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Clinical Updates in Sexually Transmitted Infections, 2024

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Abstract

Sexually transmitted infections (STIs) continue to increase in the United States with more than 2.5 million cases of gonorrhea, chlamydia, and syphilis reported to the Centers for Disease Control and Prevention in 2022. Untreated STIs in women can lead to adverse outcomes, including pelvic inflammatory disease, infertility, chronic pelvic pain, and pregnancy complications such as ectopic pregnancy, early pregnancy loss, stillbirth, and neonatal transmission. STI-related guidelines can be complex and are frequently updated, making it challenging to stay informed on current guidance. This article provides high-yield updates to support clinicians managing STIs by highlighting changes in screening, diagnosis, and treatment. One important topic includes new guidance on syphilis screening, including a clarified description of high community rates of syphilis based on Healthy People 2030 goals, defined as a case rate of primary or secondary syphilis > 4.6 per 100,000. Reproductive aged persons living in counties above this threshold should be offered syphilis screening. Additionally, American College of Obstetricians & Gynecologists now recommends syphilis screening three times during pregnancy regardless of risk—at the first prenatal visit, during the third trimester, and at delivery. In addition, new guidance to support consideration for extragenital screening for gonorrhea and chlamydia in women at sites such as the anus and pharynx is discussed. Other topics include the most recent chlamydia, gonorrhea, trichomoniasis, and pelvic inflammatory disease treatment recommendations; screening and treatment guidance for *Mycoplasma genitalium*; genital herpes screening indications and current diagnostic challenges; and the diagnosis and management of mpox in women and during pregnancy.

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Authors' Contributions

All authors in this article have agreed to be included as authors and have reviewed the final article. The authors contributed to the article as follows: K.H.: Conceptualization, Writing—Original draft preparation, Reviewing and Editing, and project administration; E.L.: Conceptualization, Writing—Original draft preparation, and Reviewing and Editing; K.M.: Writing—Reviewing and Editing, and Supervision; L.A.S.Q.: Writing—Reviewing and Editing, and Supervision.

Author Disclosure Statement

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the CDC Foundation or Centers for Disease Control and Prevention (CDC). Mention of company names or products does not imply endorsement by the CDC. The authors have no conflicts of interest relevant to this article to disclose.

Additional Disclosures

In this article, the terminology "women" is used for concision, although this information applies to all people with a vulva, vagina, cervix, and/or uterus.

Keywords

sexually transmitted infections; STIs; syphilis; chlamydia; gonorrhea; mpox

Introduction

In 2022, 2.5 million chlamydia, gonorrhea, and syphilis infections were reported in the United States (U.S.) with increases over the prior five years for gonorrhea (11%), syphilis (80%), and congenital syphilis (183%).[1] Sexually transmitted infections (STIs) can adversely affect health, including infertility, pelvic inflammatory disease (PID), chronic pelvic pain, and increased cancer risks.[2,3] In addition, some STIs can affect pregnancy, leading to increased risks of adverse outcomes such as spontaneous abortion, preterm labor, stillbirth, and transmission to the fetus *in utero* or neonate during delivery.[4,5] In support of clinicians who provide care in an ever-changing STI landscape, this article highlights updates by reviewing and summarizing important changes in STI screening and treatment in syphilis, chlamydia, gonorrhea, *Mycoplasma genitalium* (Mgen), trichomoniasis, genital herpes, and mpox (Table 1). This article is not intended to be comprehensive; more detailed information on the diagnosis and treatment of these STIs can be found in the CDC 2021 STI Treatment Guidelines (https://www.cdc.gov/std/treatment-guidelines/) and on the STI Treatment (Tx) Guide Mobile app (https://www.cdc.gov/std/treatment-guidelines/provider-resources.htm).

Syphilis

Syphilis and congenital syphilis (CS) are caused by *Treponema pallidum* and cases continue to rise at alarming rates across the United States.[1] Over the last 10 years, rates of primary and secondary syphilis among reproductive-aged women have increased more than 8-fold (from 2.1 to 19.1 per 100,000) and reported CS cases have increased over 10-fold (from 362 to 3755 cases).[1,6] Untreated syphilis can lead to long-term neurological and cardiac sequelae, and syphilis during pregnancy can lead to adverse pregnancy outcomes, including spontaneous abortion, stillbirth, preterm birth, and neonatal death.[7] Vertical transmission of syphilis to the fetus can lead to permanent sequelae in children, including musculoskeletal abnormalities, blindness, deafness, and neurodevelopmental delay.[4,7] This article reviews important points on syphilis screening, diagnosis, and management.

Syphilis testing is recommended in any sexually active person presenting with STI symptoms, a possible STI exposure, or behavioral risk factors such as having human immunodeficiency virus (HIV) or another STI, using illicit drugs or medications not as prescribed, or a history of transactional sex, incarceration, or military service.[7,8] Additionally, screening should be offered to sexually active women 15–44 years of age if they live in a high incidence area.[7] The Healthy People 2030 target for primary and secondary syphilis is a case rate in reproductive-aged women less than or equal to 4.6 per 100,000.[6] In 2022, over 30% of U.S. counties exceeded this threshold, and these areas accounted for over 70% of the reproductive-aged population.[6] During pregnancy, all people should undergo syphilis screening at the first prenatal visit or encounter with the health care system.[7,9] The American College of Obstetricians and Gynecologists (ACOG) now

recommends additional screening during pregnancy in the third trimester (around 28 weeks gestation) and at delivery for all pregnant people regardless of risk for syphilis.[10] No neonate or postpartum person should leave the hospital without syphilis testing results. In addition, syphilis testing should be performed at the time of delivery for all people diagnosed with a stillbirth.[7]

At the time of syphilis testing or a positive result, a thorough history and physical exam should be performed to determine the clinical stage. This includes an oral, urogenital (with speculum), and perirectal exam, inspecting all anatomical sites of sexual exposure as signs and symptoms of primary and secondary syphilis might be unrecognized by patients (Table 2).[7] Primary syphilis classically presents as a single painless ulcer, called a chancre, at the site of inoculation but occasionally can present as multiple and painful lesions (Fig. 1).[7,11] Common findings of secondary syphilis include a skin rash on the trunk, arms, palms, and soles (Fig. 2); mucocutaneous lesions; condyloma lata (Fig. 3); fever; chills; and lymphadenopathy. Condyloma lata might be difficult to differentiate from other vulvar lesions, such as condyloma acuminata, but are usually notable for being moist and occasionally ulcerated.[7] Latent stages of syphilis have no clinical manifestations, relying on history and laboratory testing for diagnosis, and are divided into early latent (syphilis infection of <12 months duration), late latent (syphilis infection of ≥12 months), and latent of unknown duration. To diagnose early versus late latent syphilis, a person must have a known negative titer within 12 months or known infection timing based on signs, symptoms, prior titers, and/or sexual history. Tertiary syphilis typically presents after 15–30 years of untreated syphilis and includes late manifestations such as gummas (granulomas that present as soft tumors throughout the body) or cardiovascular findings such as aortitis. Clinicians should screen all patients diagnosed with syphilis for neurological, visual, and auditory signs and symptoms as neurosyphilis, ocular syphilis, and otosyphilis can present during any clinical stage (Table 2).[7]

Syphilis testing relies on a combination of nontreponemal and treponemal tests. Nontreponemal tests (e.g., rapid plasma reagin or Venereal Disease Research Laboratory) are nonspecific and detect cardiolipin antigen when reactive.[12] Treponemal tests (e.g., *T. pallidum* enzyme immunoassay, chemiluminescence assay, fluorescent treponemal antibody absorption, and the *Treponema pallidum* particle agglutination [TPPA]) are specific and detect antibodies to *T. pallidum* (Fig. 4).[7,12] The traditional serologic testing algorithm starts with a nontreponemal screening test followed by a confirmatory treponemal test, while the reverse algorithm starts with a treponemal test. With the reverse algorithm, discordant results (i.e., a positive treponemal test followed by a negative nontreponemal test) are followed by a second different treponemal test, optimally the TPPA.[13] In recent studies comparing the two algorithms, the reverse algorithm detects more early infections but has an increased risk of false positives.[14] Point-of-care treponemal tests for syphilis are available and performed by fingerstick with ≤ 15-minute turnaround, providing the opportunity for timely testing and same-day treatment in people with no history of treated syphilis and with challenges following up or in settings without phlebotomy (e.g., syringe service programs, correctional facilities). They have lower sensitivity and specificity than laboratory-based tests and, as such, should only be used when indicated and laboratory-based tests should be collected simultaneously when possible.[7,15,16]

Primary, secondary, and early latent syphilis are treated with benzathine penicillin G 2.4 million units intramuscularly in a single dose (Table 2). During pregnancy, a second dose 1 week later may be considered.[7,17] Late latent syphilis, latent syphilis of unknown duration, and tertiary syphilis should be treated with benzathine penicillin G 2.4 million units intramuscularly in three doses given 7 days apart; during pregnancy if doses are more than 9 days apart, the treatment course must be restarted. An alternative regimen for people who are not pregnant is doxycycline. Benzathine penicillin G is the only current treatment option for people who are pregnant; in those with severe penicillin allergy, inpatient desensitization is required.[7] The Jarisch–Herxheimer reaction is a temporary febrile illness in response to treatment presenting in the first 24 hours after initial treatment and is more likely to occur with higher titers.[7] During the second half of pregnancy, the reaction can lead to preterm labor and fetal distress, but this risk should not delay treatment, and patients should be educated to monitor for signs of labor or decreased fetal movement.[7,18] Given recent benzathine penicillin G (Bicillin L-A®) shortages, in instances of Bicillin L-A® supply difficulty, Bicillin L-A® should be prioritized for people who are pregnant.[19]

All people with syphilis should be tested for other STIs, including HIV, and should undergo a clinical exam and repeat serologic testing after treatment to confirm treatment response and no evidence of reinfection; timing and frequency depends on clinical stage and HIV coinfection.[7] In pregnant persons diagnosed before 24 weeks' gestation, serologic titers should be performed no sooner than eight weeks after treatment to allow for an appropriate titer response as well as at delivery; after 24 weeks, serologic titers should be repeated at delivery. Titers should be repeated sooner, however, if there are concerns for reinfection or treatment failure. All partners should be referred for testing and treatment.[7]

Chlamydia

Chlamydia is the most reported bacterial STI in the United States and occurs more often among people under the age of 24.[1] Because chlamydia is often asymptomatic, screening is the backbone of early detection and treatment to prevent transmission and sequelae such as PID, infertility, and ectopic pregnancy.[7] Annual chlamydia screening by nucleic acid amplification test (NAAT) of either a vaginal swab or urine specimen should be performed in all sexually active women younger than 25 years and in women over 25 years with increased individual risk factors (e.g., a new sex partner, more than one sex partner, a sex partner with concurrent partners, or a sex partner who has an STI).[20] Although either specimen type can be used, vaginal swabs have shown superior sensitivity for detecting chlamydia and gonorrhea.[21]

Recent studies have shown that rectal chlamydia is relatively common in women and is not uniformly associated with receptive anal intercourse, suggesting possible spread from one's own genital infection.[22,23] Although the significance remains unclear, there are concerns that persistent rectal chlamydia could reinfect the genital tract.[22–24] As a result, the 2021 treatment guidelines recommend consideration for rectal chlamydia screening in women based on sexual behaviors and exposures (e.g., anal intercourse), using shared decision making with the patient.[7,25,26] In addition, data suggest that while azithromycin has high efficacy for urogenital chlamydial infections, it is less effective against concomitant rectal

chlamydial infections than doxycycline.[27,28] As such, in 2021, the recommended treatment for chlamydia changed to doxycycline 100 mg orally two times per day for seven days for chlamydia in nonpregnant people.[7,29] Azithromycin 1 g orally as a single dose is an alternative when there is a concern that a patient might not be able to complete this regimen, but might require post-treatment evaluation. During pregnancy, the recommended treatment is azithromycin 1 g orally as a single dose due to doxycycline teratogenicity concerns.[7] All patients should be instructed to abstain from intercourse until they and their sex partners have been treated (i.e., after completion of a 7-day regimen or for 7 days after a single-dose regimen) and any symptoms have resolved.[7] Testing for other STIs, including HIV, should be recommended if not already performed. A test of cure (TOC) for chlamydia is indicated 3–4 weeks after treatment during pregnancy and a test for reinfection is recommended for all people three months after treatment completion.[7] Sexual partners should also be referred for testing and treatment. In situations where clinicians are concerned regarding timely access to testing and treatment for partners, expedited partner therapy (EPT) should be considered unless prohibited by law or regulations.[7]

Gonorrhea

Gonorrhea has increased among women 15–39 years of age in the United States over the last 5 years.[1,30] Like chlamydia, many women with gonorrhea report no or nonspecific symptoms, making screening an important strategy to diagnose, treat, and reduce the risk of sequelae.[7] Routine annual screening for gonorrhea is recommended for all sexually active females less than 25 years of age and for women over 25 with increased risk factors for infection (same criteria as for chlamydia).[20] Similar to chlamydia, testing for gonorrhea should occur when a person presents with STI symptoms, has an STI exposure, or is diagnosed with another STI.[7] Also like chlamydia, gonococcal infections can occur at extragenital sites, including the pharynx and the rectum.[31,32] In a recent study, 35% of females exposed to gonorrhea tested positive at the pharynx.[33] While studies show high concurrency between urogenital and extragenital infections, up to 30% of extragenital infections would be missed with urogenital screening alone.[32,33] Based on this, screening for pharyngeal and rectal gonorrhea in women can be considered if oral or anal intercourse is reported.[7]

The recommended treatment for uncomplicated urogenital, pharyngeal, and anorectal gonorrhea in nonpregnant and pregnant people is a single dose of ceftriaxone 500 mg IM (or a single 1-gram dose for persons weighing ≥150 kg).[7] If chlamydial coinfection has not been excluded and the patient is not pregnant, doxycycline 100 mg orally twice daily for 7 days should be added.[7] In 2020, the gonorrhea treatment recommendations were changed due to concerns regarding the effect of azithromycin therapy on antimicrobial resistance in *N. gonorrhoeae* and other concurrent STI pathogens, as well as its decreased effectiveness given increases in gonococcal azithromycin resistance.[34] The ceftriaxone dose was also increased based on new ceftriaxone pharmacokinetics and pharmacodynamics studies.[35] Alternatives for when ceftriaxone is not available include a single dose of gentamicin 240 mg IM with azithromycin 2 g orally in a single dose, or cefixime 800 mg orally in a single dose for rectal and urogenital infections only.[7]

Gonorrhea has been considered an urgent antimicrobial resistant (AMR) threat-level pathogen in the United States since 2013 due to its ability to develop resistance to multiple antimicrobials.[36] Treatment failures with ceftriaxone have been reported internationally, but no cases have been reported in the United States; however, there remain concerns about the potential for treatment failures in the United States as resistant strains have been reported.[37,38] Pharyngeal infections rarely cause symptoms, but may play an important role in the development of AMR as pharyngeal infections can be more difficult to eradicate and most gonorrhea ceftriaxone treatment failures have occurred in the pharynx.[39,40]

Persons treated for gonorrhea should be counseled to abstain from sexual activity for 7 days after treatment or until symptoms resolve (whichever occurs last) and until all sex partners are treated.[7] Any person with pharyngeal gonorrhea should have a TOC using culture or NAAT within 7–14 days posttreatment with a lower chance of false positive if performed closer to 14 days.[7,40] TOC is not necessary at other sites, but all persons diagnosed with gonorrhea should be retested at 3 months.[7] Like chlamydia, testing for other STIs, including HIV, should be recommended and sex partners should get referred for testing and treatment. EPT should be considered if permissible by law and regulation, especially in situations where there are concerns regarding partner access to timely testing and treatment.[7]

Mycoplasma genitalium

Mycoplasma genitalium (Mgen) is a bacterium that causes asymptomatic urogenital infections or persistent or recurrent urethritis in men; in women, Mgen is often asymptomatic.[7,41] A national survey estimated the overall Mgen prevalence to be 1.7% among people 14–59 years of age with a similar prevalence between men (1.8%) and women (1.7%).[42] However, estimates among women presenting to an STI clinic were as high as 26%.[42–44] It is thought that Mgen in women might be associated with cervicitis, PID, infertility, and adverse pregnancy outcomes, including preterm birth and spontaneous abortion, although the natural course of Mgen in women is not yet well understood.[7,45] In addition, there are insufficient data demonstrating that treatment of asymptomatic women testing positive for Mgen prevents PID or other complications.[7] Mgen has gained attention due to AMR concerns, resulting in limited treatment options and new detection capabilities, resulting in its addition to multiplex laboratory panels.[46]

CDC does not recommend screening for Mgen in people who are asymptomatic.[7] In women, Mgen testing should only be performed in cases of recurrent cervicitis and can be considered for the initial evaluation of PID.[7] Testing for Mgen can be performed using an FDA-approved NAAT on urine, urethral, endocervical, and vaginal samples. Culture can be performed in few specialty research laboratories but has little clinical utility due to slow growth *in vitro*.[7]

A two-stage treatment approach is recommended for Mgen and the treatment regimen with the regimen depends on if resistance testing has been performed (i.e., resistance-guided therapy). If Mgen resistance testing is either not available or demonstrates resistance to macrolides (e.g., azithromycin), the recommended treatment is doxycycline 100 mg two times daily orally for 7 days to reduce the bacterial load followed by moxifloxacin 400 mg once daily orally for 7 days.[7] If Mgen resistance testing is available and it is sensitive

to macrolides, the treatment should be doxycycline 100 mg two times daily orally for 7 days followed by azithromycin 2.5 g over 4 days (1 g on day 1, followed by 500 mg on days 2–4).[7,47] Partner testing and treatment can be considered to reduce reinfection risk.[7] Treatment of Mgen during pregnancy presents challenges due to potential teratogenicity of the recommended first-line treatments. For cases of Mgen during pregnancy, consultation with the National Network of STD Prevention Training Centers STD Clinical Consultation Network is recommended (https://www.stdccn.org/render/Public).[7]

Trichomonas vaginalis

Trichomoniasis, caused by the protozoan *Trichomonas vaginalis*, affects approximately 3.7 million people in the United States with an estimated prevalence among women of 3.1%.[48] Some women with trichomoniasis are asymptomatic, but symptoms, including yellow-green vaginal discharge, vaginal irritation, postcoital spotting, or malodor, can occur.[7] Screening for trichomonas is only recommended in women with HIV but may also be considered for women living in high prevalence settings or in women with risk factors for infection (e.g., having multiple sex partners, engaging in transactional sex, or having a history of STIs). Testing should be performed in all women presenting with a complaint of vaginal discharge.[7]

The recommended treatment for trichomoniasis in women is metronidazole 500 mg orally twice daily for 7 days.[7] The duration and dose changed in the 2021 guidelines based on data demonstrating that the new regimen reduced the proportion of women testing positive at a one-month study-based TOC visit by half compared with women who received the prior single 2-g dose of metronidazole.[49] A single dose of tinidazole 2 g orally is an alternative regimen for women.[7] Before resuming intercourse, symptoms should be resolved and at least 7 days should have passed after completing treatment. HIV and other STI testing are recommended and partners should be referred for testing and treatment. Retesting for *T. vaginalis* for reinfection is recommended for all sexually active women 3 months after initial treatment, regardless of partner treatment status.[7]

Because recurrent or persistent trichomonas infections are most often due to reinfection, in these scenarios, a patient history and repeat NAAT should be performed no sooner than 3 weeks after treatment.[7] If treatment failure occurs after receiving the recommended treatment regimen, metronidazole or tinidazole 2 g orally once daily for 7 days can be considered.[7] If infection is persistent and not attributable to re-exposure, clinicians should contact CDC (parasiteslab@cdc.gov; TVConsultation@cdc.gov) to request drug-resistance testing and additional treatment guidance.

Genital herpes

Herpes simplex virus (HSV) infections are common in the United States with 47.8% and 11.9% of persons 14–49 years of age estimated to have HSV type 1 (HSV-1) and HSV type 2 (HSV-2), respectively.[50] Genital herpes was traditionally thought to be caused mostly by HSV-2, but there has been an increasing proportion of HSV-1 genital herpes infections.[51,52] Genital herpes is a lifelong infection and symptoms can vary greatly over one's lifetime.[7] Although rare, HSV can be transmitted to neonates perinatally, most often due to viral

exposure *via* the urogenital tract at the time of delivery and can cause significant neonatal morbidity.[5,7]

HSV detection is challenging because viral shedding often occurs without symptoms; serologic test performance is sub-optimal; and, with HSV-1, most persons acquire the infection and develop antibodies during childhood.[7] Genital herpes is best diagnosed during an active genital outbreak by swabbing an active lesion using an HSV NAAT.[7] Serologic HSV-1 and HSV-2 testing for immunoglobin G antibodies may be helpful to confirm a suspected diagnosis of genital herpes based on active symptoms with atypical, healing lesions, or negative HSV NAAT testing; diagnose patients with risk factors and a history suggestive of prior genital outbreak; or for the management of sex partners of people with known genital herpes.[7]

Three important limitations in the interpretation of currently available serologic tests should be considered. First, positive serology for HSV-1 in an asymptomatic person cannot differentiate between orolabial or anogenital infections.[7] Second, HSV-1 serologic test sensitivity is low, meaning some cases of herpes infections will be missed.[7,53] Finally, HSV-2 serologic testing has an increased risk of false-positive results, especially when the positive result is near the cutoff value.[53] Because of this, confirmatory testing should be pursued using western blot tests to avoid misdiagnosis and potential psychological harm.[53,54] Because of the above serologic testing limitations for herpes, U.S. Preventive Services Task Force and CDC currently recommend against routine serologic screening for genital herpes, including during pregnancy.[7,54] Refer to the CDC STI Treatment Guidelines for information on genital herpes treatment.[7]

PID

PID comprises a spectrum of inflammatory disorders of the upper genital tract and has commonly been associated with gonorrheal or chlamydial infections. However, recent studies have found additional pathogen associations, including Mgen, *T. vaginalis*, facultative anaerobes, *Gardnerella vaginalis, H. influenzae*, enteric gram-negative rods, and *Streptococcus agalactiae*.[7,55] As knowledge expands surrounding the role of other organisms and PID, studies have evaluated the efficacy of different PID treatment regimens.

The current recommended outpatient regimen for PID is a three-drug regimen of a cephalosporin (either ceftriaxone 500 mg intramuscularly [1 g if ≥ 150 kg], cefoxitin 2 g intramuscularly with probenecid 1 g orally, or other parenteral third generation cephalosporins), doxycycline 100 mg orally two twice daily for 14 days, and metronidazole 500 mg orally twice daily for 14 days.[7] Metronidazole was added to the recommended treatment regimens based on the findings of a recent randomized control trial that compared the clinical outcomes of individuals treated for PID with ceftriaxone and doxycycline with and without metronidazole. The findings support the addition of metronidazole to PID treatment as the group treated with metronidazole was less likely to have pelvic tenderness on examination, an Mgen cervical infection, or bacterial vaginosis and its associated organisms.[56]

Mpox

In May 2022, a global outbreak of mpox, an orthopox viral infection formerly known as monkeypox, occurred in multiple nonendemic countries with unique findings of person-to-person transmission, mainly through sexual contact. This was the largest outbreak in the United States with over 30,000 mpox cases reported and there was a disproportionate impact among men who have sex with men.[57] However, over 700 cases were reported in cisgender women, more than 20 of whom were pregnant or recently pregnant at the time of diagnosis; in addition, three neonates developed mpox perinatally.[58] Although reported cases have significantly declined in the United States, small mpox clusters are still occurring. Because of this, it is important to remain alert for the signs and symptoms of mpox, to test when patients have symptoms consistent with mpox, and to recommend the JYNNEOS vaccine to those at increased risk of mpox exposure (https://www.cdc.gov/poxvirus/mpox/clinicians/vaccines/vaccine-basics-healthcare.html).

The mpox rash is classically described as painful, firm, vesicular, or pustular lesions and typically lasts 2–4 weeks. The lesions may have an umbilicated center before crusting over (Fig. 5) and are often found on the legs, arms, genital and anorectal areas, oropharynx, or trunk.[58,59] Other symptoms include fever, headaches, malaise, and lymphadenopathy.[59] Testing for mpox is performed by DNA polymerase chain reaction test and requires swabbing the lesion(s); unroofing or aspiration of lesions is not recommended.[59] Most infections resolve spontaneously, but occasionally hospitalization is required for severe disease and pain control.[58,59] Tecovirimat, an antiviral medication, might be considered during pregnancy and in people with severe disease or immunocompromising conditions.[58,59] Tecovirimat is available through the STOMP clinical trial (https://www.stomptpoxx.org/main) or CDC's Investigational New Drug protocol (https://www.cdc.gov/poxvirus/mpox/clinicians/obtaining-tecovirimat.html). Additional mpox information can be found at https://www.cdc.gov/poxvirus/mpox/index.html.

Conclusion

Growing rates of STIs are a public health challenge and continue to impact quality of life in all segments of the population. Women and people who are pregnant are uniquely vulnerable to the risks associated with STIs due to higher efficiency of penile-to-vaginal transmission and increased sequelae among women, including long-term infertility and chronic pain-related sequelae, adverse pregnancy outcomes, and risks of vertical transmission. Discussing sexual health, obtaining a sexual history, and screening for STIs, when indicated, should be routine and readily accessible, but many experience challenges accessing comprehensive health care; this is highlighted by the 2022 surveillance, which shows that nearly 40% of people delivering infants with CS received no prenatal care during pregnancy.[6] Patient and provider discomfort when discussing sexual health may add additional barriers.[60] Efforts to improve access to care and testing is critical to reduce STIs. In addition, through promoting sexual, reproductive, pregnancy, and infant health, women's health clinicians can further reduce the burden of STIs through taking a thorough sexual history, educating patients, and providing appropriate screening and treatment.

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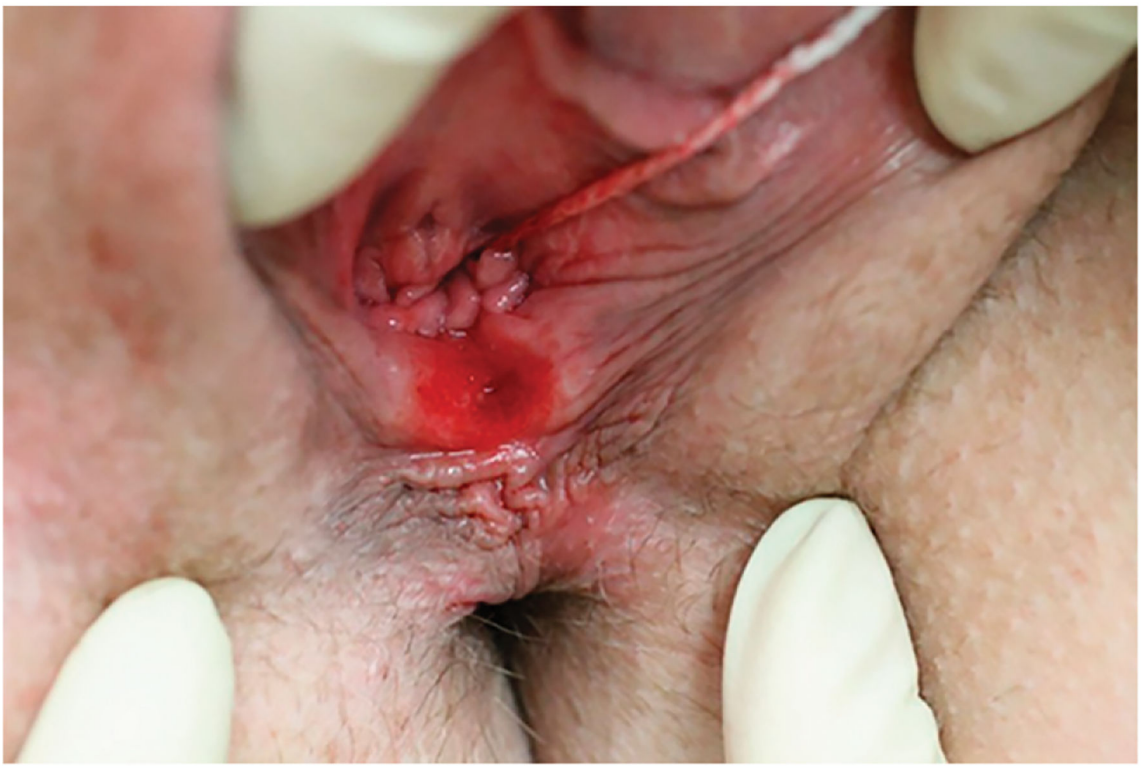

FIG 1.
Primary syphilis chancre of the vulva—with permissions from Orange County Health Care Agency, Dr. Christopher Ried.

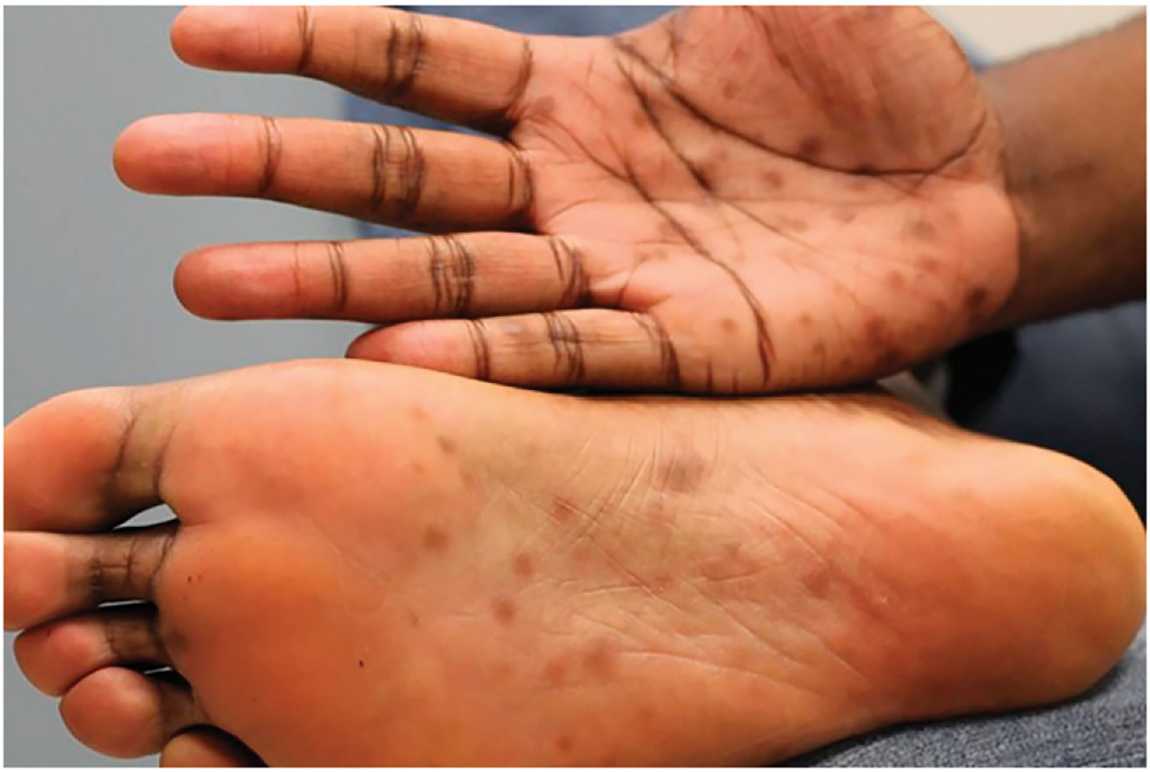

FIG 2.
Rash seen in secondary syphilis—with permissions from Orange County Health Care Agency, Dr. Christopher Ried

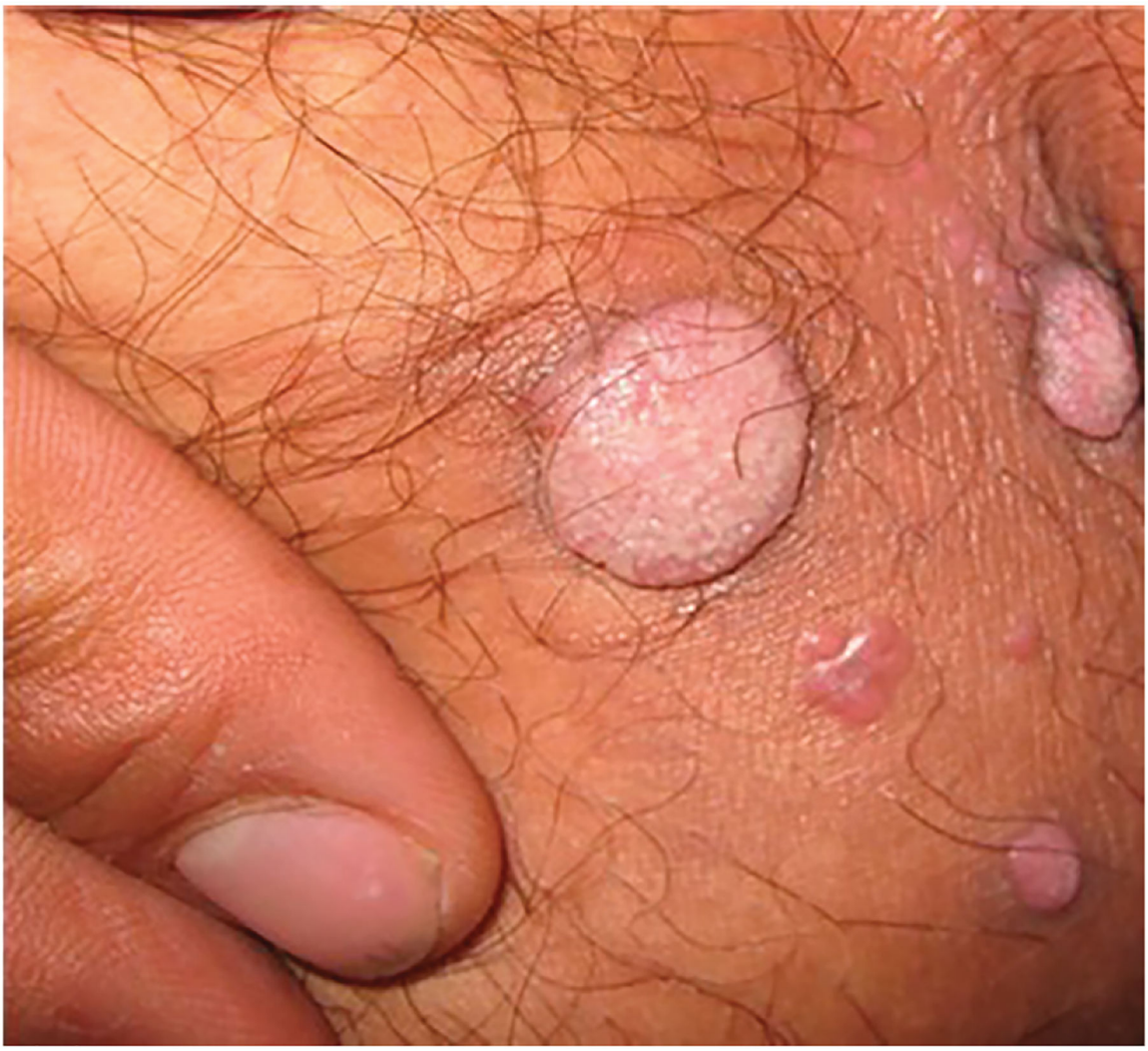

FIG 3.
Secondary syphilis—condyloma lata—with permissions from Orange County Health Care Agency, Dr. Christopher Ried

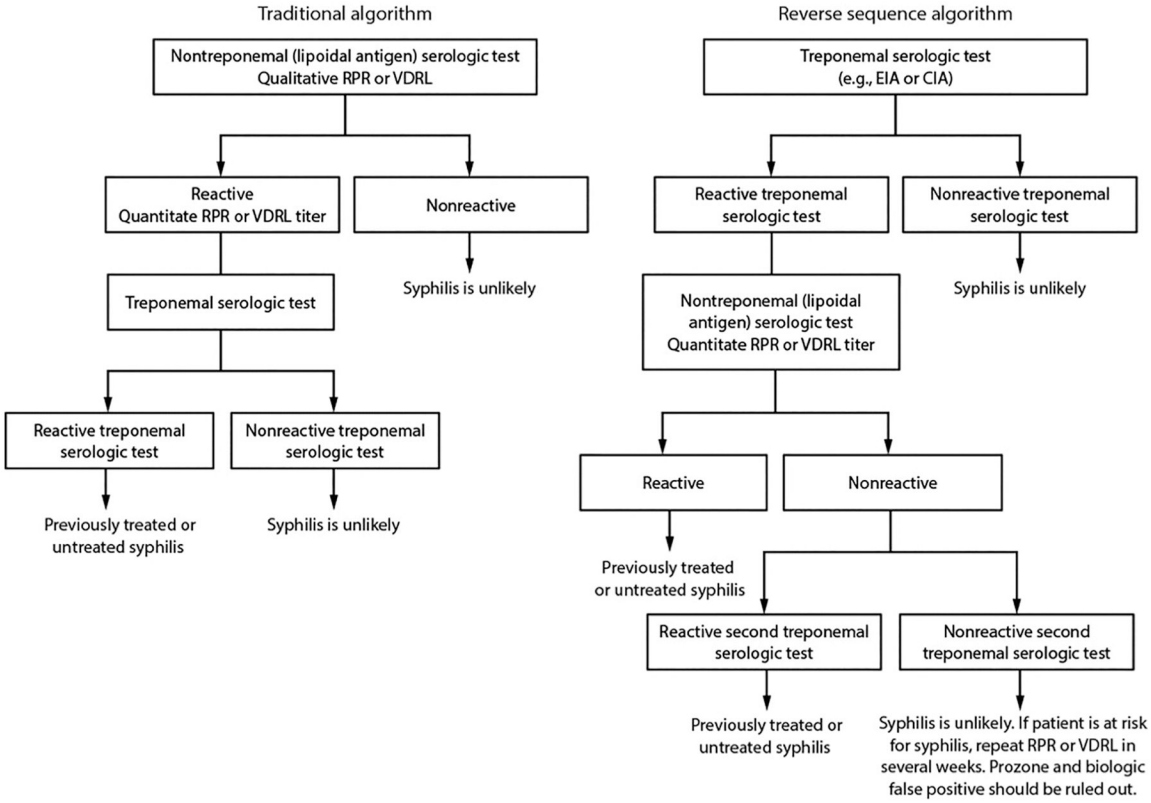

FIG 4.

Traditional sequence and reverse sequence screening algorithm for syphilis diagnosis Papp JR, Park IU, Fakile Y, Pereira L, Pillay A, Bolan GA. CDC Laboratory Recommendations for Syphilis Testing, United States, 2024. MMWR Recomm Rep 2024;73(No. RR-1):1–32. DOI: http://dx.doi.org/10.15585/mmwr.rr7301a1. Abbreviations: CIA = chemiluminescence immunoassay; EIA = enzyme immunoassay; RPR = rapid plasma reagin; TPPA = *Treponema pallidum* particle agglutination; VDRL = Venereal Disease Research Laboratory.

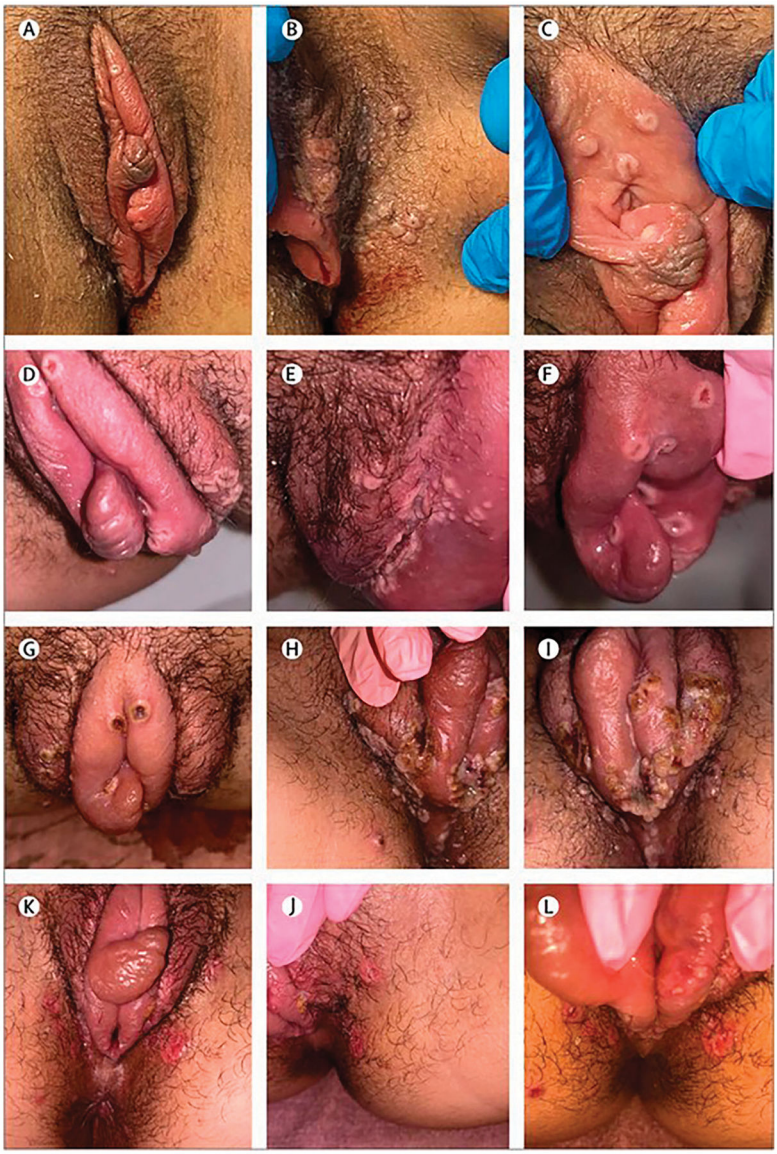

FIG 5.

Mpox lesions of the vulva *The Lancet* 2022 4001953-1965 DOI: (10.1016/S0140-6736(22)02187-0) unchanged from publication. Permissions: http://creativecommons.org/licenses/by-nc-nd/4.0/

Table 1.

Major Sexually Transmitted Infection (STI) Updates and Key Points for Clinical Practice

TOPIC OR DISEASE	***MAJOR STI[a] UPDATES AND KEY POINTS FOR CLINICAL PRACTICE***
Extragenital Screening	Chlamydia and gonorrhea screening at pharyngeal and rectal anatomical sites can be considered in women at increased risk based on sexual behaviors and/or sexual exposures with shared clinical decision making
Chlamydia	The recommended treatment for chlamydia was *changed* to: • *Nonpregnant persons:* **doxycycline** 100 mg orally twice daily for 7 days • *Pregnant persons:* **azithromycin** 1 g orally in a single dose
Gonorrhea	The recommended treatment for gonorrhea was *changed* for all persons, including during pregnancy to: • **Ceftriaxone** 500 mg IM[b] in a single dose if <150 kg (1 g for individuals ≥150 kg) • *If chlamydia testing is unknown or positive*, add **doxycycline** 100 mg orally twice daily for 7 days if not pregnant or **azithromycin** 1 g orally in a single dose if pregnant
Genital Herpes	• Universal serology screening for genital herpes is not currently recommended, including during pregnancy • Five times daily dosing regimens for genital herpes are no longer recommended
Mycoplasma genitalium (Mgen)	• Indications for Mgen testing in women include persistent cervicitis and can be considered at time of diagnosis of pelvic inflammatory disease • Routine testing for Mgen on initial vaginal discharge complaint is not recommended • Asymptomatic screening for Mgen, including during pregnancy, is not recommended
Pelvic Inflammatory Disease (PID)	Metronidazole was *added* to recommended parenteral and nonparenteral treatment regimens for PID. In addition, ceftriaxone dosage was *increased* The recommended intramuscular or oral treatment regimens for outpatient PID treatment is: • *One of the following*: **Ceftriaxone** 500 mg[c] IM in a single dose *or* **cefoxitin** 2 g IM in a single dose and **probenecid** 1 g orally administered concurrently *or* **other parenteral third-generation cephalosporin** • *Plus* **doxycycline** 100 mg orally twice daily for 14 days • *Plus* **metronidazole** 500 mg orally twice daily for 14 days
Syphilis	• All pregnant people should be screened for syphilis at their first prenatal visit or at their first encounter with the health care system during pregnancy (regardless of setting) • Syphilis screening again at 28 weeks gestation *and* at delivery is currently recommended in all pregnant people regardless of risk[d]

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TOPIC OR DISEASE	MAJOR STI[a] UPDATES AND KEY POINTS FOR CLINICAL PRACTICE
	• Syphilis creening should also occur for all sexually active persons with risk factors or who live in counties with a case rate > 4.6 per 100,000[d] • **Benzathine penicillin G** is the only recommended treatment for syphilis during pregnancy
Trichomoniasis	Screening for trichomoniasis can be considered in people with individual risk factors or those living in counties with high trichomoniasis incidence The recommended treatment regimen for trichomoniasis was *changed* for nonpregnant and pregnant women to: • **Metronidazole**, 500 mg orally twice a day for 7 days
Mpox	• Offer JYNNEOS vaccination to people at high risk for mpox infection[e] • Treatment with tecovirimat can be considered in pregnant or breastfeeding people with mpox

Adapted from American Academy of Family Physicians (AAFP). Sexually Transmitted Infections: Updates from the 2021 CDC Guidelines. https://www.aafp.org/pubs/afp/issues/2022/0500/p514.html.

Bolded items are the medications/treatment regimens.

[a] STI: sexually transmitted infection.

[b] IM: intramuscularly.

[c] ceftriaxone 1 gram for individuals ≥150 kg

[d] https://www.cdc.gov/nchhstp/atlas/syphilis/index.html.

[e] https://www.cdc.gov/poxvirus/mpox/clinicians/vaccines/vaccine-basics-healthcare.html.

Table 2.

Syphilis Stages, Clinical Manifestations, and Treatment Regimens

	Stage	*Clinical manifestations*	*Treatment*
Early	Primary	Single painless ulcer or chancre at the site of infection; can also present with multiple, atypical, or painful lesions	Recommended: Benzathine penicillin G 2.4 million units IM in a single dose Alternative: In nonpregnant persons, doxycycline 100 mg orally two times daily for 14 days
	Secondary	Skin rash, mucocutaneous lesions, lymphadenopathy	
	Early Latent (acquired <12 months)	No clinical manifestations	
Late	Late Latent (acquired ≥12 months) or Latent of Unknown Duration	No clinical manifestations	Recommended: Benzathine penicillin G 2.4 million units IM three times each at 1-week intervals Alternative: In nonpregnant persons, doxycycline 100 mg orally two times daily for 28 days
	Tertiary	Cardiac involvement, gummatous lesions, tabes dorsalis (a long-term manifestation of neurosyphilis), general paresis	
Any	Neurosyphilis	Cognitive dysfunction, motor or sensory deficits, cranial nerve palsies, meningeal signs, signs of stroke	Aqueous crystalline penicillin G 18–24 units per day, administered as 3–4 million units IV every 4 hours or continuous infusion for 10–14 days
	Ocular syphilis	Vision changes, uveitis, neuroretinitis, optic neuritis	
	Otosyphilis	Sensorineural hearing loss, tinnitus, vertigo	

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