尼亚大学洛杉矶分校，加利福尼亚州洛杉矶；Christina A. Muzny，医学博士，阿拉巴马大学伯明翰分校，阿拉巴马州伯明翰；Natalie Neu，医学博士，哥伦比亚大学，纽约州纽约；Paul Nyirjesy，医学博士，托马斯·杰斐逊大学西德尼·金梅尔医学院，宾夕法尼亚州费城；Jeff Peipert，医学博士、哲学博士，印第安纳大学，印第安纳州印第安纳波利斯；Rebecca Perkins，医学博士，波士顿大学，马萨诸塞州波士顿；Susan Philip，医学博士，旧金山公共卫生局，加利福尼亚州旧金山；Asa Radix，医学博士、哲学博士，卡伦-洛德社区健康中心，纽约州纽约；Anne Rompalo，医学博士，约翰斯·霍普金斯大学，马里兰州巴尔的摩；Sarah Rudman，医学博士，圣克拉拉县公共卫生局，加利福尼亚州圣何塞；Pablo J. Sanchez，医学博士，俄亥俄州立大学全国儿童医院，俄亥俄州哥伦布；George Sawaya，医学博士，旧金山大学，加利福尼亚州旧金山；Arlene Seña，医学博士，北卡罗来纳大学教堂山分校及达勒姆县公共卫生局，北卡罗来纳州达勒姆；Jeanne Sheffield，医学博士，约翰斯·霍普金斯大学，马里兰州巴尔的摩；Jack Sobel，医学博士，韦恩州立大学，密歇根州底特律；David Soper，医学博士，南卡罗来纳医科大学，南卡罗来纳州查尔斯顿；Anne Spaulding，医学博士，埃默里大学，佐治亚州亚特兰大；Bradley Stoner，医学博士、哲学博士，华盛顿大学，密苏里州圣路易斯；Stephanie Taylor，医学博士，路易斯安那州立大学新月关怀性健康中心，路易斯安那州新奥尔良；Susan Tuddenham，医学博士，约翰斯·霍普金斯大学医学院，马里兰州巴尔的摩；Karen Wendel，医学博士，丹佛公共卫生局，科罗拉多州丹佛；Harold C. Wiesenfeld，医学博士，匹兹堡大学，宾夕法尼亚州匹兹堡；Jonathan Zenilman，医学博士，约翰斯·霍普金斯大学，马里兰州巴尔的摩。

主持人： Philip Chan，医学博士，布朗大学，罗德岛州普罗维登斯；Edward W.Hook, III，医学博士，阿拉巴马大学伯明翰分校，阿拉巴马州伯明翰；Christine Johnston，医学博士，华盛顿大学，华盛顿州西雅图；David H.Martin，医学博士，杜兰大学，路易斯安那州立大学健康科学中心，路易斯安那州新奥尔良；Jeanne Marrazzo，医学博士，阿拉巴马大学伯明翰分校，阿拉巴马州伯明翰；Christina A.Muzny，医学博士，阿拉巴马大学伯明翰分校，阿拉巴马州伯明翰；Ina Park，医学博士，加利福尼亚大学旧金山分校，加利福尼亚州旧金山；Hilary Reno，医学博士、哲学博士，华盛顿大学，密苏里州圣路易斯；Jonathan Zenilman，医学博士，约翰斯·霍普金斯大学，马里兰州巴尔的摩。

报告人：Philip Chan，医学博士，布朗大学，罗德岛州普罗维登斯；Hilary Reno，医学博士、哲学博士，华盛顿大学，密苏里州圣路易斯；Christine Johnston，医学博士，华盛顿大学，华盛顿州西雅图；Christina A. Muzny，医学博士，阿拉巴马大学伯明翰分校，阿拉巴马州伯明翰；Ina Park，医学博士，加利福尼亚大学旧金山分校，加利福尼亚州旧金山；Jonathan Zenilman，医学博士，约翰斯·霍普金斯大学，马里兰州巴尔的摩。联络参与者：Jean Anderson，医学博士，CDC/HRSA HIV、病毒性肝炎和性传播疾病预防与治疗咨询委员会，约翰斯·霍普金斯大学，马里兰州巴尔的摩；Kevin Ault，医学博士，美国妇产科医师学会，堪萨斯大学，堪萨斯州劳伦斯；Himani Bisht，哲学博士，美国食品药品监督管理局，马里兰州银泉；J. Quentin Clemens，医学博士，美国泌尿外科学会，密歇根大学，密歇根州安娜堡；Gina Coleman，医学博士，加拿大公共卫生署，安大略省渥太华；Carolyn Deal，哲学博士，美国国家过敏和传染病研究所，马里兰州贝塞斯达；Maeve B. Mello，哲学博士，泛美卫生组织/世界卫生组织，华盛顿哥伦比亚特区；Diane Foley，医学博士，美国卫生与公众服务部，华盛顿哥伦比亚特区；Michael Ganio，药学博士，美国卫生系统药师协会，马里兰州贝塞斯达；Eric Garges，医学博士，美国国防部，弗吉尼亚州阿灵顿，以及统一服务大学，马里兰州贝塞斯达；Brent Gibson，医学博士，国家惩教医疗委员会，伊利诺伊州芝加哥；William A. Glover, II，哲学博士，公共卫生实验室协会，马里兰州银泉；W. David Hardy，医学博士，HIV医学会，约翰斯·霍普金斯大学，马里兰州巴尔的摩；David Harvey，全国性传播疾病主任联盟，华盛顿哥伦比亚特区；Letha Healey，医学博士，卫生资源与服务管理局（HIV/艾滋病局），马里兰州罗克维尔；Michael Huey，医学博士，美国大学健康协会，马里兰州银泉，以及埃默里大学，佐治亚州亚特兰大；Gal Mayer，医学博士，GLMA：推动LGBTQ平等的健康专业人员，华盛顿哥伦比亚特区；Sumathi Nambiar，医学博士，美国食品药品监督管理局，马里兰州银泉；Seema Nayak，医学博士，美国国立卫生研究院，马里兰州罗克维尔；Lori Newman，医学博士，美国国家过敏和传染病研究所，马里兰州贝塞斯达；Samantha Ritter，公共卫生硕士，全国县市卫生官员协会，华盛顿哥伦比亚特区；Elizabeth Ruebush，州与领地卫生官员协会，弗吉尼亚州阿灵顿；Bisan Salhi，医学博士、哲学博士，美国急诊医师学会，德克萨斯州欧文，埃默里大学，佐治亚州亚特兰大；Natasha Travis，医学博士，全国医学会，马里兰州银泉，以及约翰斯·霍普金斯大学，马里兰州巴尔的摩；Maria Trent，医学博士，青少年健康与医学会，伊利诺伊州芝加哥，以及约翰斯·霍普金斯大学，马里兰州巴尔的摩；Julie Vaishampayan，医学博士，美国传染病学会，弗吉尼亚州阿灵顿；Barbara Van Der Pol，哲学博士，美国性传播疾病协会，北卡罗来纳州三角研究园，以及阿拉巴马大学伯明翰分校，阿拉巴马州伯明翰；Teodora Elvira Wi，医学博士，全球HIV、肝炎和性传播感染规划部，世界卫生组织，瑞士日内瓦。

CDC and Outside CDC Consultants: Sevgi O. Aral, PhD; Laura H. Bachmann, MD; Kyle Bernstein, PhD; Gail Bolan, MD; John Brooks, MD; Philip Chan, MD, Brown University, Providence, Rhode Island; Aaron Harris, MD; Matthew Hogben, PhD; Christine Johnston, MD, University of Washington, Seattle, Washington; Sarah Kidd, MD; Kristen Kreisel, PhD; Lauri Markowitz, MD; Christina Muzny, MD, University of Alabama at Birmingham, Birmingham, Alabama; Ina Park, MD, University of California San Francisco, San Francisco, California; Allan Pillay, PhD; Laura Quilter, MD; Hilary Reno, MD, PhD, Washington University, St. Louis, Missouri; Sancta St. Cyr, MD; Mona Saraiya, MD; Julie Schillinger, MD; Virginia Senkomago, PhD; Philip Spradling, MD; Phoebe Thorpe, MD; Mark Weng, MD; Jonathan Zenilman, MD, Johns Hopkins University, Baltimore, Maryland.

CDC, Division of Sexually Transmitted Disease Prevention Treatment Guidelines, 2021, Project Coordinator: Kimberly A. Workowski, MD, National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention, CDC, and Emory University, Atlanta, Georgia.

CDC Support Staff: Alexandra Coor, MPH; Catherine Carter; Quinn Haaga; Amber Herald; Patricia Jackson; Brenda Kelly.

CDC及CDC外部顾问： Sevgi O.Aral，哲学博士；Laura H.Bachmann，医学博士；Kyle Bernstein，哲学博士；Gail Bolan，医学博士；John Brooks，医学博士；Philip Chan，医学博士，布朗大学，罗德岛州普罗维登斯；Aaron Harris，医学博士；Matthew Hogben，哲学博士；Christine Johnston，医学博士，华盛顿大学，华盛顿州西雅图；Sarah Kidd，医学博士；Kristen Kreisel，哲学博士；Lauri Markowitz，医学博士；Christina Muzny，医学博士，阿拉巴马大学伯明翰分校，阿拉巴马州伯明翰；Ina Park，医学博士，加利福尼亚大学旧金山分校，加利福尼亚州旧金山；Allan Pillay，哲学博士；Laura Quilter，医学博士；Hilary Reno，医学博士、哲学博士，华盛顿大学，密苏里州圣路易斯；Sancta St.Cyr，医学博士；Mona Saraiya，医学博士；Julie Schillinger，医学博士；Virginia Senkomago，哲学博士；Philip Spradling，医学博士；Phoebe Thorpe，医学博士；Mark Weng，医学博士；Jonathan Zenilman，医学博士，约翰斯·霍普金斯大学，马里兰州巴尔的摩。

CDC 性传播疾病预防治疗指南 2021，项目协调人： Kimberly A.Workowski，医学博士，CDC 国家 HIV/AIDS、病毒性肝炎、性传播疾病与结核病预防中心，以及佐治亚州亚特兰大埃默里大学。

CDC 支持人员： Alexandra Coor，公共卫生硕士；Catherine Carter;Quinn Haaga;Amber Herald;Patricia Jackson;Brenda Kelly。

Disclosure of Relationships

All STI Treatment Guidelines, 2021, Work Group members have completed and submitted the International Committee of Medical Journal Editors form for disclosure of potential conflicts of interest. Lindley Barbee received research support from Hologic and SpeeDx and consults for Nabriva. Christine Johnston received research funding from Sanofi-Pasteur; royalties from UpToDate; and personal fees from MedPace, Gilead, AbbVie, and UpToDate. Jeffrey Klausner received research supplies from Hologic, Cepheid, and SpeeDx; advisory fees from Shield Diagnostics, Click Diagnostics, and SpeeDx; and research funding from AbbVie and Gilead Sciences. Lisa Manhart received research supplies, honoraria, and research contracts from Hologic and served as a consultant to diagnostic test manufacturers (SpeeDx, BioFire Diagnostics, Roche Diagnostics, and Click Diagnostics). Jeanne Marrazzo serves on expert advisory boards for Becton Dickinson, BioFire Diagnostics, and Gilead Sciences and has research and grant support and supplies from Merck & Co. and Toltec. David Martin served as a consultant in 2019 to Hologic, which recently gained Food and Drug Administration clearance for a *Mycoplasma genitalium* diagnostic test and markets diagnostic tests for gonorrhea, chlamydia, and trichomonas. Kenneth Mayer serves on the scientific advisory boards for Gilead Sciences and Merck & Co. Pharmaceuticals and receives grant funds from Gilead Sciences. Leandro Mena received research funding through his institution from Atlas Genetics, Merck & Co., Becton Dickinson, Hologic, Biolytical, and Roche and received consulting honoraria from Roche Molecular, Merck & Co., Gilead Sciences, and ViiV Healthcare and from speaker bureaus for Gilead Sciences and ViiV Healthcare. Caroline Mitchell served as a consultant for Lupin Pharmaceuticals and Scynexis and received grant funding from Merck & Co. Christina A. Muzny served as a consultant and received research support from Lupin Pharmaceuticals for a randomized controlled trial of secnidazole versus placebo for treatment of trichomoniasis and grants from the National Institutes of Health/National Institute of Allergy and Infectious Diseases; was a speaker for Abbott Molecular, Cepheid, and Roche Diagnostics on topics related to STIs; received personal fees from Lupin Pharmaceuticals, PhagoMed, Cepheid, and Beckton Dickinson; and served as a consultant for BioFire Diagnostics. Paul Nyirjesy received research support from Mycovia Pharmaceuticals, Curatek Pharmaceuticals, Scynexis, and Hologic and served as a consultant for Mycovia Pharmaceuticals, Hologic, Scynexis, Daré Bioscience, and Becton Dickinson. Jeffery Pepest serves on advisory boards for Cooper Surgical and Bayer and provides research support to Merck & Co. Susan Philip is an unpaid public health advisor to GlaxoSmithKline. Anne Rompalo serves on the BioFire Diagnostics advisory board and has financial ties to UpToDate. Hilary Reno is a site principle investigator on a project evaluating the prevalence of *M. genitalium* funded by Hologic (funds are allocated via her institution). Arlene Seña serves on a speaker's bureau and scientific advisory board for *M. genitalium* at Hologic, works with the Gilead Focus grant for hepatitis C testing and linkage to care, and mentored Sancta St. Cyr, MD, at the University of North Carolina Division of Infectious Diseases before employment at CDC. Anne Spaulding received consulting fees or honoraria (either directly or through third parties) from Gilead Sciences, Merck & Co., and AbbVie and grants through her institution from Gilead Sciences and ViiV. Susan Tuddenham served as a consultant for Biofire Diagnostics and Roche Molecular Diagnostics and received a speaker honorarium from Roche Molecular Diagnostics. Karen Wendel has stock ownership in Pfizer.

关系披露

所有STI治疗指南(2021)工作组成员均已填写并提交国际医学期刊编辑委员会潜在利益冲突披露表。Lindley Barbee获得Hologic和SpeeDx的研究支持，并为Nabriva提供咨询。Christine Johnston获得Sanofi-Pasteur的研究资助；UpToDate的版税；以及MedPace、Gilead、AbbVie和UpToDate的个人费用。Jeffrey Klausner获得Hologic、Cepheid和SpeeDx的研究用品；Shield Diagnostics、Click Diagnostics和SpeeDx的顾问费；以及AbbVie和Gilead Sciences的研究资助。Lisa Manhart获得Hologic的研究用品、酬金和研究合同，并担任诊断检测制造商(SpeeDx、BioFire Diagnostics、Roche Diagnostics和Click Diagnostics)的顾问。Jeanne Marrazzo担任Becton Dickinson、BioFire Diagnostics和Gilead Sciences的专家顾问委员会成员，并获得Merck & Co.和Toltec的研究和资助支持及用品。David Martin于2019年担任Hologic的顾问，该公司最近获得食品药品监督管理局对生殖支原体诊断检测的许可，并销售淋病、衣原体和滴虫的诊断检测。Kenneth Mayer担任Gilead Sciences和Merck & Co.Pharmaceuticals的科学顾问委员会成员，并从Gilead Sciences获得资助资金。Leandro Mena通过其所在机构获得Atlas Genetics、Merck & Co.、Becton Dickinson、Hologic、Biolytical和Roche的研究资助，并获得Roche Molecular、Merck & Co.、Gilead Sciences和ViiV Healthcare的咨询酬金，以及Gilead Sciences和ViiV Healthcare的演讲者酬金。Caroline Mitchell担任Lupin Pharmaceuticals和Scynexis的顾问，并获得Merck & Co.的资助。Christina A.Muzny担任顾问，并获得Lupin Pharmaceuticals的研究支持，用于一项比较塞克硝唑与安慰剂治疗滴虫感染的随机对照试验，以及来自国家卫生研究院/国家过敏和传染病研究所的资助；曾担任Abbott Molecular、Cepheid和Roche Diagnostics关于STI相关主题的演讲者；获得Lupin Pharmaceuticals、PhagoMed、Cepheid和Beckton Dickinson的个人费用；并担任BioFire Diagnostics的顾问。Paul Nyirjesy获得Mycovia Pharmaceuticals、Curatek Pharmaceuticals、Scynexis和Hologic的研究支持，并担任Mycovia Pharmaceuticals、Hologic、Scynexis、Daré Bioscience和Becton Dickinson的顾问。Jeffery Pepest担任Cooper Surgical和Bayer的顾问委员会成员，并向Merck & Co.提供研究支持。Susan Philip是GlaxoSmithKline的无偿公共卫生顾问。Anne Rompalo担任BioFire Diagnostics顾问委员会成员，并与UpToDate有财务关系。Hilary Reno是一项评估生殖支原体患病率项目的站点主要研究者，该项目由Hologic资助(资金通过其所在机构分配)。Arlene Seña担任Hologic生殖支原体的演讲者委员会和科学顾问委员会成员，参与Gilead Focus资助的丙型肝炎检测和护理衔接工作，并在CDC任职前于北卡罗来纳大学传染病科指导Sancta St.Cyr医学博士。Anne Spaulding获得Gilead Sciences、Merck & Co.和AbbVie的咨询费或酬金(直接或通过第三方)，以及通过其所在机构获得Gilead Sciences和ViiV的资助。Susan Tuddenham担任Biofire Diagnostics和Roche Molecular Diagnostics的顾问，并获得Roche Molecular Diagnostics的演讲者酬金。Karen Wendel持有Pfizer的股票。

The *Morbidity and Mortality Weekly Report (MMWR)* Series is prepared by the Centers for Disease Control and Prevention (CDC) and is available free of charge in electronic format. To receive an electronic copy each week, visit *MMWR* at *https://www.cdc.gov/mmwr/index.html*.

Readers who have difficulty accessing this PDF file may access the HTML file at https://www.cdc.gov/mmwr/volumes/70/rr/rr7004a1.htm?s_cid=rr7004a1_w. Address all inquiries about the *MMWR* Series to Editor-in-Chief, *MMWR* Series, Mailstop V25-5, CDC, 1600 Clifton Rd., N.E., Atlanta, GA 30329-4027 or to *mmwrq@cdc.gov.*

All material in the *MMWR* Series is in the public domain and may be used and reprinted without permission; citation as to source, however, is appreciated.

MMWR and *Morbidity and Mortality Weekly Report* are service marks of the U.S. Department of Health and Human Services.

Use of trade names and commercial sources is for identification only and does not imply endorsement by the U.S. Department of Health and Human Services.

References to non-CDC sites on the Internet are provided as a service to *MMWR* readers and do not constitute or imply endorsement of these organizations or their programs by CDC or the U.S. Department of Health and Human Services. CDC is not responsible for the content of these sites. URL addresses listed in *MMWR* were current as of the date of publication.

ISSN: 1057-5987 (Print)

*Morbidity and Mortality Weekly Report(MMWR)*系列由疾病控制与预防中心(CDC)编制，并以电子格式免费提供。如需每周接收电子版，请访问MMWR 网站*https://www.cdc.gov/mmwr/index.html*.

难以访问此 PDF 文件的读者可访问 HTML 文件：https://www.cdc.gov/mmwr/volumes/70/rr/rr7004a1.htm?s_ cid=rr7004a1_w。有关*MMWR*系列的所有咨询，请联系主编，*MMWR*系列，Mailstop V25-5,CDC,1600 Clifton Rd., N.E., Atlanta, GA 30329-4027，或发送至*mmwrq@cdc.gov*。

*MMWR*系列中的所有材料均属公共领域，可未经许可使用和转载；但引用来源将不胜感激。*MMWR*和*Morbidity and Mortality Weekly Report*是美国卫生与公众服务部的服务标志。

使用商品名称和商业来源仅用于识别目的，并不意味着美国卫生与公众服务部的认可。互联网上非CDC网站的引用是为*MMWR*读者提供的服务，不构成也不暗示CDC或美国卫生与公众服务部对这些组织或其项目的认可。CDC不对这些网站的内容负责。*MMWR*中列出的URL地址在出版日期时有效。

ISSN:1057-5987(印刷版)

How this file was made

This is a complete Chinese translation of the CDC Sexually Transmitted Infections Treatment Guidelines, 2021. Tables, captions, headers, footers and numbering all keep their original positions. Nothing has been cut.

If you have documents of your own

- Contracts, tenders, standards, patents, reports: original layout kept, CNY 0.15/page
- PDF to Word: free up to 100 pages, CNY 0.10/page beyond that
- Scanned or image-only PDFs: OCR to Word, free
- No sign-up, no login: upload and download

Open the address below and try it with your own file:

https://www.ivyivy.com.cn/cdc-sti-2021-zh

On-premise deployment available (subject to model and compliance review)

Machine translation, provided for reading reference only. For professional judgement and compliance citation, please refer to the original English source.

This page is a translator's note; it is not part of the original document.

这份文件是怎么做出来的

本译本是《性传播感染治疗指南（2021）》的中文全译本，共 192 页。表格、图注、页眉页脚、编号层级都按原文位置一一还原，未做任何删节。

你手上如果也有英文文件要处理

- 合同、标书、标准、专利、报告：翻译后保留原版式，0.15 元/页
- PDF 转 Word：100 页内免费，超出 0.1 元/页
- 扫描件、图片版 PDF：先 OCR 再转 Word，免费
- 不用注册、不用登录，传上去直接下载

打开下面这个地址，把你自己的文件传上去试试：

https://www.ivyivy.com.cn/cdc-sti-2021-zh

支持私有化部署（需按贵方模型与合规要求评估）

本译本由机器翻译生成，仅供阅读参考；专业技术判断与合规引用，请以英文原文为准。

本页为译制说明，不属于原文件内容。