Genital tract chlamydia infection

The right clinical information, right where it's needed
# Table of Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Summary</strong></td>
<td>3</td>
</tr>
<tr>
<td><strong>Basics</strong></td>
<td>4</td>
</tr>
<tr>
<td>Definition</td>
<td>4</td>
</tr>
<tr>
<td>Epidemiology</td>
<td>4</td>
</tr>
<tr>
<td>Aetiology</td>
<td>4</td>
</tr>
<tr>
<td>Pathophysiology</td>
<td>4</td>
</tr>
<tr>
<td>Classification</td>
<td>5</td>
</tr>
<tr>
<td><strong>Prevention</strong></td>
<td>6</td>
</tr>
<tr>
<td>Primary prevention</td>
<td>6</td>
</tr>
<tr>
<td>Screening</td>
<td>6</td>
</tr>
<tr>
<td>Secondary prevention</td>
<td>6</td>
</tr>
<tr>
<td><strong>Diagnosis</strong></td>
<td>8</td>
</tr>
<tr>
<td>Case history</td>
<td>8</td>
</tr>
<tr>
<td>Step-by-step diagnostic approach</td>
<td>8</td>
</tr>
<tr>
<td>Risk factors</td>
<td>10</td>
</tr>
<tr>
<td>History &amp; examination factors</td>
<td>10</td>
</tr>
<tr>
<td>Diagnostic tests</td>
<td>12</td>
</tr>
<tr>
<td>Differential diagnosis</td>
<td>13</td>
</tr>
<tr>
<td><strong>Treatment</strong></td>
<td>15</td>
</tr>
<tr>
<td>Step-by-step treatment approach</td>
<td>15</td>
</tr>
<tr>
<td>Treatment details overview</td>
<td>15</td>
</tr>
<tr>
<td>Treatment options</td>
<td>16</td>
</tr>
<tr>
<td><strong>Follow up</strong></td>
<td>18</td>
</tr>
<tr>
<td>Recommendations</td>
<td>18</td>
</tr>
<tr>
<td>Complications</td>
<td>18</td>
</tr>
<tr>
<td>Prognosis</td>
<td>19</td>
</tr>
<tr>
<td><strong>Guidelines</strong></td>
<td>20</td>
</tr>
<tr>
<td>Diagnostic guidelines</td>
<td>20</td>
</tr>
<tr>
<td>Treatment guidelines</td>
<td>21</td>
</tr>
<tr>
<td><strong>Online resources</strong></td>
<td>23</td>
</tr>
<tr>
<td><strong>References</strong></td>
<td>24</td>
</tr>
<tr>
<td><strong>Disclaimer</strong></td>
<td>27</td>
</tr>
<tr>
<td>Summary</td>
<td></td>
</tr>
<tr>
<td>---------</td>
<td></td>
</tr>
<tr>
<td>◊ Genital tract chlamydia infections are one of the most frequently reported sexually transmitted infections.</td>
<td></td>
</tr>
<tr>
<td>◊ Many infected individuals are asymptomatic.</td>
<td></td>
</tr>
<tr>
<td>◊ In women, there may be cervical inflammation or yellow, cloudy discharge from the cervical os.</td>
<td></td>
</tr>
<tr>
<td>◊ In men, there may be a discharge from the penis.</td>
<td></td>
</tr>
<tr>
<td>◊ Non-culture techniques such as the nucleic acid amplification test are available. Tests in men are performed on urine or urethral samples. Tests in women are performed on urine, cervical, or self-collected vaginal samples.</td>
<td></td>
</tr>
<tr>
<td>◊ Untreated or inadequately treated patients risk possible ascending infection and further complications. Patients also risk spreading the infection to sexual partners.</td>
<td></td>
</tr>
</tbody>
</table>
**Definition**

Urogenital chlamydia infection is a common sexually transmitted infection (STI; also known as sexually transmitted disease, STD) worldwide. The causative organism is *Chlamydia trachomatis*. Infection is usually asymptomatic in both men and women.[1]

In women, chlamydia infection tends to occur in the endocervical canal. Some women who have uncomplicated cervical chlamydia infection already have subclinical upper reproductive tract infections upon diagnosis. Symptoms may include intermenstrual or postcoital bleeding; an odourless, mucoid vaginal discharge; pelvic pain; or dysuria. In men, chlamydia infection can occur in the urethra, causing a penile discharge.

Untreated or inadequately treated chlamydia infections can lead to more serious problems such as pelvic inflammatory disease (PID), ectopic pregnancy, and infertility in women, and epididymitis and prostatitis in men.

**Epidemiology**

Genital chlamydia is the most common bacterial STI in resource-rich countries.[3] [4] [5] A total of 203,116 chlamydia diagnoses were made in England in 2017, where it accounts for 48% of all new STI diagnoses.[6]

In 2017, there were 1,708,569 chlamydial infections reported to the US Centers for Disease Control and Prevention.[4] This is a rate of 528.8 cases per 100,000 population, which represents a 6.9% increase compared with 2016. Most reported infections occur among 15- to 24-year-olds.[4]

**Aetiology**

Infections are caused by the bacterium *Chlamydia trachomatis*, the most commonly reported sexually transmitted infection.[3] It is almost always transmitted by sexual contact. The bacterium may cause symptoms, but in most people the infection is asymptomatic.[1]

**Pathophysiology**

*Chlamydia trachomatis* is a small gram-negative bacterium that lives as an obligate intracellular parasite.[7] It has two life-cycle phases. During the first phase, the organism enters the cell and forms large inclusion bodies called elementary bodies. The elementary bodies re-organise into smaller, reticulate bodies. The reticulate bodies replicate and mature back into elementary bodies. Once the maturation is complete, the cell ruptures within 2 to 3 days. The freed bacteria then penetrate other cells to continue the replication process.[8] Due to this unique life-cycle, the organism cannot be cultured on artificial media.[9]

After exposure to *C trachomatis*, the incubation period is usually 7 to 21 days. Infection in the urogenital tract leads to urethral inflammation in men or cervical inflammation in women. In some cases, the infection can migrate up into the reproductive tract in women and cause an infection in the pelvis, pelvic inflammatory disease (PID), or peri-hepatitis (Fitzhugh-Curtis' syndrome). In men, ascension of the infection can lead to epididymitis or prostatitis.[2]
Classification

Serotypes L1, L2, L3

Lymphogranuloma venereum (LGV): more invasive serotype causing genital ulcer and/or inguinal lymphadenopathy, or proctitis with rectal infection.

Serotypes A, B, Ba, C

Ocular trachoma.

Serotypes B, Ba, D through to K

Oculogenital disease in adults and children, infant pneumonia.
Primary prevention

High-risk patients should be counselled on safer sex behaviours such as the use of condoms. In the UK, the National Chlamydia Screening Programme seeks to increase awareness of chlamydial disease among sexually active men and women under 25 years of age. It also provides access to screening and treatment services to prevent onward transmission of infection.

The US Centers for Disease Control and Prevention recommends collecting information on any person who has had sexual contact with a diagnosed patient within the previous 60 days.[3] Counselling should be given about avoiding unprotected sex, and the risk of re-infection with chlamydia and other STIs. Screening for common co-infections such as Neisseria gonorrhoeae should be routinely performed. Counselling and testing for HIV infection should also generally be done.[3]

UK national guidelines recommend identifying sexual partners at risk of infection in the 6-month period prior to diagnosis of the index case.[2] In males with urethral symptoms, the recommended look back period is 6 months.[2]

Screening

The US Preventive Services Task Force (USPSTF) concludes that the current evidence is insufficient to assess the balance of benefits and harms of screening for chlamydial infection for men.

The USPSTF and American Academy of Family Physicians recommend annual screening of:[22] [23]

- women aged 24 years and younger when they become sexually active
- older women who are at increased risk of infection.

In addition, the US Centers for Disease Control and Prevention (CDC) recommends screening pregnant women at the first antenatal visit and in the third trimester if:[13]

- they are under the age of 25 years
- they are are older and at increased risk of infection (such as women with a new or multiple sex partners).

The UK National Institute for Health and Care Excellence (NICE) does not recommend screening for chlamydia as part of routine antenatal care.[24]

Secondary prevention

Chlamydia infection re-testing should take place 3 to 4 months after treatment to identify those who have been re-infected. Testing for a cure is not recommended except during pregnancy. In pregnant women, re-test at 3-4 weeks after treatment, and again within 3 months.[3]

All sexual contacts within the past 60 days should be advised to seek investigation and treatment for chlamydia. At the very least, the index case should notify sexual contacts that they may have been exposed to chlamydia. In some US states the law permits expedited partner therapy (EPT), which is the practice of treating the sex partners of persons with sexually transmitted infections (STIs) without an intervening medical evaluation or professional prevention counselling.[27] This may be considered as an option to facilitate partner management among heterosexual men and women with chlamydia infection. The American College of Obstetricians and Gynecologists has issued a statement supporting EPT in the management of chlamydial and gonorrhoea infections when the partner is unlikely or unable to otherwise receive in-person evaluation and appropriate treatment.[28]
UK national guidelines recommend identifying sexual partners at risk of infection in the 6-month period prior to diagnosis of the index case.[2] In males with urethral symptoms, the recommended look back period is 6 months.[2]
Case history

Case history #1

A 22-year-old woman presents with postcoital bleeding, but denies any other symptoms. She is currently in a monogamous relationship with a male sexual partner. She is concerned that her partner may have had other sexual contacts. She currently uses oral contraception and does not use condoms. Her last sexual contact with her boyfriend was 8 days ago. On examination, her external genitalia are normal. Speculum examination reveals a mucopurulent discharge from the cervical os. The cervix is friable when scraped with a Dacron swab. Manual pelvic examination reveals no cervical motion tenderness. She has no other abnormalities on physical examination.

Case history #2

A 19-year-old man presents with dysuria. He denies any penile discharge. He does not use condoms and had recent unprotected vaginal intercourse with a new female sexual partner about 7 days ago. He denies any prior sexually transmitted infections. On examination, there is no apparent discharge on initial inspection. There is a slight whitish discharge after applying pressure along the penile shaft. No other physical abnormalities are noted.

Other presentations

Although uncommon, women may present with an odourless vaginal discharge. In addition, infection in women can ascend to the upper urogenital tract and cause fever, chills, myalgias, nausea, vomiting, and pelvic or abdominal pain. In rare cases it can cause fever and right upper quadrant abdominal pain secondary to a peri-capsular hepatic infection.

Men can also have ascending infection that causes epididymitis or prostatitis,[2] which can lead to unilateral pain in the testicle. Physical findings may include scrotal erythema and tenderness or swelling over the epididymis.

In men who have sex with men and in women who practise receptive anal intercourse, rectal infection is possible; it is usually asymptomatic except when the infection occurs with the lymphogranuloma venereum (LGV) serotypes, which can cause symptoms of proctitis and proctocolitis.

Chlamydia infections can also cause a reactive arthritis in adults. Neonates born to mothers with urogenital chlamydia can develop infections including conjunctivitis (ocular trachoma) and pneumonia.

Step-by-step diagnostic approach

Because approximately 85% of women and men are asymptomatic,[11] a high index of suspicion is warranted based on patient history and presence of risk factors.

Typical risk factors include an age under 25 years, sexual activity with an infected partner, a new sex partner or multiple sex partners, a sex partner with other concurrent sex partners, history of a prior STI, and not using condoms.
Diagnosis and treatment is relatively straightforward once clinical suspicion is present.[11] [12]

**Signs and symptoms**

Women may experience postcoital or intermenstrual bleeding, an odourless vaginal discharge, dysuria, or pelvic pain. The infection can ascend to the upper urogenital tract and cause fever, chills, myalgias, nausea, vomiting, and pelvic or abdominal pain. In rare cases it can cause fever and right upper quadrant abdominal pain secondary to a pericapsular hepatic infection. Examination of the cervical os may reveal a cloudy or yellow discharge. The cervix may bleed easily when rubbed with a Dacron swab.

Men may have dysuria and a clear-to-whitish urethral discharge. There may be a visible penile discharge on physical examination. If there is no visible discharge, pressure along the penile shaft may extract fluid from the base to the tip. Mild to severe scrotal pain may occur in ascending infections that cause epididymitis or prostatitis.[2] For severe infections, symptoms include fever, nausea, and vomiting. The scrotal area is tender to touch and feels warm.

Symptoms and signs of rectal infection are rare, but when present may include mucopurulent rectal discharge or tenesmus.

**Diagnostic tests**

Nucleic acid amplification tests (NAATs) are currently recommended.[3] The sensitivity for NAAT is >90% and the specificity is 94% to 99.5%. [13] Positive NAAT results indicate that *Chlamydia trachomatis* is present and should be treated. False-positive NAAT results due to residual non-viable DNA can occur for up to 3 weeks after successful treatment.[3] A negative test performed when clinical suspicion for infection is high should be repeated, as there is a possibility of false-negative results. Once an infection has been diagnosed, rigorous contact tracing is necessary to identify asymptomatic carriers.

NAATs can be done on self-collected (first-pass urine sample or vaginal swab) or clinician-collected samples (vaginal, endocervical, or urethral swab).

Rectal and oropharyngeal *C. trachomatis* infection can be diagnosed by testing at the anatomic site of exposure. In the US, NAATs are not cleared by the Food and Drug Administration for use with rectal or oropharyngeal swab specimens. However, some laboratories have met Clinical Laboratory Improvement Amendments (CLIA) of the Centers for Disease Control and Prevention requirements for NAATs testing validation and can perform these tests.[13] There is also good evidence that performance of NAATs on patient self-collected rectal swabs is comparable to clinician-collected rectal swabs, and patients find this self-collection method for chlamydial screening highly acceptable.[14] [15]

If NAAT is not available, nucleic acid hybridisation and transformation tests, enzyme immunoassays and direct fluorescent antibodies tests should be used.

Testing can be done by cell culture (e.g., cultivation in McCoy cell culture) but it is expensive, difficult to perform, and requires special techniques.[13] Specificity is close to 100% but sensitivity is 70% to 90% depending on the laboratory and collection technique.[13] Due to variability and expense, this test should only be used in cases where legal issues are involved.

The CDC recommends empiric antibiotics for immediate treatment if there is a high index of suspicion for infection.
Risk factors

**Strong**

**age under 25 years, sexually active**
- The risk of infection is greatest in sexually active adolescents and young adults aged less than 25 years.[3] [4]

**new sex partner or multiple sex partners**
- Risk is particularly high if a person has recently changed his or her sexual partner, has multiple sex partners, or has a sex partner with other concurrent sex partners.[3]

**sexual activity with infected partner**
- Risk is particularly high if there is a history of sexual activity with a person who has a chlamydia infection.

**condoms not used**
- Risk for STIs is increased if condoms are not used.

**history of prior STI**
- People with prior STIs should be routinely assessed for re-exposure.[3]

**Weak**

**ethnicity**
- Black people are at higher risk than white people, who are at higher risk than Asian people.[4] [10]

**urban residence and low socio-economic status**
- Urban residence and low socio-economic status increase the risk.[10]

History & examination factors

**Key diagnostic factors**

**presence of risk factors (common)**
- Typical risk factors include age under 25 years, sexual activity with an infected partner, a new sex partner or multiple sex partners, a sex partner with other concurrent sex partners, history of a prior STI, and not using condoms.

**asymptomatic (common)**
- Approximately 85% of women and men are asymptomatic.[11]

**Other diagnostic factors**

**cervical discharge (common)**
- Examination of the cervical os may reveal a cloudy or yellow discharge.

**friable cervix (common)**
• Cervix bleeds easily with friction from a Dacron swab.

**abnormal vaginal bleeding (common)**

• Women may experience postcoital or intermenstrual bleeding.

**penile discharge (common)**

• Mucoid or mucopurulent discharge from the urethral opening. Discharge may appear after applying pressure along the penile shaft.

**vaginal discharge (common)**

• Odourless mucoid discharge may be present.

**dysuria (uncommon)**

• Painful urination may be present in either sex but is more common in men.

**pelvic pain (uncommon)**

• Can occur in women if infection ascends to the upper urogenital tract or as a result of early pelvic inflammatory disease (PID).

**fever/chills (uncommon)**

• Can occur in women if infection ascends to the upper urogenital tract, or rarely secondary to a pericapsular hepatic infection.
• Can occur in men in severe infections.

**nausea/vomiting (uncommon)**

• Can occur in women if the infection ascends to the upper urogenital tract.
• Can occur in men in severe infections.

**scrotal pain (uncommon)**

• Mild to severe scrotal pain may occur in ascending infections that cause epididymitis or prostatitis.[2]
• In severe infections, the scrotal area may be tender to touch and feel warm.

**myalgias (uncommon)**

• Can occur in women if the infection ascends to the upper urogenital tract.

**abdominal pain (uncommon)**

• Can occur in women if the infection ascends to the upper urogenital tract. Rarely, right upper quadrant abdominal pain occurs secondary to a pericapsular hepatic infection.

**mucopurulent rectal discharge or tenesmus (uncommon)**

• Symptoms and signs of rectal infection are rare, but when present may include mucopurulent rectal discharge or tenesmus.
## Diagnostic tests

### 1st test to order

<table>
<thead>
<tr>
<th>Test</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>nucleic acid amplification test (NAAT)</td>
<td>positive</td>
</tr>
<tr>
<td>- Non-invasive sampling (urine or vaginal) is as effective as invasive sampling (vaginal, endocervical, or penile urethral swab) and is more acceptable to patients.\cite{16}</td>
<td></td>
</tr>
<tr>
<td>- Rectal and oropharyngeal <em>Chlamydia trachomatis</em> infection can be diagnosed by testing at the anatomic site of exposure. In the US, NAATs are not cleared by the Food and Drug Administration for use with rectal or oropharyngeal swab specimens. However, some laboratories have met Clinical Laboratory Improvement Amendments (CLIA) of the Centers for Disease Control and Prevention requirements for NAATs testing validation and can perform these tests.\cite{13} There is also good evidence that performance of NAATs on patient self-collected rectal swabs is comparable to clinician-collected rectal swabs, and patients find this self-collection method for chlamydial screening highly acceptable.\cite{14} \cite{15}</td>
<td></td>
</tr>
<tr>
<td>- Sensitivity is high (&gt;90%), as is specificity (94% to 99.5%). NAAT can detect as little as a single strand of DNA to produce a positive result. Chlamydia organisms do not need to be viable in order to obtain a positive result.\cite{13}</td>
<td></td>
</tr>
<tr>
<td>- If NAAT is negative, but clinical suspicion is high, treat the patient empirically.</td>
<td></td>
</tr>
<tr>
<td>- There is increasing use of near patient rapid NAATs that can provide results within 90 minutes.\cite{17}</td>
<td></td>
</tr>
</tbody>
</table>

### Other tests to consider

<table>
<thead>
<tr>
<th>Test</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>direct immunofluorescence</td>
<td>positive</td>
</tr>
<tr>
<td>- Requires an invasive sample (vaginal, endocervical, or penile urethral swab) and is highly specific but less sensitive than NAAT.\cite{18}</td>
<td></td>
</tr>
<tr>
<td>enzyme immunoassay</td>
<td>positive</td>
</tr>
<tr>
<td>- Requires an invasive sample (vaginal, endocervical, or penile urethral swab) and has a sensitivity of about 50% of that of NAAT. The specificity is operator-dependent.\cite{18}</td>
<td></td>
</tr>
<tr>
<td>nucleic acid hybridisation tests</td>
<td>positive</td>
</tr>
<tr>
<td>- Requires invasive sample (vaginal, endocervical, or penile urethral swab).</td>
<td></td>
</tr>
<tr>
<td>cell culture</td>
<td>positive</td>
</tr>
<tr>
<td>- Requires an invasive sample (vaginal, endocervical, or penile urethral swab). High specificity (close to 100%). Sensitivity varies depending on laboratories (70% to 90%).\cite{13} Due to variability and expense, this test is usually only used in cases where legal issues are involved.</td>
<td></td>
</tr>
</tbody>
</table>
Emerging tests

<table>
<thead>
<tr>
<th>Test</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>rapid and point-of-care tests</td>
<td>positive</td>
</tr>
<tr>
<td>• Allow diagnosis and treatment decisions to be made at initial presentation.</td>
<td></td>
</tr>
<tr>
<td>• Currently available tests have low accuracy or are expensive to carry out, but there are many point-of-care tests being developed, such as rapid molecular testing for chlamydia, with some evidence that they can improve diagnosis and reduce unnecessary treatment.[19] [20] [21]</td>
<td></td>
</tr>
</tbody>
</table>

Differential diagnosis

<table>
<thead>
<tr>
<th>Condition</th>
<th>Differentiating signs / symptoms</th>
<th>Differentiating tests</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gonorrhoea infection</td>
<td>• Signs and symptoms of cervical or male urethral discharge are generally more pronounced with gonorrhoea.</td>
<td>• Nucleic acid amplification test (NAAT) for gonorrhoea alone is positive. May see gram-negative intracellular diplococci on Gram stain of infected specimens.</td>
</tr>
<tr>
<td>Bacterial vaginosis</td>
<td>• Vaginal discharge tends to be thin and have a fishy odour.</td>
<td>• Clue cells will be present on microscopic examination.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Vaginal pH &gt;4.5.</td>
</tr>
<tr>
<td>Vaginal candidiasis</td>
<td>• Vaginal discharge may be thick and white in the vaginal vault. External genital symptoms such as itching and burning are more likely.</td>
<td>• Hyphae or budding yeast present on microscopic examination of KOH (potassium hydroxide) preparation of vaginal secretions.</td>
</tr>
<tr>
<td>Trichomonas vaginitis</td>
<td>• Men tend to be asymptomatic but can be carriers. Women classically have a thin, greyish, frothy vaginal discharge in the vaginal vault. Discharge tends to be worse straight after menses. The cervix, rarely, may be inflamed and have a strawberry appearance.</td>
<td>• Mobile trichomonads present on microscopic examination in many cases.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Nucleic acid amplification tests (NAATs) are now available.</td>
</tr>
<tr>
<td>Mycoplasma infection</td>
<td>• Caused by the organism Mycoplasma genitalium. Frequently asymptomatic; however, can cause cervicitis and PID in women, and urethritis in men.</td>
<td>• Nucleic acid amplification test (NAAT) test for M genitalium is available but is not yet in widespread use.</td>
</tr>
<tr>
<td>Condition</td>
<td>Differentiating signs / symptoms</td>
<td>Differentiating tests</td>
</tr>
<tr>
<td>-----------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Pelvic inflammatory disease (PID)</td>
<td>• A wide range of bacterial infections, including chlamydia, can ascend the female reproductive tract, causing pelvic or abdominal pain, fevers, nausea/vomiting, dyspareunia, and intermenstrual bleeding. Diagnostic criteria for PID include cervical motion tenderness and/or adnexal tenderness. The diagnosis is presumed when chlamydial infection and cervical motion tenderness coexist.</td>
<td>• There are no differentiating tests. PID is a clinical diagnosis.</td>
</tr>
<tr>
<td>Persistent or refractory urethritis in men</td>
<td>• Patients with persistent urethritis symptoms who did not comply with the treatment regimen or who were re-exposed to an untreated sex partner can be retreated with the initial antibiotic regimen. True treatment failures after treatment for genital tract chlamydia are rare. Re-infection is more likely. The most common cause of recurrent or persistent urethritis is <em>Mycoplasma genitalium</em>, especially following treatment with doxycycline. Less common causes include <em>Ureaplasma urealyticum</em> and <em>Trichomonas vaginalis</em>.</td>
<td>• Nucleic acid amplification test (NAAT) for <em>M genitalium</em> is available but is not yet in widespread use. Polymerase chain reaction (PCR) can be used to detect <em>U urealyticum</em> DNA from a urine sample or a vaginal swab. In the US, some laboratories have performed the necessary Clinical Laboratory Improvement Amendments (CLIA) of the Centers for Disease Control and Prevention validations and can perform nucleic acid amplification tests (NAATs) for <em>T vaginalis</em> detection.</td>
</tr>
</tbody>
</table>
Step-by-step treatment approach

The main treatment goal is to eradicate the infection and follow up on sexual contacts. Delaying treatment may increase the risk of subsequent infertility.

Recommended treatment

Azithromycin or doxycycline are recommended first-line antibiotics.[3] Alternative antibiotics are erythromycin, ofloxacin, levofloxacin, or a delayed-release formulation of doxycycline.[3] [25] Azithromycin is safe during pregnancy and may reduce the risk of premature delivery, but doxycycline and fluoroquinolones should be avoided in pregnant women. Alternatives during pregnancy include amoxicillin or erythromycin.[3] A Cochrane review of interventions for treating genital chlamydia infection in pregnancy concluded no difference in efficacy or pregnancy complications when comparing antibacterial agents (amoxicillin, erythromycin, clindamycin, azithromycin); however, azithromycin and clindamycin appear to have fewer side effects than erythromycin.[26]

If the risk for chlamydia infection is high, treatment should be started empirically before test results are known. Patients are advised to avoid sexual contact for 7 days after the treatment has started.

All sexual contacts within the past 60 days should be advised to seek investigation and treatment for chlamydia. At the very least, the index case should notify sexual contacts that they may have been exposed to chlamydia. In some US states the law permits expedited partner therapy (EPT), which is the practice of treating the sex partners of persons with sexually transmitted infections (STIs) without an intervening medical evaluation or professional prevention counselling.[27] [CDC: expedited partner therapy] This may be considered as an option to facilitate partner management among heterosexual men and women with chlamydia infection. The American College of Obstetricians and Gynecologists has issued a statement supporting EPT in the management of chlamydial and gonorrhoea infections when the partner is unlikely or unable to otherwise receive in-person evaluation and appropriate treatment.[28]

Treatment details overview

Please note that formulations/routes and doses may differ between drug names and brands, drug formularies, or locations. Treatment recommendations are specific to patient groups: see disclaimer

<table>
<thead>
<tr>
<th>Acute</th>
<th>(summary)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>confirmed or suspected</strong></td>
<td></td>
</tr>
<tr>
<td>men and non-pregnant women</td>
<td>1st antichlamydial antibiotics</td>
</tr>
<tr>
<td>pregnant women</td>
<td>1st alternative antichlamydial antibiotics</td>
</tr>
</tbody>
</table>
### Treatment options

Please note that formulations/routes and doses may differ between drug names and brands, drug formularies, or locations. Treatment recommendations are specific to patient groups: [see disclaimer](#).

#### Acute

<table>
<thead>
<tr>
<th>confirmed or suspected</th>
<th>1st antichlamydial antibiotics</th>
<th>Primary options</th>
</tr>
</thead>
<tbody>
<tr>
<td>men and non-pregnant women</td>
<td></td>
<td>» azithromycin: 1 g orally as a single dose</td>
</tr>
<tr>
<td></td>
<td>OR</td>
<td>» doxycycline: 100 mg orally (immediate-release) twice daily for 7 days</td>
</tr>
<tr>
<td></td>
<td>Secondary options</td>
<td>» erythromycin base: 500 mg orally four times daily for 7 days</td>
</tr>
<tr>
<td></td>
<td>OR</td>
<td>» ofloxacin: 300 mg orally twice daily for 7 days</td>
</tr>
<tr>
<td></td>
<td>OR</td>
<td>» levofloxacin: 500 mg orally once daily for 7 days</td>
</tr>
<tr>
<td></td>
<td>OR</td>
<td>» doxycycline: 200 mg orally (delayed-release) once daily for 7 days</td>
</tr>
</tbody>
</table>

- Treatment is generally started after test results are known. However, if clinical suspicion is high, treatment should commence empirically before the test results are known.
- Recommended first-line antibiotics provide an excellent cure rate.[29] Treatment benefits include a decrease in the incidence of pelvic inflammatory disease (PID) and reduction in the risk for infertility in women. There is a reduction in the incidence of epididymitis or prostatitis in men.
- All sexual contacts within the past 60 days should be advised to seek investigation and treatment for chlamydia. The management of the patient’s sex partners is an important
### Treatment

<table>
<thead>
<tr>
<th>Acute</th>
<th>1st alternative antichlamydial antibiotics</th>
</tr>
</thead>
<tbody>
<tr>
<td>pregnant women</td>
<td>Primary options</td>
</tr>
<tr>
<td></td>
<td>azithromycin: 1 g orally as a single dose</td>
</tr>
<tr>
<td></td>
<td>Secondary options</td>
</tr>
<tr>
<td></td>
<td>amoxicillin: 500 mg orally three times daily for 7 days</td>
</tr>
<tr>
<td></td>
<td>OR</td>
</tr>
<tr>
<td></td>
<td>erythromycin base: 500 mg orally four times daily for 7 days</td>
</tr>
</tbody>
</table>

- Treatment is generally started after test results are known. However, if clinical suspicion is high, treatment should commence empirically before test results are known.
- All sexual contacts within the past 60 days should be advised to seek investigation and treatment for chlamydia. The management of the patient’s sex partners is an important consideration to prevent re-infection and further transmission.
**Recommendations**

**Monitoring**
Because of the risk of re-infection, men and women should be re-tested 3 to 4 months after the initiation of antibiotics.

Pregnant women found to have a chlamydial infection should be re-tested 3-4 weeks after treatment, and again within 3 months.[3]

**Patient instructions**
Abstinence from sexual activity is recommended for 7 days after single dose antibiotics or until completion of a 7-day course of antibiotics.[3] A patient unwilling to comply with abstinence should be encouraged to use condoms during the 7-day period. Treating the partner with what is commonly known as a ‘partner pack’ has been shown to reduce recurrence rates of the infection. [CDC: expedited partner therapy] [3] All sexual contacts within the past 60 days should be tested.[3] Chlamydia is a reportable disease in the US.

**Complications**

<table>
<thead>
<tr>
<th>Complications</th>
<th>Timeframe</th>
<th>Likelihood</th>
</tr>
</thead>
<tbody>
<tr>
<td>epididymitis</td>
<td>short term</td>
<td>low</td>
</tr>
<tr>
<td>More common in men aged 35 years and younger but still low likelihood. The infection ascends through the cord structures.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>reactive arthritis</td>
<td>short term</td>
<td>low</td>
</tr>
<tr>
<td>About 3% to 8% of infected patients will develop reactive arthritis.[31] [32] [33]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ophthalmia neonatorum</td>
<td>short term</td>
<td>low</td>
</tr>
<tr>
<td>Newborns may contract conjunctivitis from infected mother during delivery. There is conflicting data on the efficacy of neonatal eye prophylaxis.[34]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>chlamydia pneumonia</td>
<td>short term</td>
<td>low</td>
</tr>
<tr>
<td>Newborns may contract pneumonia from their infected mother during delivery.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ectopic pregnancy</td>
<td>long term</td>
<td>medium</td>
</tr>
<tr>
<td>A single infection increases the risk for ectopic pregnancy.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>infertility</td>
<td>long term</td>
<td>low</td>
</tr>
<tr>
<td>Infection is associated with an increased risk of tubal factor infertility.[3] [30]</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
There is evidence to suggest that Chlamydia trachomatis infections increase the risk of cervical cancer. The risk is increased in those patients with associated human papillomavirus infections.[35]

The risk of PID is low if the infection is treated appropriately, but rises if left untreated.

### Prognosis

Nearly all patients are cured with the current recommended antibiotic therapy.[29] Potential complications in women for untreated or inadequately treated infections include pelvic inflammatory disease and infertility. Men can develop prostatitis, epididymitis, and urethral strictures if not treated. Occasionally, a reactive arthritis may occur.

---

<table>
<thead>
<tr>
<th>Complications</th>
<th>Timeframe</th>
<th>Likelihood</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cervical cancer</td>
<td>long term</td>
<td>low</td>
</tr>
<tr>
<td>pelvic inflammatory disease (PID)</td>
<td>variable</td>
<td>low</td>
</tr>
</tbody>
</table>

FOLLOW UP

This PDF of the BMJ Best Practice topic is based on the web version that was last updated: Feb 08, 2019. BMJ Best Practice topics are regularly updated and the most recent version of the topics can be found on bestpractice.bmj.com. Use of this content is subject to our disclaimer. © BMJ Publishing Group Ltd 2019. All rights reserved.
# Diagnostic guidelines

## Europe

<table>
<thead>
<tr>
<th>Guideline</th>
<th>Published by</th>
<th>Last published</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>2015 European guideline on the management of Chlamydia trachomatis infections</strong></td>
<td>International Union against Sexually Transmitted Infections</td>
<td>2015</td>
</tr>
<tr>
<td><strong>2015 UK national guideline for the management of infection with Chlamydia trachomatis</strong></td>
<td>British Association for Sexual Health and HIV</td>
<td>2015</td>
</tr>
<tr>
<td><strong>Diagnosis of Chlamydia trachomatis: quick reference guide for general practices</strong></td>
<td>Public Health England</td>
<td>2014</td>
</tr>
<tr>
<td><strong>Management of genital Chlamydia trachomatis infection: a national clinical guideline</strong></td>
<td>Scottish Intercollegiate Guidelines Network</td>
<td>2009</td>
</tr>
</tbody>
</table>

## North America

<table>
<thead>
<tr>
<th>Guideline</th>
<th>Published by</th>
<th>Last published</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sexually transmitted diseases treatment guidelines, 2015</strong></td>
<td>Centers for Disease Control and Prevention</td>
<td>2015</td>
</tr>
<tr>
<td><strong>Chlamydia and gonorrhea: screening</strong></td>
<td>US Preventive Services Task Force</td>
<td>2014</td>
</tr>
<tr>
<td><strong>Recommendations for the laboratory-based detection of Chlamydia trachomatis and Neisseria gonorrhoeae - 2014</strong></td>
<td>Centers for Disease Control and Prevention</td>
<td>2014</td>
</tr>
</tbody>
</table>

## Oceania

<table>
<thead>
<tr>
<th>Guideline</th>
<th>Published by</th>
<th>Last published</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Guidelines for preventive activities in general practice 9th edition: Chapter 6.2 Sexually transmissible infections</strong></td>
<td>Royal Australian College of General Practitioners</td>
<td>2018</td>
</tr>
</tbody>
</table>
# Treatment guidelines

<table>
<thead>
<tr>
<th>Region</th>
<th>Title</th>
<th>Published by</th>
<th>Last published</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Europe</strong></td>
<td><strong>2015 European guideline on the management of Chlamydia trachomatis infections</strong></td>
<td>International Union against Sexually Transmitted Infections</td>
<td>2015</td>
</tr>
<tr>
<td></td>
<td><strong>Sexually transmitted infections in primary care</strong></td>
<td>Royal College of General Practitioners</td>
<td>2013</td>
</tr>
<tr>
<td></td>
<td><strong>Service standards for sexual and reproductive health care</strong></td>
<td>Royal College of Obstetricians and Gynaecologists</td>
<td>2013</td>
</tr>
<tr>
<td></td>
<td><strong>Management of genital Chlamydia trachomatis infection: a national clinical guideline</strong></td>
<td>Scottish Intercollegiate Guidelines Network</td>
<td>2009</td>
</tr>
<tr>
<td></td>
<td><strong>Sexually transmitted infections and under-18 conceptions: prevention</strong></td>
<td>National Institute for Health and Care Excellence</td>
<td>2007</td>
</tr>
<tr>
<td><strong>International</strong></td>
<td><strong>WHO guidelines for the treatment of Chlamydia trachomatis</strong></td>
<td>World Health Organization</td>
<td>2016</td>
</tr>
<tr>
<td><strong>North America</strong></td>
<td><strong>Sexually transmitted diseases treatment guidelines, 2015</strong></td>
<td>Centers for Disease Control and Prevention</td>
<td>2015</td>
</tr>
<tr>
<td></td>
<td><strong>Recommendations for partner services programs for HIV infection, syphilis, gonorrhea and chlamydial infection</strong></td>
<td>Centers for Disease Control and Prevention</td>
<td>2008</td>
</tr>
<tr>
<td></td>
<td><strong>Expedited partner therapy in the management of sexually transmitted diseases</strong></td>
<td>Centers for Disease Control and Prevention</td>
<td>2006</td>
</tr>
</tbody>
</table>
### Oceania

**Guidelines for preventive activities in general practice 9th edition: Chapter 6.2 Sexually transmissible infections**

**Published by:** Royal Australian College of General Practitioners  
**Last published:** 2018
Online resources

1. CDC: expedited partner therapy (external link)
### Key articles


### References


Disclaimer

This content is meant for medical professionals situated outside of the United States and Canada. The BMJ Publishing Group Ltd ("BMJ Group") tries to ensure that the information provided is accurate and up-to-date, but we do not warrant that it is nor do our licensors who supply certain content linked to or otherwise accessible from our content. The BMJ Group does not advocate or endorse the use of any drug or therapy contained within nor does it diagnose patients. Medical professionals should use their own professional judgement in using this information and caring for their patients and the information herein should not be considered a substitute for that.

This information is not intended to cover all possible diagnosis methods, treatments, follow up, drugs and any contraindications or side effects. In addition such standards and practices in medicine change as new data become available, and you should consult a variety of sources. We strongly recommend that users independently verify specified diagnosis, treatments and follow up and ensure it is appropriate for your patient within your region. In addition, with respect to prescription medication, you are advised to check the product information sheet accompanying each drug to verify conditions of use and identify any changes in dosage schedule or contraindications, particularly if the agent to be administered is new, infrequently used, or has a narrow therapeutic range. You must always check that drugs referenced are licensed for the specified use and at the specified doses in your region. This information is provided on an "as is" basis and to the fullest extent permitted by law the BMJ Group and its licensors assume no responsibility for any aspect of healthcare administered with the aid of this information or any other use of this information.

View our full Website Terms and Conditions.

Contact us

+ 44 (0) 207 111 1105
support@bmj.com

BMJ
BMA House
Tavistock Square
London
WC1H 9JR
UK
Contributors:

// Authors:

Anne Rompalo, MD
Professor of Medicine
Johns Hopkins University School of Medicine, Baltimore, MD
DISCLOSURES: AR declares that she has no competing interests.

// Acknowledgements:

Dr Anne Rompalo would like to gratefully acknowledge Dr Christopher K. Fairley, a previous contributor to this topic.
DISCLOSURES: CKF declares that he has no competing interests.

// Peer Reviewers:

Kenneth Lin, MD
Assistant Editor
American Family Physician, Clinical Assistant Professor, GUSOM Medical Officer, US Preventive Services Task Force
DISCLOSURES: KL declares that he has no competing interests.

Lars Jørgen Østergaard, MD, PhD, DMSc
Professor/Head
Department of Infectious Diseases, Aarhus University Hospital, Skejby Sygehus, Aarhus, Denmark
DISCLOSURES: LJO has been funded by Pfizer to write a leaflet on Chlamydia infections.