CHLAMYDIA

Chlamydia is the most commonly reported bacterial sexually transmitted infection. It occurs when the bacteria *Chlamydia trachomatis* infects the columnar epithelial cells that line the cervix, uterus and fallopian tubes, urethra and anus.

Chlamydia is transmitted sexually and can be transmitted from an infected mother to her infant during labor and birth. Nationally, rates of chlamydia infection increased between 2007 and 2008, but this can largely be attributed to increased screening with sensitive tests. Among young pregnant women (ages 15-24) rates of chlamydia infection range from 3.4 to 24.1%, depending on the state and type of clinic. Over 70% of chlamydia infections among women are asymptomatic, detected only by specific screening.

Complications from Chlamydia

*C. trachomatis* causes infection and damage to reproductive organs in women and, infrequently, men. Untreated chlamydia causes pelvic inflammatory disease (PID) in 10 to 20% of non-pregnant women, with some studies suggesting rates as high as 40% (Figure 4). Because it infects the uterus and fallopian tubes, chlamydia is a leading cause of preventable subfertility, infertility, ectopic pregnancy and chronic pelvic pain. Additionally, women with chlamydia are five times more likely to acquire HIV if exposed.

In pregnancy, chlamydia is associated with ectopic pregnancy, preterm premature rupture of membranes, preterm birth, and postpartum endometritis. Mothers can pass a chlamydia infection to their newborn during labor and birth. Eye infections (chlamydia conjunctivitis) affect 20 to 50% of untreated infants exposed to chlamydia during birth (Figure 4). Similarly, 10 to 20% of exposed infants develop congenital pneumonia. Topical antibiotics given at the time of birth can prevent the development of chlamydia conjunctivitis. Congenital pneumonia can only be prevented through prenatal detection and treatment of the mother.
Figure 4 Frequency of Complications Associated with Untreated Chlamydial Infection Among Women.
GUIDELINES FOR CHLAMYDIA SCREENING AND MANAGEMENT IN PREGNANCY

Screening in Pregnancy

ALL pregnant women should be screened for *C. trachomatis* at the onset of prenatal care, using a nucleic acid amplification technology (NAAT) test (see Table 6). NAAT tests detect 20% more chlamydia infections than non-NAAT tests.

Follow-up

**Partner Treatment:** All partners of women with chlamydia need to receive treatment to prevent reinfection and to reduce the chance of infecting other individuals. Partner treatment can be facilitated in a number of ways. Please see the section on partner treatment (page 88).

**Test of Cure:** A test of cure is recommended one month following CDC recommended treatment for all pregnant women who were initially positive.

**Third Trimester Screening:** Re-screening at the beginning of the third trimester is recommended by the CDC for the following pregnant women:

- Age 25 or less
- Single marital status
- New or multiple sexual partners
- History of chlamydia within the past 12 months

LA Best Babies Network also recommends chlamydia re-screening for:

- Women with HIV and/or HCV infections, and
- Women using alcohol or substances during pregnancy.

Re-infection from untreated partners is common and occurs among 15 to 39% of young women. Re-screening in the third trimester and subsequent treatment are crucial to preventing congenital chlamydia infections.
### Table 5 Key Principles of Best Practices for Screening, Treatment and Follow-up for Chlamydia During Pregnancy

<table>
<thead>
<tr>
<th>Screening</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Test for <em>C. trachomatis</em> (PCR test preferred over other nucleic acid based tests)</td>
<td>CDC-P Recommended Regimens:</td>
</tr>
<tr>
<td>➢ Perform Test of Cure 3 to 4 weeks after CDC-P recommended treatment.</td>
<td>• Azithromycin 1 g orally (single dose); OR</td>
</tr>
<tr>
<td>• During the 3rd trimester (28 weeks) retest women at risk for re-infection:</td>
<td>• Amoxicillin 500 mg orally three times daily for seven days;</td>
</tr>
<tr>
<td>➢ i.e., Age ≤25; new partner, more than 1 partner, prior treatment during pregnancy, and uncertain treatment of partner.</td>
<td><strong>Alternate therapy</strong>^*^ NOTE: gastrointestinal side effects are common with erythromycin and can result in non-compliance with these regimens.</td>
</tr>
<tr>
<td></td>
<td>• Erythromycin base 500 mg orally 4 times daily for 7 days; OR</td>
</tr>
<tr>
<td></td>
<td>• Erythromycin base 250 mg. orally 4 times a day for 14 days; OR</td>
</tr>
<tr>
<td></td>
<td>• Erythromycin ethylsuccinate 800 mg. orally 4 times a day for 7 days; OR</td>
</tr>
<tr>
<td></td>
<td>• Erythromycin ethylsuccinate 400 mg. orally 4 times a day for 14 days.</td>
</tr>
<tr>
<td></td>
<td>• Partner(s) (in past 60 days or less) should receive treatment; or the last partner if this was more than 60 days.</td>
</tr>
</tbody>
</table>

^*Erythromycin estolate is contraindicated in pregnancy, due to drug-related hepatotoxicity
Screening, Treatment, Follow-up for *Chlamydia trachomatis* Reproductive Tract Infection in Pregnancy

Screen all pregnant women the first prenatal physical exam

Test using NAAT

- Education on STIs in pregnancy
- Ways to reduce risk for infection
- Re-screen if patient becomes symptomatic or begins preterm labor, or has new partner
- Re-screen at 28 wks if at risk for infection:
  - age 25 or less
  - single
  - New or multiple partners in pregnancy
  - Hx CT in past 12 mos.
  - Using alcohol/substances\(^2\)
  - HIV/HCV infection\(^2\)

Treatment (CDC)
- Azithromycin 1 g orally (single dose); OR
- Amoxicillin 500 mg orally three times daily for seven days;
  Alternate therapy:
  - Erythromycin base 500 mg orally 4 times daily for 7 days; OR
  - Erythromycin base 250 mg orally 4 times daily for 14 days; OR
  - Erythromycin ethylsuccinate 800 mg orally 4 times daily for 7 days; OR
  - Erythromycin ethylsuccinate 400 mg orally 4 times daily for 14 days.

Abstain from sexual intercourse for 7 days or until completion of multi-dose regimen

Partner(s) Treatment:
- (All < 60 days or less; last partner even if > 60 days)
- Education: Chlamydia in pregnancy;
- Ways to reduce risk of infection; Meds

Test of Cure 4 wks after CDC Rx

- Re-screen - 28 wks
- CDC-strongly encourages re-screening all women 3-12 mos after initial Rx.

[1] NAAT = Nucleic Acid amplification tests; examples include: Ligase Chain Reaction (LCR)-LCx (Abbott); Polymerase Chain Reaction (PCR)-Amplicor (Roche); Transcription Mediated Amplification (TMA)-APTIMA (GenProbe); Strand Displacement Amplification (SDA)-BD ProbeTec (Becton Dickinson)

[2] LA Best Babies Network recommends considering these groups high risk for STI infection

Centers for Disease Control and Prevention. Sexually Transmitted Diseases Treatment Guidelines—MMWR 2010; 59(RR-12).
### Table 6 Comparison of Chlamydia Testing Technologies

<table>
<thead>
<tr>
<th>Test type and brand name</th>
<th>Nucleic acid amplification technology (NAAT)</th>
<th>Cell culture</th>
<th>Direct fluorescent antibody (DFA)</th>
<th>Enzyme immunoassay (EIA)</th>
<th>Nucleic acid probe</th>
<th>Point of Care Tests</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test type and brand name</td>
<td>Ligase chain reaction (LCR)-</td>
<td></td>
<td></td>
<td></td>
<td>DNA probe hybridization</td>
<td>Direct observation antigen detection immunoassay</td>
</tr>
<tr>
<td></td>
<td>• Lcx (Abbott)</td>
<td></td>
<td></td>
<td></td>
<td>• PACE 2 (GenProbe)</td>
<td>• Clearview (Inverness)</td>
</tr>
<tr>
<td></td>
<td>• Polymerase chain reaction (PCR)</td>
<td></td>
<td></td>
<td></td>
<td>Hybrid capture with signal amplification</td>
<td>• Lateral Flow</td>
</tr>
<tr>
<td></td>
<td>• Amplicor (Roche)</td>
<td></td>
<td></td>
<td></td>
<td>• Hybrid Capture II</td>
<td>• QuickVue Chlamydia test</td>
</tr>
<tr>
<td></td>
<td>• Transcription Mediated Amplification (TMA)</td>
<td></td>
<td></td>
<td></td>
<td>(Digene)</td>
<td>(Quidel)</td>
</tr>
<tr>
<td></td>
<td>• APTIMA (GenProbe)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Strand Displacement (SDA)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• BD ProbeTec (Becton Dickinson)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Preferred Test YES</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Collection Site</td>
<td>Urine-female and male;</td>
<td>Endocervical, urethral, rectal, conjunctival, nasopharyngeal</td>
<td>Endocervical, urethral, rectal, conjunctival, nasopharyngeal</td>
<td>Endocervical, urethral, conjunctival</td>
<td>Endocervical, urethral, conjunctival</td>
<td>Endocervical, self-collected, vaginal</td>
</tr>
<tr>
<td>Vaginal Swab-including self collected</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sensitivity</td>
<td>Cervical: 84-91%</td>
<td>Cervical: 60-80%</td>
<td>Cervical: 65-75%</td>
<td>Cervical: 60-75%</td>
<td>Cervical: 49-87%</td>
<td>Cervical: 49-87%</td>
</tr>
<tr>
<td></td>
<td>Female Urine: 79-83%</td>
<td>Cervical: 65-75%</td>
<td>Cervical: 60-75%</td>
<td>Semi-automated. One swab for both chlamydia and gonorrhea</td>
<td>Vaginal: 17-33%</td>
<td>Vaginal: 17-33%</td>
</tr>
<tr>
<td>Specificity</td>
<td>&gt;98%</td>
<td>97-99%</td>
<td>97-99%</td>
<td>98-99%</td>
<td>97-99%</td>
<td>97-99%</td>
</tr>
</tbody>
</table>


Sensitivity may be somewhat lower for urine compared to swab specimens in NAAT, thus if a pelvic exam is being performed a cervical specimen should be collected for NAAT.

Not all NAATs are currently FDA-cleared for gonorrhea testing of both male and female urine specimens. Check with your laboratory for details.

Sensitivity- the proportion of patients who truly have chlamydia for whom the test is positive.
PATIENT EDUCATIONAL MATERIALS

In this section you will find examples of patient education materials chlamydia infections among women.

Please also consult the links below for the most up-to-date patient education materials.

Centers for Disease Control and Prevention

Patient Handout—Chlamydia The Facts available in English and Spanish
http://www.cdc.gov/std/healthcomm/the-facts.htm

Chlamydia Fact Sheet
http://www.cdc.gov/std/chlamydia/STDFact-Chlamydia.htm

STDs In Pregnancy Fact Sheet
http://www.cdc.gov/std/pregnancy/STDFact-Pregnancy.htm

California STD/HIV Prevention Training Center:

Chlamydia Fact Sheet—6-8th grade reading level, 8/4/2009

American Congress of Obstetricians and Gynecologists

Gonorrhea, Chlamydia and Syphilis Fact Sheet
http://www.acog.org/publications/patient_education/

American Academy of Family Physicians

Sexually Transmitted Diseases—Fact Sheets
http://familydoctor.org/online/famdocen/home/common/sexinfections.html

Medline Plus-US National Library of Medicine, National Institutes of Health

Chlamydia Facts
http://vsearch.nlm.nih.gov/vivisimo/cgi-bin/query-meta?v%3Aproject=medlineplus&query=chlamydia
What is chlamydia?

Chlamydia is a common sexually transmitted disease (STD) caused by the bacterium, *Chlamydia trachomatis*, which can damage a woman’s reproductive organs. Even though symptoms of chlamydia are usually mild or absent, serious complications that cause irreversible damage, including infertility, can occur “silently” before a woman ever recognizes a problem. Chlamydia also can cause discharge from the penis of an infected man.

- **How common is chlamydia?**
  Chlamydia is the most frequently reported bacterial sexually transmitted disease in the United States. In 2006, 1,030,911 chlamydial infections were reported to CDC from 50 states and the District of Columbia. Under-reporting is substantial because most people with chlamydia are not aware of their infections and do not seek testing. Also, testing is often not done if patients are treated for their symptoms. An estimated 2,291,000 non-institutionalized U.S. civilians ages 14-39 are infected with chlamydia based on the U.S. National Health and Nutrition Examination Survey. Women are frequently re-infected if their sex partners are not treated.

- **How do people get chlamydia?**
  Chlamydia can be transmitted during vaginal, anal, or oral sex. Chlamydia can also be passed from an infected mother to her baby during vaginal childbirth.

  Any sexually active person can be infected with chlamydia. The greater the number of sex partners, the greater the risk of infection. Because the cervix (opening to the uterus) of teenage girls and young women is not fully matured and is probably more susceptible to infection, they are at particularly high risk for infection if sexually active. Since chlamydia can be transmitted by oral or anal sex, men who have sex with men are also at risk for chlamydial infection.

- **What are the symptoms of chlamydia?**
  Chlamydia is known as a “silent” disease because about three quarters of infected women and about half of infected men have no symptoms. If symptoms do occur, they usually appear within 1 to 3 weeks after exposure.

  In women, the bacteria initially infect the cervix and the urethra (urine canal). Women who have symptoms might have an abnormal vaginal discharge or a burning sensation when urinating. When the infection spreads from the cervix to the fallopian tubes (tubes that carry fertilized eggs from the ovaries to the uterus), some women still have no signs or symptoms; others have lower abdominal pain, low back pain, nausea, fever, pain during intercourse, or bleeding between menstrual periods. Chlamydial infection of the cervix can spread to the rectum.

  Men with signs or symptoms might have a discharge from their penis or a burning sensation when urinating. Men might also have burning and itching around the opening of the penis. Pain and swelling in the testicles are uncommon.

  Men or women who have receptive anal intercourse may acquire chlamydial infection in the rectum, which can cause rectal pain, discharge, or bleeding. Chlamydia can also be found in the throats of women and men having oral sex with an infected partner.

- **What complications can result from untreated chlamydia?**
  If untreated, chlamydial infections can progress to serious reproductive and other health problems with both short-term and long-term consequences. Like the disease itself, the damage that chlamydia causes is often “silent.”
In women, untreated infection can spread into the uterus or fallopian tubes and cause pelvic inflammatory disease (PID). This happens in up to 40 percent of women with untreated chlamydia. PID can cause permanent damage to the fallopian tubes, uterus, and surrounding tissues. The damage can lead to chronic pelvic pain, infertility, and potentially fatal ectopic pregnancy (pregnancy outside the uterus). Women infected with chlamydia are up to five times more likely to become infected with HIV, if exposed.

To help prevent the serious consequences of chlamydia, screening at least annually for chlamydia is recommended for all sexually active women age 25 years and younger. An annual screening test also is recommended for older women with risk factors for chlamydia (a new sex partner or multiple sex partners). All pregnant women should have a screening test for chlamydia.

Complications among men are rare. Infection sometimes spreads to the epididymis (the tube that carries sperm from the testes), causing pain, fever, and, rarely, sterility.

Rarely, genital chlamydial infection can cause arthritis that can be accompanied by skin lesions and inflammation of the eye and urethra (Reiter's syndrome).

How does chlamydia affect a pregnant woman and her baby?

In pregnant women, there is some evidence that untreated chlamydial infections can lead to premature delivery. Babies who are born to infected mothers can get chlamydial infections in their eyes and respiratory tract. Chlamydia is a leading cause of early infant pneumonia and conjunctivitis (pink eye) in newborns.

How is chlamydia diagnosed?

There are laboratory tests to diagnose chlamydia. Some can be performed on urine, other tests require that a specimen be collected from a site such as the penis or cervix.

What is the treatment for chlamydia?

Chlamydia can be easily treated and cured with antibiotics. A single dose of azithromycin or a week of doxycycline (twice daily) are the most commonly used treatments. HIV-positive persons with chlamydia should receive the same treatment as those who are HIV negative.

All sex partners should be evaluated, treated, and treated. Persons with chlamydia should abstain from sexual intercourse until they and their sex partners have completed treatment, otherwise re-infection is possible.

Women whose sex partners have not been appropriately treated are at high risk for re-infection. Having multiple infections increases a woman's risk of serious reproductive health complications, including infertility. Retesting should be encouraged for women three to four months after treatment. This is especially true if a woman does not know if her sex partner received treatment.

How can chlamydia be prevented?

The surest way to avoid transmission of STDs is to abstain from sexual contact, or to be in a long-term mutually monogamous relationship with a partner who has been tested and is known to be uninfected.

Latex male condoms, when used consistently and correctly, can reduce the risk of transmission of chlamydia.

CDC recommends yearly chlamydia testing of all sexually active women age 25 or younger, older women with risk factors for chlamydial infections (those who have a new sex partner or multiple sex partners), and all pregnant women. An appropriate sexual risk assessment by a health care provider should always be conducted and may indicate more frequent screening for some women.

Any genital symptoms such as an unusual sore, discharge with odor, burning during urination, or bleeding between menstrual cycles could mean an STD infection. If a woman has any of these symptoms, she should stop having sex and consult a health care provider immediately. Treating STDs early can prevent PID. Women who are told they have an STD and are treated for it should notify all of their recent sex partners (sex partners within the preceding 60 days) so they can see a health care provider and be evaluated for STDs. Sexual activity should not resume until all sex partners have been examined and, if necessary, treated.

FOR MORE INFORMATION:

Division of STD Prevention (DSTDSP)
Centers for Disease Control and Prevention
http://www.cdc.gov/std/

CDC-INFO Contact Center
1-800-232-4636
Email: cdcinfo@cdc.gov

American Social Health Association (ASHA)
1-800-793-9877
www.ashastd.org

CONTENT UPDATED: DECEMBER, 2007
Chlamydia Fact Sheet

Chlamydia (cla-MID-e-ah) is a Sexually Transmitted Disease (STD) caused by a type of bacteria called Chlamydia trachomatis. Chlamydia can infect men, women, and newborns. Chlamydia is the most common bacterial STD in the United States.

Q: How is chlamydia spread?
A: Chlamydia passes from one person to another during vaginal and anal sex. It also passes to the throat through oral sex (penis in mouth) — or from the throat to the penis. A pregnant woman can pass chlamydia to her baby during birth, causing serious eye infections and pneumonia (a serious lung infection).

Q: What are the signs and symptoms of chlamydia?
A: Most WOMEN with chlamydia have NO SYMPTOMS!
If you do have symptoms, they could include:
• Fluid from the vagina that smells, looks, or feels different;
• Bleeding from the vagina or the anus that is not normal;
• Pain with urination;
• Lower stomach pain, especially when having sex.

Most MEN with chlamydia have NO SYMPTOMS!
If you do have symptoms, they could include:
• Fluid from the head of the penis or the anus that is not normal;
• Pain or itching on the head of the penis;
• Pain with urination.

EVEN WITHOUT SYMPTOMS, A PERSON WITH CHLAMYDIA CAN GIVE CHLAMYDIA TO A SEX PARTNER(S).

Q: Is chlamydia serious?
A: Yes! Even without symptoms, chlamydia can cause serious health problems.
Women who have chlamydia can get pelvic inflammatory disease (PID), a very bad infection in the lower abdomen. PID happens when the bacteria move up into the womb, female organs, and surrounding areas. PID can cause scars and other damage that make women infertile (unable to have children). PID can also make women more likely to have a “tubal pregnancy”, which can cause death.
Men can sometimes develop an infection of the testicles that causes pain and swelling.
Newborns can develop serious eye and lung infections.

PLUS, A PERSON WITH CHLAMYDIA HAS A GREATER CHANCE OF GIVING OR GETTING HIV.
Q: How is chlamydia treated?  
A:  
• Your health care provider will give you medicine to cure chlamydia infection.  
  • If you have chlamydia, your partner(s) must be treated, even if they have no symptoms.  
  • If they are not treated, they can give the infection back to you, or infect others.  
  • It is important to get tested again for chlamydia about 3 months after your treatment.  
  • If you are pregnant or think you may be pregnant, be sure to tell your doctor or nurse.

Q: How can I avoid getting chlamydia?  
A:  
✓ Abstinence (not having sex) is the only sure way to avoid infection.  
✓ Plan Ahead: Think about protecting yourself. Talk with your sex partner(s) about STDs and the need  
  to protect yourself. Then, you can choose not to have sex (abstinence), or decide to:  
✓ Use a male condom with each sex partner.  
✓ Use a female condom when a male condom cannot be used.

HIV IS ALSO A STD!  
When you catch chlamydia, you could also be getting HIV.  
Birth control pills or a birth control shot cannot protect you against chlamydia or other STDs.  

c USING LATEX CONDOMS CORRECTLY EVERY TIME YOU HAVE SEX CAN REDUCE THE CHANCE FOR  
TRANSMISSION OF CHLAMYDIA, HIV, AND OTHER STDs.

Q: Where can I get more information about STDs and referrals for STD testing?  
A:  
• Phone: Talk to a trained operator who can answer your questions and provide information about  
  STD testing. In English and Español 24 hours/day, 7 days/week: Toll-free: 1-800-CDC-INFO  
  (1-800-232-4636); TTY for the Deaf and Hard of Hearing: 1-888-232-6348  
• Internet: Centers for Disease Control and Prevention:  http://www.cdc.gov/std/  
  http://www.cdc.gov/std/healthcomm/fact_sheets.htm  

  Talk to your own health care provider, or call your county health department by looking for the  
  telephone number in the phone book (white pages) under county government. Ask to speak to  
  someone in the STD clinic or STD program for more information about chlamydia.