

Sexually Transmitted Infections

Testing and Treatment

Taraneh Shafii, MD, MPH; Gale R. Burstein, MD, MPH; Margaret J. Blythe, MD

Over 19 million cases of sexually transmitted infections (STIs) occur in the United States each year, with a disproportionate number among young people and racial and ethnic minority populations.¹

The estimated annual direct medical costs of treating STIs and their sequelae are \$17 billion.¹ Left untreated, STIs can cause serious women's health problems ranging from infertility to increased risk of HIV infection.² In this article, we provide updates that are important for clinicians who care for female patients.

The US Centers for Disease Control and Prevention (CDC) *Sexually Transmitted Diseases Treatment Guidelines, 2010*, which updates the 2006 guidelines, advises health care providers on the most effective STI treatment regimens, screening procedures, and prevention and vaccination strategies.¹

The CDC recommendations are developed in consultation with public and private sector professionals knowledgeable in the treatment of STIs. Although CDC, through an evidence-based process, revises the printed *Guidelines* every 3 to 4 years, the web-based version is regularly updated and is available at www.cdc.gov/std/treatment/ as well as an eBook for iPad, iPhone, and iPod Touch.

Special Populations

The CDC *STD Treatment Guidelines* addresses screening and management needs for specific populations that may be at increased risk for infection. Below is a summary of several of the changes found in the 2010 *Guidelines*.

Adolescents and Young Adult Females

There are physiologic, behavioral, and logistic factors that contribute to the increased risk for adolescents and young adult females acquiring STIs. Females aged 15 to 24 years old continue to have the highest rates of reported *Chlamydia trachomatis* and *Neisseria gonorrhoeae* compared to any other age group in the United States.² As both chlamydia and

gonorrhea often present as asymptomatic infections in females and may lead to significant morbidity if untreated, all sexually active adolescent and young adult females should be screened annually, regardless of symptoms.¹

Routine screening of asymptomatic adolescents in the general population for certain other STIs (eg, syphilis,

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*Females aged 15 to 24 years old continue to have the highest rates of reported *Chlamydia trachomatis* and *Neisseria gonorrhoeae* compared to any other age group in the United States.*

Trichomonas vaginalis, bacterial vaginosis [BV], herpes simplex virus [HSV], human papillomavirus [HPV], hepatitis A virus [HAV], and hepatitis B virus [HBV]) is not recommended, although local recommendations may vary in areas with high disease prevalence.

Prevention Strategies

Recognizing that young women are at increased risk for STIs, health care providers have the opportunity to offer

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anticipatory guidance and prevention strategies to decrease risk. CDC updated recommendations for prevention include the following:

1. Encourage immunizations with the vaccines that are currently available for the primary prevention of STIs.

- **HPV vaccine** is recommended for all 11- and 12-year-old females, but can be administered as young as 9 years

The CDC updated recommendations for screening of asymptomatic adolescents and young adults

1. Screen annually for *C trachomatis* in all sexually active females aged ≤ 25 years.
2. Screen annually for *N gonorrhoeae* in all sexually active females at risk for infection (eg, aged < 25 years, prior gonorrhea infection, infection with other STDs, new or multiple sex partners, inconsistent condom use, commercial sex work, and drug use).
3. Discuss human immunodeficiency virus (HIV) screening and encourage testing for those who are sexually active and those who use injection drugs.
4. Screen for cervical cancer beginning at age 21 years for immunocompetent females.

of age, and catch-up vaccination is recommended for all females aged 13 to 26 years.

- **HBV vaccine** is recommended for all adolescents and those who have not completed the vaccination series.
- **HAV vaccine** is recommended for all adolescents in areas with existing HAV vaccination programs and may be considered in areas without such programs.

2. Provide information regarding HIV infection, testing, transmission, and implications of infection.

3. Integrate evidenced-based sexuality education (including discussions

about abstinence, consistent and correct condom use, and STI testing of new partners) into clinical practice. The US Preventive Task Force Services recommends high-intensity behavioral counseling to prevent STIs for all sexually active adolescents and client-centered risk reduction counseling for all ages.³

Women Who Have Sex With Women (WSW)

Females with female partners may be at increased risk for STIs and potential exposures may go unrecognized by patients or their health care providers. While the efficiency of STI transmission is greater with penile-vaginal intercourse, infection is also spread via sex toys, skin-to-skin contact, and oral and digital sex.

The majority of self-identified WSW (53% to 99%) report having had sex with men. Therefore, WSW and women with both male and female partners should be evaluated for exposures and potential risk through same-sex and heterosexual contact, which includes screening for chlamydia and syphilis when indicated.

HPV may be spread via skin-to-skin or skin-to-mucosa contact, so all females with either male or female partners or both should be offered the HPV vaccine as recommended and routinely screened for cervical cancer as per published guidelines.

Pregnant Women

The 2010 *Guidelines* does not offer significant changes in regard to STI screening of pregnant females. However, the *Guidelines* clarifies that evidence does not support routine BV screening or HSV-2 serologic screening during pregnancy.

Updates on the Diagnosis and Management of Common STIs and Associated Syndromes Gonorrhea and Chlamydia

Diagnosics

New *C trachomatis* and *N gonorrhoeae* laboratory specimen-testing options are

TABLE 1. CDC–Recommended Treatment for Uncomplicated Gonorrhea Infection of the Cervix, Urethra, or Rectum

Recommended Regimens

- Ceftriaxone 250 mg IM in a single dose
- OR, IF NOT AN OPTION
- Cefixime 400 mg orally in a single dose
- OR
- Single-dose injectible cephalosporin regimens
- PLUS
- Azithromycin 1 g orally in a single dose
- OR
- Doxycycline 100 mg orally twice a day for 7 days

Abbreviation: IM, intramuscularly
Available at: www.cdc.gov/std/treatment/2010/gonococcalinfections.htm.

highlighted in the *2010 Guidelines*. Nucleic acid amplification tests (NAATs) are the most sensitive tests to detect *C trachomatis* and *N gonorrhoeae* and are recommended by CDC.

NAATs are Food and Drug Administration (FDA)-cleared for use with urine, cervical, and urethral specimens, and many NAATs are cleared for use with provider- or patient-collected vaginal swabs. The patient-collected vaginal swab is the preferred, noninvasive, female specimen because of improved test performance, although urine remains a great NAAT specimen option.

Although NAATs are not FDA-cleared for use with rectal or oropharyngeal swab specimens, many laboratories have met the Clinical Laboratory Improvement Amendments (CLIA) requirements to offer *N gonorrhoeae* and *C trachomatis* NAAT testing on rectal swab specimens and *N gonorrhoeae* NAAT testing on oral swabs.

TABLE 2. CDC–Recommended Treatment for Uncomplicated Gonorrhea Infection of the Pharynx

Recommended Regimens

- Ceftriaxone 250 mg IM in a single dose
- PLUS
- Azithromycin 1 g orally in a single dose
- OR
- Doxycycline 100 mg orally twice a day for 7 days

Abbreviation: IM, intramuscularly
Available at: www.cdc.gov/std/treatment/2010/gonococcalinfections.htm.

Treatment

Gonococcal antimicrobial resistance remains an issue in the United States. Penicillin, tetracycline, and quinolones are no longer gonorrhea treatment options. Due to concerns about the emergence of cephalosporin-resistant gonorrhea in the United States, CDC now recommends dual therapy, ie, 2 antibiotics, for gonococcal infections at all anatomic sites (Tables 1, 2).

Ceftriaxone is preferred over cefixime for dual therapy with azithromycin preferred over doxycycline due to emerging resistance.⁴ If ceftriaxone is not an option, dual therapy with cefixime 400 mg orally plus azithromycin 1 g in a single dose or doxycycline 100 mg twice daily for 7 days is an alternative. Although cefixime is administered orally, there is limited efficacy of cefixime for treatment of pharyngeal infection.

In addition, CDC's Gonococcal Isolate Surveillance Project, which monitors antimicrobial *N gonorrhoeae* susceptibilities, has identified a trend of decreasing gonorrhea sensitivities to cefixime.⁴ If a patient experiences cefixime treatment failure, CDC advises clinicians to re-treat the patient with ceftriaxone 250 mg intramuscularly

(IM) and azithromycin 2 g orally.

In May, 2011, the first US case of a high-level azithromycin resistant *N gonorrhoeae* infection was detected in Hawaii.⁵ Although CDC does not recommend azithromycin alone for routine gonorrhea treatment, an azithromycin 2-g oral dose may be prescribed for patients with a cephalosporin allergy. If this regimen is used, a test-of-cure with culture should be performed 1 week after treatment. If culture is not available, a NAAT can be used as soon as 1 week after treatment. With a positive NAAT result, a culture should be done to confirm.

Follow-up

Return to sexual activity with untreated partners results in high chlamydia and gonorrhea reinfection rates. CDC recommends retesting patients treated for gonorrhea or chlamydia approximately 3 months after treatment or the next time the patients present for medical care, regardless of patients' relationship status with their partners or whether they believe that their sex partners were treated.

Partner Management:

Expedited Partner Therapy (EPT)

The 2010 *Guidelines* emphasizes the important role of partner management in STI prevention. Partner treatment not only directly benefits the infected individual, but also prevents reinfection and disrupts STI transmission networks. The *Guidelines* highlights the importance of EPT and the clinical practice of treating the sex partners of patients diagnosed with an STI without previous medical evaluation of the partners.

According to the 2010 *Guidelines* and CDC EPT guidance,⁶ EPT should be considered for the treatment of gonorrhea and chlamydia in heterosexual partners when other management strategies are impractical or unsuccessful. As of August 10, 2011, 30 states and 1 city have made EPT possible or even legally permissible, and many state health departments have developed EPT implementation guidelines.

In addition, EPT has been endorsed by many professional organizations, such as the American Academy of Pediatrics, American Bar Association, American College of Obstetricians and Gynecologists, American Medical Association, and Society for Adolescent Health and Medicine. The 2010 *Guidelines* also discusses new evidence supporting using the Internet to facilitate partner notification.

Pelvic Inflammatory Disease (PID)

Treatment

As a result of the emergence of quinolone-resistant *N gonorrhoeae*, regimens that include a quinolone agent are no longer recommended for PID treatment. Alternative oral regimens may be found in the CDC *Guidelines* (Table 3).

One randomized trial has demonstrated short-term effectiveness with azithromycin (1 g orally once a week for 2 weeks) when

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given in combination with ceftriaxone (250 mg IM in a single dose). Clinicians who use an alternative PID treatment regimen should consider adding metronidazole to treat anaerobic organisms in the polymicrobial infection, especially when BV is present.

Vaginitis

Diagnostics

Vaginitis diagnostic evaluation can be challenging. Historically, BV has been diagnosed by clinical criteria (eg, Amsel's Diagnostic Criteria that includes

TABLE 3. CDC-Recommended Oral Treatment for Pelvic Inflammatory Disease

Recommended Regimens

Ceftriaxone 250 mg IM in a single dose
PLUS

Doxycycline 100 mg orally twice a day for 14 days
WITH OR WITHOUT

Metronidazole 500 mg orally twice a day for 14 days
OR

Cefoxitin 2 mg IM in a single dose and **Probenecid**, 1 g orally administered concurrently in a single dose
PLUS

Doxycycline 100 mg orally twice a day for 14 days
WITH OR WITHOUT

Metronidazole 500 mg orally twice a day for 14 days
OR

Other parenteral third-generation cephalosporin (eg, ceftizoxime or cefotaxime)

PLUS
Doxycycline 100 mg orally twice a day for 14 days
WITH OR WITHOUT

Metronidazole 500 mg orally twice a day for 14 days

Abbreviation: IM, intramuscularly
Available at: www.cdc.gov/std/treatment/2010/pid.htm.

microscopy) or with Gram stain. However, in many providers' offices, these methods are no longer available. The sensitivity of microscopic examination of vaginal secretions immediately after the slide preparation for *T vaginalis* is only 60% to 70%. New vaginitis diagnostic tools include the availability of CLIA-waived, rapid vaginal tests where results are available in 10 minutes.

The OSOM® Trichomonas Rapid Test (Sekisui Diagnostics, Framingham, MA), an immunochromatographic capillary flow dipstick technology, looks and works exactly like a rapid strep test.

The OSOM BVBLUE® Test (Sekisui Diagnostics, Framingham, MA) detects elevated vaginal fluid sialidase activity, an enzyme produced by BV-associated bacteria, including *Gardnerella*, *Bacteroides*, *Prevotella*, and *Mobilincus*. If a blue or green color appears 10 minutes after a vaginal swab is placed in a testing vessel with medium and buffer, the test is positive; if the vessel contents are yellow, the test is negative. These tests have Current Procedural Terminology codes.

The Affirm™ VP III (Becton Dickinson, San Jose, CA), a nucleic acid probe test, which tests for *T vaginalis*, *G vaginalis*, and *C albicans*, is a CLIA moderate complexity test with results available within 45 minutes. A NAAT for *T vaginalis* was developed by Gen Probe (San Diego, CA) for use on their APTIMA assay platform. The test is FDA-approved for testing all female specimens on which a gonorrhea and chlamydia test can be run.

Treatment and Follow-Up

Although metronidazole and clindamycin remain the recommended BV treatment regimens, two new alternative BV treatment regimens are tinidazole 2 g orally once daily for 2 days or tinidazole 1 g orally once daily for 5 days are options for patients. Tinidazole is contraindicated in patients where pregnancy cannot be ruled out.

Since there is a high rate of reinfection among patients diagnosed and treated for *T vaginalis*, providers may consider re-screening female patients for *T vaginalis* 3 months after treatment. Tinidazole 2 g orally may also be considered as a treatment regimen for *T vaginalis* in women who are not pregnant, especially for those with repeat infections.

More Information

The complete treatment guidelines, as well as information on webinars, or-

dering information regarding hard copies of the *Guidelines*, wall charts, and pocket guides and downloading iPhone and eBook versions can be viewed and downloaded at www.cdc.gov/std/treatment/2010 or contact CDC-INFO at 800-CDC-INFO (800-232-4636), 24 hours/day, or e-mail cdcinfo@cdc.gov.

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About NASPAG

The North American Society for Pediatric and Adolescent Gynecology (NASPAG) is a nonprofit organization dedicated to educating health care professionals in pediatric and adolescent gynecology.

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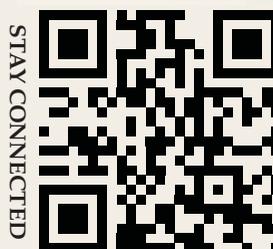
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