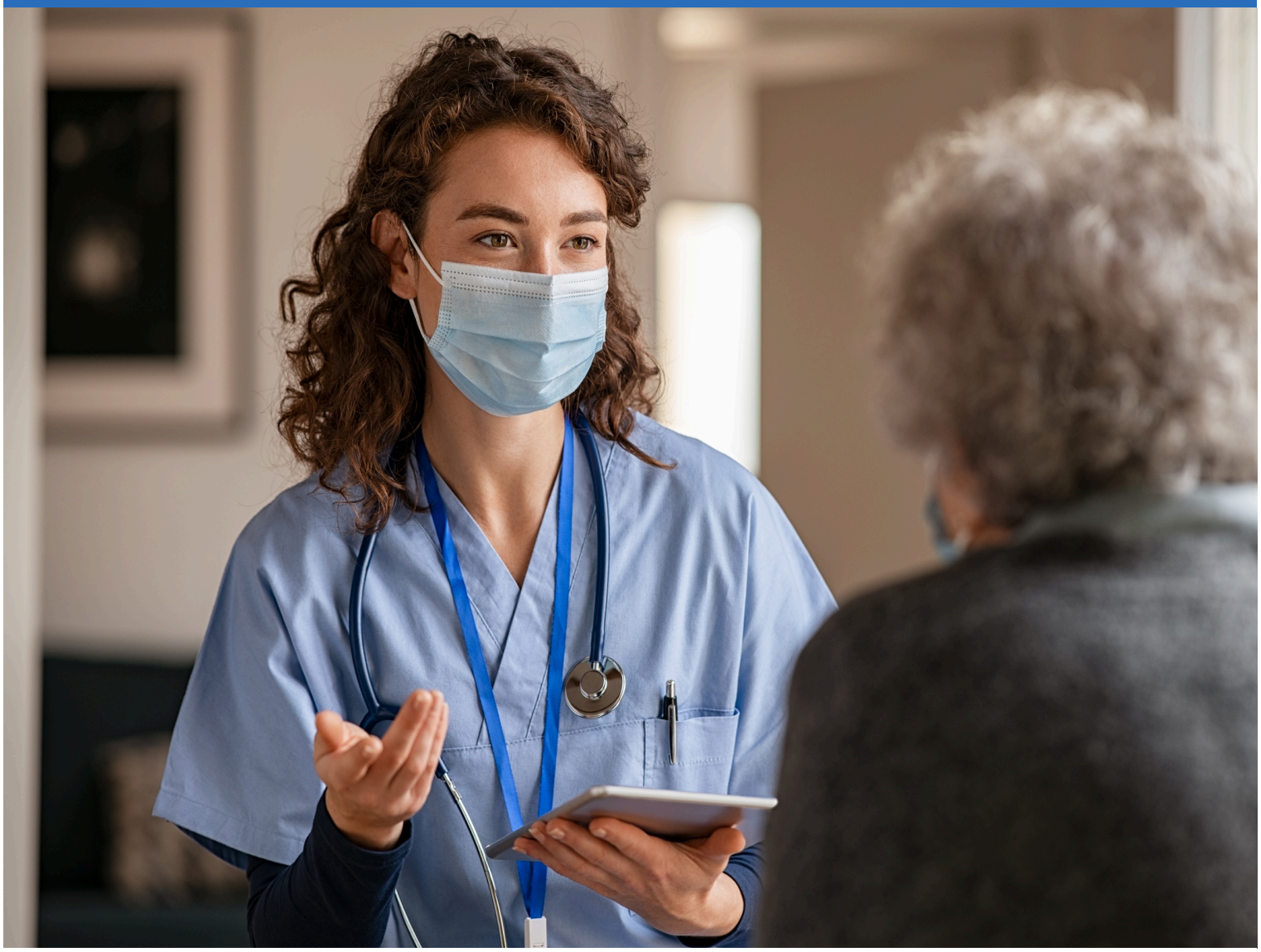
BMJ Best Practice

Genital tract chlamydia infection

Straight to the point of care



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Summary

Genital tract chlamydia infections are one of the most frequently reported sexually transmitted infections.

Many infected individuals are asymptomatic.

In women, there may be cervical inflammation or yellow, cloudy discharge from the cervical os, resulting in vaginal discharge.

In men, there may be a discharge from the penis.

Nonculture techniques such as the nucleic acid amplification test are available and are the preferred diagnostic method. Tests in men are performed on urine or urethral samples. Tests in women are performed on urine, cervical, or vaginal samples (a vaginal swab is the specimen of choice), which are either clinician- or self-collected.

Untreated or inadequately treated patients are at increased risk for ascending infection and further complications. Patients also risk spreading the infection to sexual partners and from mother-to-child during labor and delivery.

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 odorless, mucoid vaginal discharge; pelvic pain; or dysuria. In men, chlamydia infection can occur in the urethra, causing a penile discharge; or dysuria.

Untreated or inadequately treated chlamydia infections can lead to more serious problems such as pelvic inflammatory disease (PID), ectopic pregnancy, and infertility in women, epididymitis and prostatitis in men, and reactive arthritis in all patients. Infants born to women with untreated chlamydia are at risk of neonatal conjunctivitis and pneumonia.

THEORY

Epidemiology

In 2016, there were an estimated 127.2 million incident chlamydia infections worldwide.[3] Genital chlamydia is the most common bacterial STI in resource-rich countries.[2] [4] [5] In the US, in 2022, there were 1,649,716 chlamydial infections reported to the Centers for Disease Control and Prevention. This is a rate of 495.0 cases per 100,000 population, which is similar to the rate of 495.5 cases per 100,000 population in 2021. Between 2021 and 2022, the rates of reported chlamydia increased 1.8% (from 357.4 to 363.7 per 100,000) among men and decreased 1.2% (from 628.8 to 621.2 per 100,000) among women. The overall reduction in the number of reported cases of chlamydia since 2019 (552.8 cases per 100,000 population) reflects a persistent disruption in chlamydia screening coverage because of the COVID-19 pandemic. Most reported infections in the US occur among 15-24 year olds (57.7% in 2022).[4] In 2019, in the UK there were 134,418 diagnoses of chlamydia in this age group, which is equivalent to a detection rate of 2043 cases per 100,000 population.[6]

Etiology

Infections are caused by the bacterium *Chlamydia trachomatis* .[2] [5]

Chlamydia 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 reorganize 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 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 perihepatitis (Fitzhugh-Curtis syndrome). In men, ascension of the infection can lead to epididymitis or prostatitis.[2]

Classification

Serotypes L1, L2, L3

Lymphogranuloma venerum (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 K

Oculogenital disease in adults and children, infant pneumonia.

Case history

Case history #1

A 22-year-old woman presents with postcoital bleeding, but denies any other symptoms. She has been in a monogamous relationship with a male sexual partner for 2 years. She is concerned that her partner may have had other sexual contacts outside of their relationship. She currently uses subdermal, long-acting contraception and does not use condoms. Her last sexual contact with her boyfriend was 8 days ago, she has not had other sexual partners for more than 2 years. 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 polyester 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 oral and 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, from proximal to distal. There is no testicular tenderness, and no other physical abnormalities are noted.

Other presentations

Although uncommon, women may present with an odorless 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 pericapsular hepatic infection.

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

In men and women who practice 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 reactive arthritis in adults. Neonates born to mothers with urogenital chlamydia can develop infections including conjunctivitis and pneumonia.

Approach

Because approximately 85% of women and men are asymptomatic, a high index of suspicion is warranted based on patient history and presence of risk factors.[13]

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 and acted on.[13] [14]

Signs and symptoms

Women may experience postcoital or intermenstrual bleeding, an odorless 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 polyester 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 from proximal to distal may express fluid from the urethra to the tip. Mild to severe scrotal pain may occur in ascending infections that cause epididymitis, orchitis, or prostatitis.[2] For severe infections, symptoms include fever, nausea, and vomiting. The scrotal area is tender to touch and feels warm, and the ipsilateral cremasteric reflex is intact.

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

Reactive arthritis is a rare manifestation of chlamydial infection, typically occurring up to 4 weeks after an infection. It most commonly causes joint pain, stiffness and swelling, but can also be associated with inflammation of the eyes and urethra or skin problems.

Diagnostic tests

Nucleic acid amplification tests (NAATs) are currently recommended.[5] The sensitivity for NAAT is >90% and the specificity is 94% to 99.5%.[15] Positive NAAT results indicate that *Chlamydia trachomatis* is present and should be treated. False-positive NAAT results due to residual nonviable DNA can occur for up to 3 weeks after successful treatment.[5] 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). Do not routinely collect urine samples in women if vaginal swab collection is possible because this provides the optimal specimen for NAATs to detect *C trachomatis* .[2] [5] [16]

Rectal and oropharyngeal *C trachomatis* infection can be diagnosed by testing at the anatomic site of exposure. In the US, the Food and Drug Administration (FDA) has approved NAATs for use with rectal or oropharyngeal swab specimens. 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.[17] [18]

If a NAAT is not available, nucleic acid hybridization and transformation tests, enzyme immunoassays, and direct fluorescent antibodies tests may 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.[15] Specificity is close to 100% but sensitivity is 70% to 90% depending on the laboratory and collection technique.[15] Due to variability and expense, this test should only be used in cases where legal issues are involved.

The Centers for Disease Control and Prevention (CDC) recommends empiric antibiotics for immediate treatment if there is a high index of suspicion for infection such as a recent sexual contact with a partner diagnosed with chlamydia.[5]

Emerging tests

Rapid tests are being developed for use at the point-of-care that allow diagnosis and treatment decisions to be made at initial presentation. This potentially decreases onward transmission and complications of infection. Previously available tests had low accuracy or were 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] [22] Some of these rapid tests are approved by the FDA.

History and exam

Key diagnostic factors

asymptomatic (common)

- Approximately 85% of women and men are asymptomatic.[13]

Other diagnostic factors

cervical discharge (common)

- Examination of the cervical os may reveal a cloudy or yellow discharge.

friable cervix (common)

- Cervix may bleed easily with friction from a polyester 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 from proximal to distal.

vaginal discharge (common)

- Odorless 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 the 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 the infection ascends to the upper urogenital tract, or rarely secondary to a pericapsular hepatic infection.
- Can occur in men in severe infections, including orchitis or epididymitis.
- Can occur with *Lymphogranuloma venerum* (LGV) infection.

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, orchitis, 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. In people with rectal LGV infection, there may be other changes in bowel habit (diarrhea or constipation), in addition to rectal discharge and tenesmus.

joint pain and swelling (uncommon)

- Reactive arthritis is an uncommon manifestation of chlamydial infection, typically occurring up to 4 weeks after an infection. Joints most commonly affected are knees, ankles, and feet.

eye irritation (uncommon)

- Conjunctivitis can occur in tandem with joint pain and swelling.

rashes (uncommon)

- Rashes can accompany joint and eye symptoms, most commonly on the palms and soles.

inflammation (uncommon)

- Inflammation can affect eyes, skin and urethra.

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, in particular female adolescents, and men who have sex with men.[4] [5]

new sex partner or multiple sex partners

- Risk is particularly high if a person has recently changed their sexual partner, has multiple sex partners, or has a sex partner with other concurrent sex partners.[5]

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 and those with a prior chlamydial infection should be retested 3 months after treatment because the risk of reinfection is high.[5]

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 socioeconomic status

- Urban residence and low socioeconomic status increase the risk.[10]

Tests

1st test to order

Test	Result
nucleic acid amplification test (NAAT) • Noninvasive sampling (urine or vaginal) is as effective as invasive sampling (vaginal, endocervical, or penile urethral swab) and is more acceptable to patients.[23] Do not routinely collect urine samples in women if vaginal swab collection is possible because this provides the optimal specimen for NAATs to detect *Chlamydia trachomatis* .[2] [5] [16] • Rectal and oropharyngeal *C trachomatis* infection can be diagnosed by testing at the anatomic site of exposure. 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.[17] [18] • Sensitivity is high (>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.[15] • If NAAT is negative, but clinical suspicion is high, treat the patient empirically and consider repeat testing. • There is increasing use of near patient rapid NAATs that can provide results within 20 to 90 minutes, depending on the platform used.[24]	**positive**

Other tests to consider

Test	Result
direct immunofluorescence • Requires an invasive sample (vaginal, endocervical, or penile urethral swab) and is highly specific but less sensitive than NAAT.[25]	**positive**
enzyme immunoassay • 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.[25]	**positive**
nucleic acid hybridization tests • Requires an invasive sample (vaginal, endocervical, or penile urethral swab).	**positive**
cell culture • Requires an invasive sample (vaginal, endocervical, or penile urethral swab). High specificity (close to 100%). Sensitivity varies depending on laboratories (70% to 90%).[15] Due to variability and expense, this test is usually only used in cases where legal issues are involved.	**positive**

Emerging tests

Test	Result
rapid and point-of-care tests • Allow diagnosis and treatment decisions to be made at initial presentation. Potentially decreases onward transmission and complications of infection. • Previously available tests had low accuracy or were 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] [22] • Some of these rapid tests are approved by the Food and Drug Administration.	**positive**

Differentials

Condition	Differentiating signs / symptoms	Differentiating tests
Lymphogranuloma venereum	• More invasive serotype causing genital ulcer and/or inguinal lymphadenopathy, or proctitis with rectal infection.	• Identification of *Chlamydia trachomatis* genovars/ serovars L1, L2, or L3 (collectively termed the "LGV biovar") from the swab of a genital ulcer or aspiration of a bubo is definitive diagnosis.
Gonorrhea infection	• Signs and symptoms of cervical or male urethral discharge are generally more pronounced with gonorrhea.	• Nucleic acid amplification test (NAAT) for gonorrhea alone is positive. May see gram-negative intracellular diplococci on Gram stain of infected specimens.
Bacterial vaginosis	• Vaginal discharge tends to be thin and have a fishy odor.	• Clue cells will be present on microscopic examination. • Vaginal pH >4.5. • A KOH (potassium hydroxide) whiff test of vaginal discharge will liberate a fishy odor. • Molecular tests for bacterial vaginosis-associated bacteria are available.
Vaginal candidiasis	• Vaginal discharge may be thick and white in the vaginal vault. External genital symptoms such as itching and burning are more likely.	• Hyphae or budding yeast present on microscopic examination of KOH preparation of vaginal secretions.
Trichomonas vaginitis	• Men tend to be asymptomatic but can be carriers. Women classically have a thin, grayish, frothy vaginal discharge in the vaginal vault. Discharge tends to be worse right after menses. The cervix, rarely, may be inflamed and have a strawberry appearance.	• Mobile trichomonads present on microscopic examination in many cases. • Nucleic acid amplification tests (NAATs) are available.
Mycoplasma infection	• Caused by the organism *Mycoplasma genitalium.* Frequently asymptomatic; however, can cause cervicitis and PID in women, and urethritis in men. It can also infect the rectum and pharynx.	• A nucleic acid amplification test (NAAT) for *M genitalium* is Food and Drug Administration approved, available but is not yet in widespread use.

Condition	Differentiating signs / symptoms	Differentiating tests
Pelvic inflammatory disease (PID)	• 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.	• There are no differentiating tests. PID is a clinical diagnosis.
Persistent or refractory urethritis in men	• 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. Reinfection is more likely. The most common cause of recurrent or persistent urethritis is *Mycoplasma genitalium* , especially following treatment with doxycycline. Less common causes include *Ureaplasma urealyticum* and *Trichomonas vaginalis* .	• Nucleic acid amplification test (NAAT) for *M genitalium* are available. Polymerase chain reaction (PCR) can be used to detect *U urealyticum* 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 *T vaginalis* detection. As well as NAATs for *T vaginalis* rapid, point-of-care tests are available for diagnosis from vaginal sampling.

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.[26]

However, the Centers for Disease Control and Prevention (CDC) recommends urogenital screening for chlamydia in men who have sex with men at high risk:

- Sexually active young men in adolescent service clinics, correctional facilities and STI clinics
- Men who have sex with men at risk of STIs as part of HIV Pre Exposure Prophylaxis (PrEP) care and those with HIV.[5] [27]

The USPSTF and American Academy of Family Physicians recommend annual urogenital screening of:[26] [28]

- Sexually active women, including pregnant women at their first prenatal visit, 24 years and younger

- Women 25 years or older who are at increased risk of infection (i.e., those who have a new or multiple sex partners or a sex partner who has an STI).

The USPSTF recommends repeat urogenital screening of pregnant women in their third trimester if infection risk remains high.[26]

The CDC advises that rectal chlamydia testing be considered through shared decision-making between women and their providers on the basis of sexual behavior and exposure.[5] The World Health Organization recommends self-collection of samples should be made available as an additional approach to deliver STI testing services.[29]

The National Chlamydia Screening Programme in the UK aims to offer opportunistic screening to all sexually active young people under the age of 25 years as part of every general practice or sexual health consultation.[30] However, the UK National Institute for Health and Care Excellence (NICE) does not recommend urogenital screening for chlamydia as part of routine prenatal care.[31]

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 and other sequelae such as reactive arthritis.

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.

Recommended treatment

The Centers for Disease Control and Prevention (CDC) STI guidelines recommend doxycycline as the first-line antibiotic.[5] [34] The UK guidelines also recommend doxycycline treatment as the first-line treatment for any diagnosed chlamydia infection, regardless of anatomical site.[2] Alternative antibiotics are azithromycin and levofloxacin.[5]

Systemic fluoroquinolone antibiotics, such as levofloxacin, may cause serious, disabling, and potentially long-lasting or irreversible adverse events. This includes, but is not limited to, tendinopathy/tendon rupture; peripheral neuropathy; arthropathy/arthralgia; aortic aneurysm and dissection; heart valve regurgitation; dysglycemia; and central nervous system effects including seizures, depression, psychosis, and suicidal thoughts and behavior.[35]

- Prescribing restrictions apply to the use of fluoroquinolones, and these restrictions may vary between countries. In general, fluoroquinolones should be restricted for use in serious, life-threatening bacterial infections only. Some regulatory agencies may also recommend that they must only be used in situations where other antibiotics, that are commonly recommended for the infection, are inappropriate (e.g., resistance, contraindications, treatment failure, unavailability).
- Consult your local guidelines and drug formulary for more information on suitability, contraindications, and precautions.

Treatment during pregnancy

Azithromycin is the first-line option in pregnancy. It is safe during pregnancy and may reduce the risk of premature delivery. An alternative during pregnancy is amoxicillin. Doxycycline and fluoroquinolones should be avoided in pregnant women.[5] 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.[36]

Partner notification

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 counseling.[37] [CDC: expedited partner therapy] (http://www.cdc.gov/std/ept) 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 gonorrhea infections when the partner is unlikely or unable to otherwise receive in-person evaluation and appropriate treatment.[38]

Treatment algorithm 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

Acute (summary)			
confirmed or suspected			
	men and nonpregnant women	**1st**	**antichlamydial antibiotics**
	pregnant women	**1st**	**alternative antichlamydial antibiotics**

Treatment algorithm

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

confirmed or suspected

men and nonpregnant women

1st

antichlamydial antibiotics

Primary options

» doxycycline: 100 mg orally twice daily for 7 days

Secondary options

» azithromycin: 1 g orally as a single dose

OR

» levofloxacin: 500 mg orally once daily for 7 days

» 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.[39] [40] 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.

» Systemic fluoroquinolone antibiotics may cause serious, disabling, and potentially long-lasting or irreversible adverse events. This includes, but is not limited to, tendinopathy/tendon rupture; peripheral neuropathy; arthropathy/arthralgia; aortic aneurysm and dissection; heart valve regurgitation; dysglycemia; and central nervous system effects including seizures, depression, psychosis, and suicidal thoughts and behavior.[35] Prescribing restrictions apply to the use of fluoroquinolones, and these restrictions may vary between countries. In general, fluoroquinolones should be restricted for use in serious, life-threatening bacterial infections only. Some regulatory agencies may also recommend that they must only be used in situations where other antibiotics, that are commonly recommended for the infection, are inappropriate (e.g., resistance, contraindications, treatment failure,

Acute

unavailability). Consult your local guidelines and drug formulary for more information on suitability, contraindications, and precautions.

» All sexual contacts within the previous 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 reinfection and further transmission.[37]

pregnant women **1st** **alternative antichlamydial antibiotics**

Primary options

» azithromycin: 1 g orally as a single dose

Secondary options

» amoxicillin: 500 mg orally three times daily for 7 days

» 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 previous 60 days, or the most recent sex partner if >60 days since last sexual contact, should be advised to seek investigation and treatment for chlamydia.[5] The management of the patient's sex partners is an important consideration to prevent reinfection and further transmission.[37]

Primary prevention

High-risk patients should be counseled on safer sex behaviors such as the use of condoms.[11]

Information should be collected on any person who has had sexual contact with a diagnosed patient within the previous 60 days, and the most recent sex partner should be evaluated and treated, even if the time of the last sexual contact was >60 days before symptom onset or diagnosis.[5] Counseling should be given about avoiding condomless sex, and the risk of reinfection with chlamydia and other STIs.[12] Screening for common coinfections such as *Neisseria gonorrhoeae* and *Treponema pallidum* should be routinely performed. Counseling and testing for HIV infection should also generally be done.[5]

Secondary prevention

Chlamydia infection retesting should take place 3 months after treatment to identify those who have been reinfected. Testing for a cure is generally not recommended except during pregnancy. In pregnant women, retest approximately 4 weeks after treatment, and again within 3 months.[5] The UK guidelines recommend a test of cure for rectal chlamydia at least 3 weeks after treatment.[2]

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

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Patient discussions

Abstinence from sexual activity is recommended for 7 days after single dose antibiotics or until completion of a 7-day course of antibiotics.[5] 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.[5] [CDC: expedited partner therapy] (http://www.cdc.gov/std/ept) All sexual contacts within the past 60 days, or the most recent sex partner if >60 days since last sexual contact, should be tested.[5] Chlamydia is a reportable disease in the US.

FOLLOW UP

Monitoring

Monitoring

Because of the risk of reinfection, men and women should be retested approximately 3 months after treatment with antibiotics. If retesting after 3 months is not possible, individuals should be retested if they present for medical care within 12 months of treatment.[5]

Pregnant women found to have a chlamydial infection should be retested 4 weeks after treatment, and again within 3 months.[5]

Complications

Complications	Timeframe	Likelihood
epididymitis	**short term**	**low**
More common in men aged 35 years and younger but still low likelihood.[45] The infection ascends through the cord structures. The testicle can also be involved (orchitis).		
reactive arthritis	**short term**	**low**
About 3% to 8% of infected patients will develop reactive arthritis.[46] [47] [48]		
ophthalmia neonatorum	**short term**	**low**
Newborns may contract conjunctivitis from their infected mother during delivery. There is conflicting data on the efficacy of neonatal eye prophylaxis.[49]		
chlamydia pneumonia	**short term**	**low**
Newborns may contract pneumonia from their infected mother during delivery.		
ectopic pregnancy	**long term**	**medium**
A single infection increases the risk for ectopic pregnancy.[43]		
infertility	**long term**	**low**
Infection is associated with an increased risk of tubal factor infertility.[5] [44]		
cervical cancer	**long term**	**low**
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.[50]		
pelvic inflammatory disease (PID)	**variable**	**low**
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.[39] Potential complications in women for untreated or inadequately treated infections include pelvic inflammatory disease and infertility. Men can develop prostatitis, epididymitis, orchitis, and urethral strictures if not treated. Occasionally, reactive arthritis may occur, sometimes accompanied by conjunctivitis and skin manifestations.

Diagnostic guidelines

International

Sexually transmitted infections treatment guidelines, 2021 (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8344968) [5]

Published by: Centers for Disease Control and Prevention **Last published:** 2021

Screening for chlamydia and gonorrhea: recommendation statement (https://www.uspreventiveservicestaskforce.org/uspstf/recommendation/chlamydia-and-gonorrhea-screening) [26]

Published by: US Preventive Services Task Force **Last published:** 2021

Recommendations for the laboratory-based detection of Chlamydia trachomatis and Neisseria gonorrhoeae - 2014 (https://www.cdc.gov/std/chlamydia/default.htm) [15]

Published by: Centers for Disease Control and Prevention **Last published:** 2014

2015 European guideline on the management of Chlamydia trachomatis infections (https://iusti.org/guidelines-resources) [32]

Published by: International Union against Sexually Transmitted Infections **Last published:** 2015

Guidelines for preventive activities in general practice 9th edition: Chapter 6.2 Sexually transmissible infections (https://www.racgp.org.au/clinical-resources/clinical-guidelines) [33]

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

2015 UK national guideline for the management of infection with Chlamydia trachomatis (https://www.bashh.org/guidelines) [2]

Published by: British Association for Sexual Health and HIV **Last published:** 2015

Treatment guidelines

International

Sexually transmitted infections treatment guidelines, 2021 (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8344968) [5]

Published by: Centers for Disease Control and Prevention **Last published:** 2021

Recommendations for partner services programs for HIV infection, syphilis, gonorrhea, and chlamydial infection (http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5709a1.htm) [41]

Published by: Centers for Disease Control and Prevention **Last published:** 2008

Expedited partner therapy in the management of sexually transmitted diseases (http://www.cdc.gov/std/ept/default.htm) [37]

Published by: Centers for Disease Control and Prevention **Last published:** 2006

Expedited partner therapy (https://www.acog.org/clinical/clinical-guidance/committee-opinion) [38]

Published by: American College of Obstetricians and Gynecologists **Last published:** 2018 (reaffirmed 2023)

WHO guidelines for the treatment of Chlamydia trachomatis (http://www.who.int/reproductivehealth/publications/rtis/chlamydia-treatment-guidelines/en) [42]

Published by: World Health Organization **Last published:** 2016

2015 European guideline on the management of Chlamydia trachomatis infections (https://iusti.org/guidelines-resources/) [32]

Published by: International Union against Sexually Transmitted Infections **Last published:** 2015

Guidelines for preventive activities in general practice 9th edition: Chapter 6.2 Sexually transmissible infections (https://www.racgp.org.au/clinical-resources/clinical-guidelines) [33]

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

Reducing sexually transmitted infections (https://www.nice.org.uk/guidance/ng221) [12]

Published by: National Institute for Health and Care Excellence **Last published:** 2022

2015 UK national guideline for the management of infection with Chlamydia trachomatis (https://www.bashh.org/guidelines) [2]

Published by: British Association for Sexual Health and HIV **Last published:** 2015

Online resources

1. CDC: expedited partner therapy (http://www.cdc.gov/std/ept) *(external link)*

Key articles

- Nwokolo NC, Dragovic B, Patel S, et al. 2015 UK national guideline for the management of infection with Chlamydia trachomatis. Int J STD AIDS. 2016 Mar;27(4):251-67. Full text (https://www.bashhguidelines.org/media/1192/ct-2015.pdf) Abstract (http://www.ncbi.nlm.nih.gov/pubmed/26538553?tool=bestpractice.bmj.com)
- Rowley J, Vander Hoorn S, Korenromp E, et al. Chlamydia, gonorrhoea, trichomoniasis and syphilis: global prevalence and incidence estimates, 2016. Bull World Health Organ. 2019 Aug 1;97(8):548-562P. Full text (https://www.doi.org/10.2471/BLT.18.228486) Abstract (http://www.ncbi.nlm.nih.gov/pubmed/31384073?tool=bestpractice.bmj.com)
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This approach is in line with the guidance of the International Bureau of Weights and Measures Service.

Figure 1 – BMJ Best Practice Numeral Style

5-digit numerals: 10,000

4-digit numerals: 1000

numerals < 1: 0.25

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Contact us

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

BMJ
BMA House
Tavistock Square
London
WC1H 9JR
UK

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Contributors:

// Authors:

Matthew M. Hamill, MBChB, PhD, FRCP

Assistant Professor of Medicine
Johns Hopkins University School of Medicine, Baltimore, MD
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// 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
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