

Mycoplasma genitalium

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Module 2: [Self-Study Lessons](#)

Lesson 10: [Mycoplasma genitalium](#)

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Introduction

Mycoplasma genitalium has emerged as an important bacterial sexually transmitted infection (STI). Recent data suggest the *M. genitalium* prevalence is as high or higher than the *C. trachomatis* prevalence in both males and females. The clinical presentation associated with *M. genitalium* infection is similar to that with *Chlamydia trachomatis*, and infection with *M. genitalium* has been associated with the STI syndromes of urethritis, cervicitis, and pelvic inflammatory disease (PID). In addition, *M. genitalium* may cause infertility and preterm delivery in pregnant women. It is frequently detected in the rectum, but whether it causes proctitis is unclear. Antimicrobial resistance in *M. genitalium* emerged around 2008 and has been rapidly expanding, making treatment of this infection challenging. Highly sensitive and specific diagnostic assays are available to detect it in clinical practice, and national guidelines outline recommendations for who should be tested and treated.

Epidemiology in the United States

Surveillance Data

Mycoplasma genitalium is not a reportable infection in the United States, and information on the prevalence of this infection is derived from three sources: (1) the 2017-2018 cycle of the National Health and Nutritional Examination Survey (NHANES), (2) a sentinel surveillance system in sexual health clinics, and (3) research studies. Among people of reproductive age (14–59 years of age) participating in NHANES, a population generally at lower risk of STIs, *M. genitalium* prevalence was 1.7%, which is lower than with *C. trachomatis* but higher than *N. gonorrhoeae* in a representative sample of young adults.[1,2,3,4] In contrast, the overall prevalence of *M. genitalium* among 1,743 attendees at 6 urban sexual health clinics in 2020 was 16.6%; among those participating in this surveillance study, 56% had genitourinary symptoms, and 44% were asymptomatic (Figure 2).[5] In those sexual health clinic attendees, *M. genitalium* prevalence was significantly higher among males with symptoms than among males without symptoms, but there was no significant difference in prevalence between females with and without symptoms.[5][Q] Mycoplasma genitalium Epidemiology

- **Sex:** Whether *M. genitalium* prevalence differs by sex depends on the population surveyed. Among people at relatively low risk of STIs participating in the 2017-2018 cycle of NHANES, *M. genitalium* prevalence was similar in males and females (1.8% and 1.7%, respectively).[2] The *M. genitalium* prevalence in the sexual health clinic surveillance study noted above was slightly higher in persons who identified as females (17.8%) than males (16.0%).[5]
- **Age:** Like other bacterial STIs, *M. genitalium* is most common among younger individuals. Among NHANES participants, *M. genitalium* prevalence was 3.9% in people 20–29 years of age, which was more than four times higher than the prevalence in older adults 40–59 years of age (0.9%).[2] In the sexual health clinic surveillance study, the prevalence was higher for younger people; those younger than 19 years of age had a very high prevalence rate (30.4%), but this sample size was very small (only 23 people).[5] The higher prevalence in younger individuals may be due to higher levels of sexual activity in young people or possibly to the development of partial immunity after initial infections, although this latter hypothesis has not been rigorously explored.[6]
- **Race/Ethnicity:** *M. genitalium* infection is more common among people who report Black race and this is consistent in both community and sexual health clinic surveillance settings.[2,5] In 2020, *M. genitalium* prevalence was lowest among Hispanic and non-Hispanic White sexual health clinic attendees (11–12%), whereas it was 21% in people reporting non-Hispanic Black race/ethnicity.[5]
- **Region and State:** *M. genitalium* prevalence varies by geographic location. Among sexual health clinic patients in 2020, the prevalence was lowest in the Pacific Northwest (9.9%) and highest in the South-Central United States (22–24%).[5]

Factors Associated with Acquisition of *M. genitalium*

The rate of new *M. genitalium* infections in women ranges from 0.9 per 100 person-years among university students in Great Britain to 18.2 per 100 person-years among women in the United States who engaged in exchange or survival sex (or were at high risk of STIs for other reasons).[7,8] Although relatively few studies have assessed factors associated with acquiring a new *M. genitalium* infection, bacterial vaginosis may play a role. Kenyan women engaging in exchange or survival sex who had bacterial vaginosis and women in the United States with asymptomatic bacterial vaginosis were more likely to subsequently acquire *M. genitalium* than women who did not have bacterial vaginosis.[7,9,10] Other factors are likely associated with an increased risk of acquiring a new *M. genitalium* infection, but few longitudinal studies have been done to identify them. Incidence in males appears to be somewhat lower than in females but potentially higher than the rate of other new bacterial STIs. Among men who have sex with women only (MSW) seeking sexual health care, the rate of new *M. genitalium* infections was 7 per 100 person-years, slightly higher than the rate of new chlamydial infections (6 per 100 person-years) and more than double the rate of new gonorrhea infections (3 per 100 person-years).[11]

Impact

Between 2017-2018, there were an estimated 3 million people of reproductive age (14–59 years) in the United States with a prevalent *M. genitalium* urogenital infection.[\[2\]](#) To date, no monetary costs for *M. genitalium* infections have been calculated, but these infections have been associated with PID, infertility, and preterm delivery—all conditions associated with high costs.[\[12\]](#)

Microbiology, Pathogenesis, and Transmission

Organism and Classification

Mycoplasma genitalium is a member of the Mollicute Class of bacteria.[13] In 2018, a name change to *Mycoplasmoides genitalium* was proposed, but this has been disputed, and most continue to refer to the organism as *Mycoplasma genitalium*. [13,14] Mycoplasmas are very small (0.5 and 1.5 µm in size) flask-shaped organisms; the protruding terminal (narrow) element contains an attachment organelle that drives gliding motility (Figure 3). [15,16] They are characterized by their absence of a rigid peptidoglycan cell wall and fastidious nature. The latter makes culture challenging, and few strains have been adapted to grow on agar. Tissue culture, requiring weeks to months, is typically used to isolate clinical strains of *M. genitalium*, but this has been accomplished by only a few laboratories globally. [17] Several other *Mycoplasma* species, including *M. pneumoniae*, *M. hominis*, *M. fermentans*, *M. penetrans*, *Ureaplasma urealyticum*, and *U. parvum*, are known to colonize humans, but only *M. pneumoniae* and *M. genitalium* are recognized human pathogens. Although *M. penetrans* has been associated with urethritis among men who have sex with men (MSM), to date, there is insufficient evidence linking *M. hominis*, *U. urealyticum*, *U. parvum*, and *M. fermentans* to disease syndromes. [18,19] [Q] Mycoplasma genitalium Microbiology

Transmission

The primary mode of transmission for *M. genitalium* is sexual. The organism is found infrequently in people who have not yet become sexually active. [20,21,22,23] The person-to-person sexual transmission probability with *M. genitalium* has not been clearly defined, but it appears to be lower than with other common bacterial STIs, most likely due to a relatively lower *M. genitalium* organism load. Limited evidence suggests that vertical transmission of *M. genitalium* can occur in some instances. In addition, *Mycoplasma genitalium* has been detected in the trachea of an infant born to an infected birth parent and in conjunctival specimens from infants born to infected birth parents. [24,25] Autoinoculation from the male urethra to the conjunctiva has also been documented. [26]

Natural History

The duration of *M. genitalium* infection varies substantially. Among women engaging in exchange or survival sex, the median duration of infection ranged from 1 to 3 months, but up to 16% of women in one study had infection that persisted for at least 12 months. [20,27] In men treated with incompletely effective antibiotic regimens, the median duration of infection was 4.7 months, but the organism persisted after resolution of symptoms in some men for up to 11 months. [28] In another study, 30% of asymptomatic MSM with HIV who had *M. genitalium* cleared their infection spontaneously over an 18-month time period, with clearance possibly due to the production of *M. genitalium*-specific antibodies that are present in urethral secretions. [29,30] Data on sequelae from asymptomatic infections are fairly limited, and the uncertainty over how often sequelae occur is a major factor in current testing and treatment guidelines.

Antimicrobial Susceptibility in *Mycoplasma genitalium*

Limited antimicrobials are available to treat *M. genitalium* infections. The lack of a rigid cell wall renders cell-wall-mediated antibiotics ineffective, and beta-lactam antibiotics, including penicillins, cephalosporins, and carbapenems, have no activity against *M. genitalium*. Culture is challenging; much of the available data on antimicrobial resistance are derived from pairing clinical treatment failure data with molecular detection of characteristic mutations. Minimum inhibitory concentrations (MICs) are not used in individual treatment decisions and are only performed in select research laboratories. Azithromycin, a macrolide antibiotic, and moxifloxacin, a fluoroquinolone antibiotic, have historically been the primary antimicrobials used to treat *M. genitalium* infections. Shortly after these two antibiotics began being used to treat *M. genitalium* infections (around 2008-2010), there was a rapid expansion of resistance to them. By 2016-2017, macrolide resistance had grown to greater than 50%, quinolone resistance to nearly 8%, and, globally, resistance to both antibiotic classes to approximately 3%.[\[31\]](#) As a result of these resistance trends, *M. genitalium* is one of three bacteria on the Watch List included in the United States Centers for Disease Control and Prevention (CDC) 2019 Report of Antibiotic Resistance Threats.[\[32\]](#) The following summarizes resistance data with antimicrobials that have been used to treat *M. genitalium*. Details regarding treatment recommendations are outlined below in the section on Treatment of *Mycoplasma genitalium* Infection.

Azithromycin

During 2008-2013, *M. genitalium* azithromycin cure rates declined substantially, reflecting the emergence and spread of macrolide resistance.[\[33\]](#) Macrolide resistance to *M. genitalium* is due to single-point mutations in the 23S rRNA gene, referred to as macrolide resistance mutations (MRMs).[\[34\]](#) The MRMs are similar to macrolide resistance in other microorganisms, but unlike antimicrobial resistance in *Neisseria gonorrhoeae*, there are no subtle gradations in susceptibility. Macrolide resistance in *M. genitalium* is bimodal, with either near-complete susceptibility (MICs ≤ 0.004 $\mu\text{g/mL}$) or total resistance (MICs ≥ 8 $\mu\text{g/mL}$) ([Figure 4](#)).[\[35\]](#) Macrolide resistance likely arose because of the widespread use of azithromycin. *Mycoplasma genitalium* has a high mutation rate, and bacterial populations naturally include organisms with MRMs that survive and proliferate after azithromycin treatment.[\[36\]](#) Available data suggest that approximately 44-64% of *M. genitalium* isolates in the United States are resistant to azithromycin, with similar, if not higher, rates of resistance in other regions globally.[\[28,35,37,38\]](#) In addition, among baseline azithromycin-susceptible *M. genitalium* isolates, the selection of resistant strains occurs in approximately 10% of those treated with azithromycin alone, but in less than 4% of people treated first with doxycycline followed by high-dose azithromycin.[\[39,40\]](#)[\[Q\]](#) *Mycoplasma genitalium* and Azithromycin Resistance

Doxycycline

Despite relatively good susceptibility in the laboratory (MICs in United States strains range from less than 0.125 to 2.0 $\mu\text{g/mL}$), doxycycline has consistently low cure rates in clinical settings ([Figure 5](#)).[\[35\]](#) The low cure rate with doxycycline does not appear to be due to antimicrobial resistance. The *tetM* resistance determinant has not been identified in *M. genitalium*, and although numerous 16S rRNA mutations that are associated with tetracycline resistance in other organisms have been detected in *M. genitalium*, none have been linked to the efficacy of doxycycline treatment for *M. genitalium*.[\[41\]](#) Attempts to induce doxycycline resistance in the laboratory by passaging strains in sub-inhibitory concentrations have been unsuccessful.[\[42\]](#)

Minocycline

Minocycline is an older and more potent tetracycline than doxycycline and has shown some efficacy when used for *M. genitalium* treatment failures. Among Australian patients in whom moxifloxacin had failed or was contraindicated, 68% experienced microbiologic cure after a 14-day regimen of minocycline.[\[43\]](#) No resistance mutations have been identified for minocycline. Older MICs range from 0.031-0.25 $\mu\text{g/mL}$, which is lower than doxycycline MICs.[\[44\]](#)

Moxifloxacin

Moxifloxacin has increasingly been used as a component of first-line *M. genitalium* therapy. Other fluoroquinolones, such as ciprofloxacin and levofloxacin, have limited efficacy against *M. genitalium*. Sitafloxacin, a more potent fluoroquinolone that is not available in the United States, is used for treatment failures in countries where it is available to clinicians. Prior to 2010, *M. genitalium* cure rates after moxifloxacin monotherapy treatment were uniformly 100%, but dropped to 89% after 2010 and have continued to decline.[\[45\]](#) Decreased cure rates after moxifloxacin are largely due to the emergence of quinolone resistance, mediated by ParC gene mutations. The ParC S83I has emerged as the mutation most strongly associated with treatment failure, and it was detected in 10% of specimens in the Americas tested between 2011-2017.[\[31,46,47\]](#) The presence or absence of the S83I mutation correlates strongly with fluoroquinolone treatment response. For example, in Australia, among people with *M. genitalium* who did not have the S83I mutation, the cure rate for a 7-day course of moxifloxacin monotherapy was 96.5%.[\[47\]](#) Concurrent mutations in the GyrA gene also increase the likelihood of resistance. When the GyrA mutation M95I was present in combination with the ParC S83I mutation, moxifloxacin treatment failure occurred in nearly 81% of Australian patients between 2019-2020, whereas only 43% failed when S83I alone was present in the absence of M95I.[\[47\]](#)

Pristinamycin

Pristinamycin is manufactured in France and available in some countries outside the United States. It is not been approved by the U.S. Food and Drug Administration (FDA) and is not currently available in the United States. In other settings, it is an important treatment option for people in whom other antimicrobial treatments have failed with a cure rate of 75%, irrespective of whether it is used alone or in combination with doxycycline.[\[48\]](#) Little work has been done to determine resistance determinants for pristinamycin, and only one potential mutation has been identified (A2062T in the 23S rRNA gene).[\[49\]](#)

Other Antibiotics

Omadacycline and tinidazole are FDA-approved antibiotics, with in vitro data suggesting they may be effective against *M. genitalium*. Omadacycline is a newer tetracycline with MICs of 0.063-0.5 µg/ml, the same range as MICs for minocycline and somewhat lower than MICs for doxycycline (0.125-2 µg/mL) and tetracycline (0.5-16 µg/mL).[\[50\]](#) Tinidazole is a nitroimidazole antibiotic, with MICs ranging from 0.8-6.3 µg/mL, lower than MICs for two other nitroimidazoles used to treat bacterial vaginosis in women (metronidazole MIC range=6.3-12.5 µg/mL and secnidazole MIC range=3.1-12.5 µg/mL). Higher MICs for tinidazole may be due to a resistance mutation in the MG-342 gene, but the prevalence of this resistance mutation is currently unknown. In 2025, however, a case report noted that tinidazole effectively cured a man with *M. genitalium* treatment failure and.[\[51\]](#) Treatment studies with tinidazole are ongoing.

Clinical Manifestations

Mycoplasma genitalium has a tropism for urogenital and rectal tissues. Infection with *M. genitalium* has been associated with a range of genitourinary manifestations, including urethritis, cervicitis, pelvic inflammatory disease (PID), and proctitis. In addition, *M. genitalium* may cause preterm delivery in pregnant women and female infertility. No definitive data link *M. genitalium* to epididymitis or male infertility, although studies on this are limited. Rare cases of conjunctivitis have been documented. Although *M. genitalium* has been identified in oropharyngeal specimens, pharyngitis has not been reported in people with *M. genitalium* in the oropharynx.

Urogenital Infections in Women

Urethritis

Mycoplasma genitalium has been detected in a small proportion of women with urethritis (4-9%) and has been linked to urethral inflammation and female urethritis.[52,53] *Mycoplasma genitalium* has also been detected in up to 22% of women reporting dysuria, a frequent complaint among women with urinary tract infections (UTI).[54] Notably, first-line therapies for female UTIs, such as trimethoprim-sulfamethoxazole and nitrofurantoin, have poor efficacy against *M. genitalium*.

Vaginitis

In clinical settings, *M. genitalium* has been detected in 13-21% of women with vaginitis.[5,55] Although some studies have reported a significant association of *M. genitalium* and vaginitis, it is unclear whether the vaginitis results from *M. genitalium* infection of vaginal epithelial cells and/or the cervix—or from other causes.[55] In a study involving 21 sites in the United States, among 1,051 women who sought care for vaginitis symptoms, 8.8% had *M. genitalium* identified.[56] The rates of *M. genitalium* were even higher among women who had bacterial vaginosis diagnosed as the cause of vaginitis.[56] Detection of *M. genitalium* in women with vaginitis may reflect synergy between *M. genitalium* and other bacteria that play a pathogenic role in bacterial vaginosis. The higher incidence and prevalence of *M. genitalium* in women with bacterial vaginosis suggests that bacterial vaginosis may enhance susceptibility to *M. genitalium* infection.[9,10]

Cervicitis

Mycoplasma genitalium has been detected in 10-29% of women with cervicitis (Figure 6).[57,58] Not all studies have shown a consistent association with *M. genitalium* and cervicitis, but those studies that accounted for other known causes of cervicitis (and/or defined cervicitis as 30 polymorphonuclear cells or greater per high-power field in cervical mucus) have shown that women with cervical *M. genitalium* infection are approximately two times more likely to have cervicitis than women without cervical *M. genitalium*.[12]

Pelvic Inflammatory Disease (PID)

Mycoplasma genitalium has been detected by NAAT in 4-18% of women with PID, and women with *M. genitalium* infection are approximately 2.0-2.5 times as likely to have PID as women without *M. genitalium* infection (Figure 7).[12,59,60] Some experts have debated the causal nature of this association, in part because few studies have followed women over time to observe the development of PID after a woman acquires *M. genitalium*. One systematic review and meta-analysis found that women with *M. genitalium* infection had an approximately 67% higher risk of being diagnosed with PID, and among women diagnosed with PID, approximately 1 in 10 had *M. genitalium* detected.[61] There are only two prospective studies that have addressed this issue, and when analyses are limited to these 2 studies, the relationship between *M. genitalium* and PID is less pronounced.[20] Larger and more rigorous longitudinal studies are needed to resolve the controversy. A strong relationship with post-abortal PID and perihepatitis (Fitz-Hugh Curtis

syndrome) has also been reported.[62,63] Women with *M. genitalium*-associated PID have a similar clinical presentation as women with *C. trachomatis*-associated PID, with two exceptions: women with *M. genitalium* infection more frequently had abdominal tenderness on examination and were somewhat less likely to report post-coital bleeding.[64]

Infertility

Mycoplasma genitalium can ascend to the fallopian tubes, and in serologic studies that adjusted for prior chlamydial infection, women with antibodies to *M. genitalium* were 4–5 times more likely to have tubal factor infertility than women without antibodies to *M. genitalium*, suggesting that some women may suffer tubal occlusion after infection (Figure 8).[65,66,67] These data, however, are not consistent, and other studies have shown a more modest relationship with infertility.[12] Fecundability (probability of conception in a single menstrual cycle) may also be impaired during or after an *M. genitalium* infection.[68,69] For example, the per-menstrual cycle probability of pregnancy was 27% lower in Kenyan women with active *M. genitalium* infection, and the time to conception was 24% longer among women in the United States with serologic evidence of a prior *M. genitalium* infection.[69] Notably, delayed time to pregnancy may involve some synergy with *M. genitalium* and bacterial vaginosis. Fecundability among Kenyan women was nearly 50% lower when both *M. genitalium* infection and bacterial vaginosis were present, but there was only a marginal reduction in fecundability with either bacterial vaginosis or *M. genitalium* alone.[68]

Ectopic Pregnancy

There are limited data on *M. genitalium* and ectopic pregnancy, and the few studies that have been published are conflicting. One study demonstrated a modest and non-significant 60% increase in the odds of ectopic pregnancy among women with antibodies to *M. genitalium*, but only among younger women (15–30 years of age). In contrast, *M. genitalium* was detected in Fallopian tube tissue among Saudi Arabian women with ectopic pregnancy more commonly than among women with total hysterectomies or tubal ligation (20.2% versus 3.9%).[70] To date, there is no consensus on whether *M. genitalium* infection can result in ectopic pregnancy.

Preterm Delivery

Pregnant women with *M. genitalium* may be at higher risk of preterm delivery. Two meta-analyses summarizing data published through 2021 demonstrated an approximately two-fold increase in the likelihood of delivery prior to 37 weeks.[12,71] Some evidence also suggests that pregnant women with *M. genitalium* may be at increased risk for spontaneous abortion, but relatively few studies have been conducted and data are conflicting.[12,71] Data are even more limited on whether *M. genitalium* is linked to lower birth weight.[72,73] Given these unclear consequences of asymptomatic infections in pregnancy and limited antimicrobial treatment options for pregnant women, screening asymptomatic pregnant women for *M. genitalium* is not currently recommended.[38]

Urogenital Infections in Men

Urethritis

Mycoplasma genitalium is responsible for 15–30% of nongonococcal urethritis (NGU) and is detected in more than 30% of men with non-chlamydial NGU.[74] *Mycoplasma genitalium* is also sometimes present in persons with gonococcal urethritis; among males from 6 United States cities with urethritis, 21.2% with *M. genitalium* also had *Neisseria gonorrhoeae* infection.[37] Symptoms associated with *M. genitalium* NGU are similar to those observed with *C. trachomatis* infection, although men with *M. genitalium* were more likely to report urethral discharge and to have cloudy or purulent discharge than men with other causes of NGU.[75] In clinical settings, *M. genitalium* has been a common cause of persistent and/or recurrent urethritis and may be present in up to 40% of people who have been treated with doxycycline or azithromycin without success.[74]. In a retrospective review involving men with symptomatic urethritis who were evaluated at an STI clinic,

persistent and/or recurrent urethritis that resulted in a follow-up visit increased by 51% during 2015-2019.[76] The significant increase in follow-up visits occurred in men who were treated with azithromycin but not those treated with doxycycline.[76] Further, similar changes were seen among men with urethritis who tested negative for chlamydia.[76] Taken together, these findings suggest that macrolide-resistant *M. genitalium* may have driven this increase in persistent and/or recurrent urethritis.[76] [Q] *Mycoplasma genitalium* Urethritis in Males

Epididymitis

It is unclear whether *M. genitalium* causes epididymitis. It has been detected in men with epididymitis, but this appears to occur rarely, and there are no studies comparing detection of *M. genitalium* in men with and without epididymitis.[77,78]

Manifestations in Men or Women

Conjunctivitis

Although *M. genitalium* conjunctivitis has been documented, this is rare. Only one case of a man with *M. genitalium*-associated conjunctivitis has been reported.[26] The organism has also been detected in conjunctival specimens from infants born to infected birth parents, but this was not accompanied by information on whether the infants had conjunctivitis.[24]

Oropharyngeal Infection

Oropharyngeal infection with *M. genitalium* is rare. Using contemporary, highly sensitive NAAT assays, *M. genitalium* has been detected in the oropharynx in 1-5% of people, although it was found more frequently (12.3%) in one study of Italian MSM.[79,80,81] *Mycoplasma genitalium*-associated pharyngitis has not been reported.

Proctitis

Rectal *M. genitalium* prevalence in MSM ranges widely, from 1-30%, but was as high as 41.5% in young MSM with HIV (Figure 9).[79] Among women, rectal *M. genitalium* has been detected in 2.6% of South African women and in as many as 22% of females attending sexual health clinics in the United States.[82,83] In a recent study in France involving 365 men with proctitis, among the 315 who underwent testing for *M. genitalium*, 46 (15%) had a positive test for *M. genitalium*. [84] Although *M. genitalium* prevalence is often higher in people with rectal symptoms than without rectal symptoms, data on whether it causes proctitis are conflicting. Some studies have identified an association, while others have not.[85,86,87]

Reactive Arthritis

In rare circumstances, reactive arthritis may occur in people who have had an *M. genitalium* infection. There are case reports of *M. genitalium* (in the absence of chlamydia and gonorrhea) detected in the synovial fluid of a man with Reiter's syndrome, in a man with seronegative rheumatoid arthritis, and in a man with sexually acquired reactive arthritis after *M. genitalium* urethritis.[88,89] There are no larger-scale studies of the relationship between *M. genitalium* and Reiter's syndrome.

Laboratory Diagnostic Tests and Resistance Assays

Mycoplasma genitalium Diagnostic Testing

The preferred method to diagnose *M. genitalium* infections is the use of an Food and Drug Administration (FDA)-cleared nucleic acid amplification test (NAAT).[\[38\]](#) To date, there are no FDA-cleared point-of-care tests for the diagnosis of *M. genitalium*. Serologic assays and culture have been used in research settings but have no practical application in clinical care.

- **Nucleic Acid Amplification Test:** The FDA has cleared multiple NAATs to detect *M. genitalium* in clinical specimens. Most tests are approved for first-void urine and swab samples (urethral, vaginal, endocervical, penile-meatal), although there is some variability in approved sample type by manufacturer. Sensitivity of these assays is high, including 98% for urethral swabs (transcription-mediated amplification [TMA] only), 91-100% for male urine; 92-99% for vaginal swabs; 82-83% for endocervical swabs; and 78-86% for female urine specimens. Specificity is higher, ranging from 87-99%. Assays performed on self-obtained vaginal swab samples often have higher sensitivity than clinician-obtained vaginal swab samples, although this is not uniformly the case. Although none of these assays are FDA-cleared for use in extragenital samples or for home testing, laboratories that have undergone a validation process and obtained Clinical Laboratory Improvement Amendments (CLIA) certification for *M. genitalium* NAATs in oropharyngeal and/or rectal specimens may report results for clinical care.
- **Serology:** Although serology has been used in research efforts, it is not used in clinical practice to diagnose *M. genitalium* infections. Western Blot assays, which are labor-intensive and have an element of subjectivity in their interpretation, are the most common serologic assays and have only been implemented in a few laboratories.[\[66,67,69\]](#) ELISA assays have also been developed and used in studies of infertility, but are not sufficiently sensitive and specific to be used for diagnosing *M. genitalium* infection.[\[90,91\]](#)
- **Culture:** Although it is possible to culture *M. genitalium*, it is a lengthy process that takes several weeks and typically requires tissue culture.[\[17\]](#) Few research laboratories have this capacity and culture is not used to diagnose *M. genitalium* infections in clinical settings.[\[Q\]](#) Diagnostic Testing Methods for *Mycoplasma genitalium*

Resistance Testing

Mycoplasma genitalium resistance testing has been more widely available in Europe and Australia than in the United States. Macrolide resistance testing assays are commercially available in the United States through several laboratories, but at this time, assays that detect *M. genitalium* fluoroquinolone resistance are not commercially available. Most *M. genitalium* resistance assays are NAATs, but next-generation sequencing approaches are also being explored and may provide greater efficiency.[\[92\]](#)

- **Macrolide Resistance Testing:** Several commercially available NAAT assays incorporate the detection of genetic mutations linked to macrolide resistance. These assays detect both *M. genitalium* and any of five major macrolide resistance mutations (MRM) in the 23S rRNA gene that are associated with high rates of azithromycin treatment failure.[\[93\]](#) The MRM assays are a key component of resistance-guided therapy.[\[38\]](#) Although some of the assays that incorporate the detection of MRM have lower sensitivity overall than the FDA-approved NAATs for detecting *M. genitalium*, their published sensitivity for detecting MRM ranges from 95-100%; specificity ranges from 95-97%.[\[94\]](#) First-generation versions of these assays do not have an internal control that confirms the detection of wild-type *M. genitalium*, making it impossible to differentiate between a truly negative (susceptible) result and a failure to amplify. In the United States, macrolide resistance testing is most often performed using a reflex process whereby samples positive for *M. genitalium* subsequently have resistance testing performed. When using this reflex process, resistance testing can usually be performed on the same clinical specimen as used for the diagnostic test.

- **Fluoroquinolone Resistance Testing:** As quinolone resistance expands, additional assessment for quinolone resistance-associated mutations (QRAMs) may be needed (using a rule-out strategy). Detecting wild-type sequences in the ParC gene effectively rules out the presence of quinolone resistance.[\[95\]](#) To date, in the United States, assays to detect QRAMs are not commercially available, and clinical testing for fluoroquinolone resistance is not recommended. Although the concomitant detection of specific mutations in the GyrA gene more closely correlates with treatment failure, assays to detect these mutations are currently only available in research settings.[\[47\]](#)

Diagnostic Testing and Screening Guidelines

When considering whether to test for *M. genitalium*, it is important to differentiate between screening and diagnostic testing. Screening is performed on asymptomatic people with the goal of identifying a pathogen that is not causing current clinical signs or symptoms but may result in sequelae if not eradicated. Routine screening of asymptomatic persons for *M. genitalium* is not recommended.[38] Diagnostic testing is performed on symptomatic patients with the goal of identifying the pathogen causing the clinical signs or symptoms and providing appropriate treatment. The 2021 STI Treatment Guidelines recommend diagnostic testing for *M. genitalium* in patients who have persistent and/or recurrent genitourinary symptoms and that it be considered in all cases of PID.[38] Table 1.

Mycoplasma genitalium Testing Recommendations

| Type of Test | Definition | Recommendations |
|------------------------|--|--|
| Screening Test | Testing of asymptomatic people with the goal of preventing disease sequelae and prevent transmission to others | Routine testing of asymptomatic people is not recommended. |
| Diagnostic Test | Testing of symptomatic persons to direct treatment decisions | Testing recommended for: <ul style="list-style-type: none"> • Men with persistent or recurrent urethritis • Women with persistent or recurrent cervicitis Testing should be considered for: <ul style="list-style-type: none"> • Women with pelvic inflammatory disease |

Source:

- Wetmore CM, Manhart LE, Lowens MS, et al. Demographic, behavioral, and clinical characteristics of men with nongonococcal urethritis differ by etiology: a case-comparison study. Sex Transm Dis. 2011;38:180-6. [PubMed Abstract]
- Workowski KA, Bachmann LH, Chan PA, et al. Sexually transmitted infections treatment guidelines, 2021. *Mycoplasma genitalium*. MMWR Recomm Rep. 2021;70(No. RR-4):1-187. [2021 STI Treatment Guidelines]

Diagnostic Testing

Guidelines on diagnostic testing for *M. genitalium* vary globally, ranging from recommendations in the European Guidelines to test any person with any STI syndrome for *M. genitalium* to recommendations in the 2021 STI Treatment Guidelines to test only men with persistent or recurrent urethritis, women with persistent or recurrent cervicitis, and to consider testing women with PID.[38,96] The 2021 STI Treatment Guidelines recommend using an FDA-cleared NAAT for the testing process, but testing of extragenital sites for *M. genitalium* is not recommended.[38] If resistance testing with the capability to detect MRM is available, this should also be ordered to enable resistance-guided therapy. The following summarizes recommendations in the 2021 STI Treatment Guidelines for *M. genitalium* diagnostic testing for males with NGU, females with cervicitis and PID, persons with proctitis, and extragenital testing.[38]

- **Males with NGU:** For males with acute NGU, routine *M. genitalium* testing is not currently recommended.[38] Instead, testing and organism-directed therapy is only recommended for males with persistent or recurrent urethritis.[76] This recommendation was established prior to documentation of a 60% reduction in the number of cases of persistent or recurrent urethritis after one sexual health clinic implemented routine *M. genitalium* testing and treatment with moxifloxacin for all men with NGU.[97] This finding, coupled with increasing sexual health clinic visits for chlamydia-

negative persistent and/or recurrent NGU from 2015-2019, suggests that there may be a benefit to testing males with acute NGU for *M. genitalium* when they first present with symptoms.[76]

- **Female Cervicitis and PID:** Given associations with cervicitis and PID, *M. genitalium* testing should be considered in females with cervicitis and/or PID; provider judgment should determine whether to test women with cervicitis and/or PID at the time of presentation.[38] For women with persistent or recurrent cervicitis, *M. genitalium* testing is recommended.[38]
- **Proctitis:** Although the prevalence of *M. genitalium* in the rectum can be high (up to 42% of MSM with HIV and up to 22% of women), the association with proctitis is inconsistent, and most rectal infections are asymptomatic.[83,85,86,87] For these reasons, routine testing of people with proctitis for *M. genitalium* is not recommended.[38] However, *M. genitalium* testing may be performed in people with persistent proctitis if *N. gonorrhoeae* and *C. trachomatis* have been ruled out.[38]
- **Extragenital Testing:** Testing for *M. genitalium* at extragenital sites, such as the pharynx, is not recommended, based primarily on the low overall prevalence of pharyngeal infection.[38][Q]

Indications for Mycoplasma genitalium Diagnostic Testing

Screening

Asymptomatic people should not be screened for *M. genitalium*. [38] Unlike chlamydia and gonorrhea, screening for *M. genitalium* is not recommended for women under the age of 25 years, nor is screening pregnant women at prenatal care visits recommended.[38] *Mycoplasma genitalium* is not included in the routine STI screening for bacterial STIs that is recommended for people taking HIV preexposure prophylaxis (PrEP). The recommendation against screening is consistent across the globe, reflecting the uncertain consequences of asymptomatic *M. genitalium* infections and the mandate to avoid prescribing antibiotics when they may not be necessary.[98] This is particularly relevant in pregnancy, given the extremely limited number of antimicrobials with efficacy against *M. genitalium* that are not contraindicated in pregnancy.[38] In addition, screening for *M. genitalium* in pregnancy in asymptomatic women is not recommended as the consequences of asymptomatic infection in pregnancy remain unknown, and there are limited antimicrobial options available for the treatment of *M. genitalium* in pregnancy.[38] Nevertheless, if future evidence demonstrates causal relationships with infertility, adverse pregnancy outcomes, or increased transmission or acquisition of HIV, screening may be warranted.[Q] Routine screening for Mycoplasma genitalium

Reporting Requirements

Mycoplasma genitalium is not a reportable infection. Therefore, there are no reporting requirements.

Treatment of *Mycoplasma genitalium* Infection

Approach to Treatment

It is important to conceptually understand that *M. genitalium* does not have a peptidoglycan cell wall. Thus, antibiotics that work by targeting cell wall synthesis (e.g., penicillins and cephalosporins) do not have activity against *M. genitalium*.^[38] Earlier attempts to treat *M. genitalium* used monotherapy with either azithromycin or doxycycline. Unfortunately, these antibiotics, when used alone, have relatively low cure rates, and the cure rates have declined over time with increasing resistance, especially with macrolide resistance (Figure 10).^[99,100,101] Due to high rates of resistance to azithromycin and the low efficacy of doxycycline monotherapy, these antimicrobials are now only used as a component of sequential therapy for *M. genitalium*.^[38] Moxifloxacin, a fluoroquinolone antibiotic, has also become a key antimicrobial used to treat *M. genitalium* infections. Ideally, the recommended approach for treating *M. genitalium* is to (1) use sequential therapy with two antibiotics and (2) use macrolide resistance testing (with assays that can detect MRM) to guide the specific regimen used. The rationale for using sequential therapy with doxycycline followed by a second antibiotic is to reduce the overall *M. genitalium* organism burden prior to starting moxifloxacin or azithromycin. This approach enhances cure rates and reduces antimicrobial resistance. The detection of MRM correlates highly with azithromycin treatment failure, but macrolide resistance testing is not often available in the United States. Accordingly, the following discussion will include 2021 STI Treatment Guidelines recommendations for when resistance testing is available and when it is not available.^[38]

Recommended Treatment if Resistance Testing is Available

Resistance-guided therapy using MRM detection was developed to enhance treatment efficiency and efficacy for persons diagnosed with *M. genitalium*. Since detection of MRM correlates highly with azithromycin treatment failure, the absence of MRM indicates a macrolide-susceptible infection where azithromycin can be prescribed. The use of azithromycin for macrolide-susceptible infection reduces the empiric use of moxifloxacin, which has more significant side effects than azithromycin and should only be used when there are no other safer alternatives. Using a resistance-guided approach, patients diagnosed with *M. genitalium* infection start treatment with a 7-day course of doxycycline (100 mg orally twice daily for 7 days), with the second component of the regimen determined by the results of the resistance testing.^[38] Patients with macrolide-sensitive infections follow the initial doxycycline regimen with high-dose azithromycin (1g orally on day one followed by 500 mg orally once daily for three additional days, for a total of 2.5g). Patients with macrolide-resistant infections follow the doxycycline 7-day course with a 7-day course of oral moxifloxacin 400 mg daily.^[38] The sequential approach yielded cure rates of 95% for doxycycline followed by high-dose azithromycin and 92% for doxycycline followed by moxifloxacin when first implemented.^[40] When moxifloxacin is contraindicated, CDC guidelines recommend sequential therapy with 7 days of doxycycline followed by the high-dose azithromycin course, but with a test-of-cure added at 21 days after completion of the high-dose azithromycin.^[38] Minocycline (100 mg orally twice daily for 14 days) may also be an option for patients who cannot take moxifloxacin.

Table 2. 2021 STI Treatment Guidelines: *Mycoplasma genitalium* Recommended Regimens if *M. genitalium* Resistance Testing is Available

| |
|---|
| <p>Recommended if macrolide sensitive:</p> <p>Doxycycline followed by Azithromycin</p> <p><i>Doxycycline 100 mg orally 2 times/day for 7 days, followed by Azithromycin 1 g orally initial dose, followed by 500 mg orally once daily for 3 additional days (2.5 g total of Azithromycin)</i></p> |
| <p>Recommended if macrolide resistant:</p> |

Doxycycline followed by Moxifloxacin

Doxycycline 100 mg orally 2 times/day for 7 days, followed by Moxifloxacin 400 mg orally once daily for 7 days

Source: Workowski KA, Bachmann LH, Chan PA, et al. Sexually transmitted infections treatment guidelines, 2021. *Mycoplasma genitalium*. MMWR Recomm Rep. 2021;70(No. RR-4):1-187. [[2021 STI Treatment Guidelines](#)]

[Q] *M. genitalium* Treatment With Resistance Testing

Recommended Treatment if Resistance Testing is Not Available

In most clinical settings in the United States, *M. genitalium* macrolide resistance testing is not available and, therefore, not incorporated into clinic protocols. Thus, most clinicians treat *M. genitalium* infection without information about macrolide resistance.[38] The empiric approach utilizes a two-stage treatment regimen, with the first stage using 7 days of oral doxycycline, followed by a second stage consisting of oral moxifloxacin 400 mg for 7 days, which is exactly the same regimen outlined above when macrolide resistance is identified.[38] The rationale for using this two-stage approach is that doxycycline up front can reduce the overall *M. genitalium* organism burden prior to the course of moxifloxacin, which has the effect of improving clinical cure rates and may reduce the likelihood of moxifloxacin resistance developing.

Table 3. 2021 STI Treatment Guidelines: *Mycoplasma genitalium* Recommended Regimens if *M. genitalium* Resistance Testing is Not Available

Recommended if *M. genitalium* is detected by an FDA-cleared NAAT:

Doxycycline followed by Moxifloxacin

Doxycycline 100 mg orally 2 times/day for 7 days, followed by Moxifloxacin 400 mg orally once daily for 7 days

Source: Workowski KA, Bachmann LH, Chan PA, et al. Sexually transmitted infections treatment guidelines, 2021. *Mycoplasma genitalium*. MMWR Recomm Rep. 2021;70(No. RR-4):1-187. [[2021 STI Treatment Guidelines](#)]

[Q] *M. genitalium* Treatment Without Resistance Testing

Treating *M. genitalium* in Women with PID

Nonpregnant women who present with PID and are managed as an outpatient should receive the recommended empiric PID treatment regimen that consists of ceftriaxone 500 mg in a single intramuscular dose plus doxycycline 100 mg orally twice daily for 14 days plus metronidazole 500 mg orally twice daily for 14 days.[102] Women with PID and a positive test for *M. genitalium* should first receive the standard PID treatment, followed by moxifloxacin 400 mg orally once daily for 14 days; the addition of the moxifloxacin to specifically target *M. genitalium*.[38] Although the standard PID regimen is not effective against *M. genitalium*, the doxycycline will reduce the *M. genitalium* organism load prior to treatment with moxifloxacin.[103] In addition, the metronidazole in the PID treatment regimen may have some activity

against *M. genitalium*; women in a randomized trial who received a metronidazole-containing PID regimen were significantly less likely to have a persistent cervical *M. genitalium* infection than women who did not receive metronidazole.[60][Q] Treatment of *M. genitalium* in Women with PID

Treatment in Pregnancy

Mycoplasma genitalium infection in pregnancy has emerged as a major challenge. Azithromycin is the only antibiotic available in the United States that is recommended for the treatment of *M. genitalium* during pregnancy, but there is a significant chance for treatment failure with azithromycin monotherapy due to high rates of macrolide resistance. Tetracyclines (including doxycycline and minocycline) and fluoroquinolones (including moxifloxacin) are generally contraindicated during pregnancy. There are no controlled human studies of doxycycline during pregnancy, but it is usually not prescribed, given concerns over staining of primary teeth in infants and associations with congenital anomalies.[104,105] Similar concerns about use in pregnancy apply to minocycline. All fluoroquinolones, including moxifloxacin, are considered class C drugs in pregnancy and should not be used unless there is no other safe alternative.[106,107] Pristinamycin is considered safe in pregnancy, but is not available in the United States. In this setting, the treatment risks should be weighed against the potential sequelae of *M. genitalium* infection during pregnancy and discussed with the patient. Given these challenges, expert consultation is generally recommended when treating *M. genitalium* during pregnancy.

Treatment of Neonates and Children

Mycoplasma genitalium has rarely been detected in neonates and children, and there are no specific recommendations for treatment in non-adults.[38] If treatment of *M. genitalium* is required, age- and weight-specific recommendations and safety considerations for each of the recommended antibiotics (doxycycline, azithromycin, moxifloxacin) should be followed. In general, given the potential adverse effects of doxycycline and moxifloxacin in young children, expert consultation is advised.

Post-Treatment Follow-Up and Test-of-Cure

The 2021 STI Treatment Guidelines do not recommend performing a test-of-cure after treatment of *M. genitalium* in people whose symptoms have resolved.[38] The rationale for this approach is twofold. First, the benefit of identifying and treating asymptomatic infections in the absence of definitive evidence that asymptomatic *M. genitalium* infections cause sequelae is unclear. Second, the continued expansion of antimicrobial resistance in *M. genitalium* increases the risk of untreatable infections and highlights the importance of using antibiotics only when there is a clear benefit. The exception to the CDC recommendation against performing a test-of-cure is when high-dose azithromycin must be used instead of moxifloxacin and macrolide resistance data is not available. Because of the uncertain cure with azithromycin-based regimens, a test-of-cure is recommended in this setting, but should be done no sooner than 21 days or more after the treatment regimen has been completed to allow sufficient time to allow for residual nucleic acids from dead organisms to fully clear. Further, in this setting, test-of-cure should be performed even if the patient has experienced resolution of symptoms, since persistent, ongoing infection has been observed after macrolide-based regimens in persons who had resolution of symptoms. Regardless of the treatment regimen used, routine 3-month follow-up testing to check for reinfection with *M. genitalium* infection is not recommended.[38]

Management of Sex Partners

Given the high concordance of infection between sex partners (30-50%), the 2021 STI Treatment Guidelines note that sex partners of people with *M. genitalium* can be tested and, if positive, treated.[20,23,38] Ideally, this approach would focus on people in ongoing partnerships, with the goal of using concomitant treatment to prevent reinfection. If testing of the sex partner is not an option, the partner can be treated empirically with the same antibiotic regimen as used to treat the person diagnosed with *M. genitalium*.[38] Expedited partner

therapy should not be used for sex partners of people with *M. genitalium* infections. Its efficacy has not been evaluated for *M. genitalium*, and it may contribute to ongoing development and spread of resistance.

Counseling and Education

Counseling and education for patients in whom *M. genitalium* is detected should be consistent with that provided to patients with other bacterial STIs. The following summarizes key counseling messages for persons diagnosed with *M. genitalium* infection.

- **Resuming Sexual Activity:** When treated for *M. genitalium* infection, people should be told to abstain from sexual activity until they have completed both antibiotics in their sequential therapy, their symptoms have resolved, and any ongoing sex partners have either been tested or completed their own antibiotic treatment.
- **Partner Notification:** People with whom a person has an ongoing sexual relationship should be notified and encouraged to get an *M. genitalium* test (and treatment if positive) to reduce the risk of reinfection. People with whom the patient does not intend to have sex with again do not need to be notified.
- **Follow-up Testing:** Follow-up testing for *M. genitalium* should only be done in people with persistent or recurrent symptoms. People who are asymptomatic after completing their antibiotic treatment do not require a test-of-cure, with one exception—when macrolide resistance testing is not available and the treatment regimen used was doxycycline followed by azithromycin. In this situation, a test-of-cure should be performed 21 days after the antibiotics have been completed. For patients with *M. genitalium* infection, routine 3-month follow-up testing is not recommended, regardless of the treatment regimen used.
- **STI Prevention:** At the time a person is receiving treatment for an STI, it is appropriate to provide counseling messages on how to prevent STIs in the future (e.g., limiting the number of sex partners and consistently using condoms).

Summary Points

- *Mycoplasma genitalium* is not a reportable infection, and the estimated number of people infected is based on survey data. Between 2017 and 2018, there were an estimated 3 million people of reproductive age in the United States with an *M. genitalium* infection.
- *Mycoplasma genitalium* is most common among females younger than 25 years of age.
- Asymptomatic *M. genitalium* infection occurs frequently; *M. genitalium* can also cause urethritis in males and is associated with cervicitis, pelvic inflammatory disease, infertility, and preterm delivery in women. *Mycoplasma genitalium* can infect the rectum and may cause proctitis.
- Screening asymptomatic people for *M. genitalium* is not recommended. Diagnostic testing is recommended for people with persistent or recurrent symptoms.
- FDA-cleared NAATs are the preferred method of detecting *M. genitalium*. Validated specimen types include male and female urine and clinician- and self-collected urethral, vaginal, and endocervical swab specimens. Rectal specimens can be tested in laboratories that have validated this procedure. Culture is challenging and is not used in clinical care.
- Treatment of *M. genitalium* is limited to a few antibiotics. Due to the lack of a rigid cell wall, neither beta-lactams, cephalosporins, nor carbapenems have activity against *M. genitalium*. Doxycycline has low cure rates, and antibiotic resistance in *M. genitalium* has rapidly emerged, reaching nearly 60% for azithromycin and up to 10% for moxifloxacin.
- Resistance-guided therapy leverages assays that detect macrolide resistance; it can increase cure rates and reduce selection for resistance. People with macrolide-sensitive infections should receive sequential treatment with doxycycline (100 mg bid for 7 days) followed by high-dose azithromycin (1 g on day 1 followed by 500 mg on days 2-4). Patients (except pregnant women) with macrolide-resistant infections should receive sequential treatment with 7 days of doxycycline followed by 7 days of moxifloxacin (400 mg daily).
- If resistance-guided therapy is not available or not utilized, treatment for patients (except pregnant women) should consist of sequential treatment with doxycycline (100 mg bid for 7 days) followed by 7 days of moxifloxacin (400 mg daily).
- Treatment of *M. genitalium* during pregnancy is challenging, primarily due to the potential toxicity to the fetus with doxycycline and moxifloxacin. If treatment is required, the best option is high-dose azithromycin (1 g on day 1 followed by 500 mg on days 2-4), followed by a test-of-cure 21 days after completing treatment.
- Except for patients treated an azithromycin-based regimen in the absence of resistance testing, a test-of-cure in asymptomatic patients is not recommended.
- Clinicians should seek expert consultation for the treatment of pregnant women, treatment of young children, and in cases of treatment failure after moxifloxacin.
- Ongoing sex partners of people diagnosed with *M. genitalium* infection should be tested and treated with the same regimen their partner received. Presumptive treatment should only be provided when testing is not possible.

Citations

1. Miller WC, Ford CA, Morris M, et al. Prevalence of chlamydial and gonococcal infections among young adults in the United States. *JAMA*. 2004;291:2229-36.
[[PubMed Abstract](#)] -
2. Torrone EA, Kruszon-Moran D, Philips C, et al. Prevalence of Urogenital *Mycoplasma genitalium* Infection, United States, 2017 to 2018. *Sex Transm Dis*. 2021;48:e160-e162.
[[PubMed Abstract](#)] -
3. Kreisel KM, Weston EJ, St Cyr SB, Spicknall IH. Estimates of the Prevalence and Incidence of Chlamydia and Gonorrhea Among US Men and Women, 2018. *Sex Transm Dis*. 2021;48:222-31.
[[PubMed Abstract](#)] -
4. Manhart LE, Holmes KK, Hughes JP, Houston LS, Totten PA. *Mycoplasma genitalium* among young adults in the United States: an emerging sexually transmitted infection. *Am J Public Health*. 2007;97:1118-25.
[[PubMed Abstract](#)] -
5. Manhart LE, Leipertz G, Soge OO, et al. *Mycoplasma genitalium* in the US (MyGeniUS): Surveillance Data From Sexual Health Clinics in 4 US Regions. *Clin Infect Dis*. 2023;77:1449-59.
[[PubMed Abstract](#)] -
6. Haderxhanaj LT, Leichter JS, Aral SO, Chesson HW. Sex in a lifetime: Sexual behaviors in the United States by lifetime number of sex partners, 2006-2010. *Sex Transm Dis*. 2014;41:345-52.
[[PubMed Abstract](#)] -
7. Balkus JE, Manhart LE, Lee J, et al. Periodic Presumptive Treatment for Vaginal Infections May Reduce the Incidence of Sexually Transmitted Bacterial Infections. *J Infect Dis*. 2016;213:1932-7.
[[PubMed Abstract](#)] -
8. Balkus JE, Manhart LE, Jensen JS, et al. *Mycoplasma genitalium* Infection in Kenyan and US Women. *Sex Transm Dis*. 2018;45:514-21.
[[PubMed Abstract](#)] -
9. Lokken EM, Balkus JE, Kiarie J, et al. Association of Recent Bacterial Vaginosis With Acquisition of *Mycoplasma genitalium*. *Am J Epidemiol*. 2017;186:194-201.
[[PubMed Abstract](#)] -
10. Seña AC, Lee JY, Schwebke J, et al. A Silent Epidemic: The Prevalence, Incidence and Persistence of *Mycoplasma genitalium* Among Young, Asymptomatic High-Risk Women in the United States. *Clin Infect Dis*. 2018;67:73-9.
[[PubMed Abstract](#)] -
11. Rowlinson E, Hughes JP, Chambers LC, et al. Incidence of Nongonococcal Urethritis in Men Who Have Sex With Women and Associated Risk Factors. *Sex Transm Dis*. 2021;48:341-6.
[[PubMed Abstract](#)] -
12. Lis R, Rowhani-Rahbar A, Manhart LE. *Mycoplasma genitalium* infection and female reproductive tract disease: a meta-analysis. *Clin Infect Dis*. 2015;61:418-26.
[[PubMed Abstract](#)] -
13. Gupta RS, Sawani S, Adeolu M, Alnajjar S, Oren A. Phylogenetic framework for the phylum Tenericutes

based on genome sequence data: proposal for the creation of a new order *Mycoplasmoidales* ord. nov., containing two new families *Mycoplasmoidaceae* fam. nov. and *Metamycoplasmataceae* fam. nov. harbouring *Eperythrozoon*, *Ureaplasma* and five novel genera. Antonie Van Leeuwenhoek. 2018;111:1583-1630.

[\[PubMed Abstract\]](#) -

14. Balish M, Bertaccini A, Blanchard A, et al. Recommended rejection of the names *Malacoplasma* gen. nov., *Mesomycoplasma* gen. nov., *Metamycoplasma* gen. nov., *Metamycoplasmataceae* fam. nov., *Mycoplasmoidaceae* fam. nov., *Mycoplasmoidales* ord. nov., *Mycoplasmoides* gen. nov., *Mycoplasmopsis* gen. nov. [Gupta, Sawnani, Adeolu, Alnajar and Oren 2018] and all proposed species comb. nov. placed therein. Int J Syst Evol Microbiol. 2019;69:3650-3.

[\[PubMed Abstract\]](#) -

15. Miyata M. Centipede and inchworm models to explain *Mycoplasma* gliding. Trends Microbiol. 2008;16:6-12.

[\[PubMed Abstract\]](#) -

16. Wood GE, Bradshaw CS, Manhart LE. Update in Epidemiology and Management of *Mycoplasma genitalium* Infections. Infect Dis Clin North Am. 2023;37:311-33.

[\[PubMed Abstract\]](#) -

17. Jensen JS, Hansen HT, Lind K. Isolation of *Mycoplasma genitalium* strains from the male urethra. J Clin Microbiol. 1996;34:286-91.

[\[PubMed Abstract\]](#) -

18. Srinivasan S, Chambers LC, Tapia KA, et al. Urethral Microbiota in Men: Association of *Haemophilus influenzae* and *Mycoplasma penetrans* With Nongonococcal Urethritis. Clin Infect Dis. 2021;73:e1684-e1693.

[\[PubMed Abstract\]](#) -

19. Jensen JS. To Test or Not to Test for *Mycoplasma hominis* and Ureaplasmas: That's (Not) the Question. Clin Infect Dis. 2021;73:669-71.

[\[PubMed Abstract\]](#) -

20. Cina M, Baumann L, Egli-Gany D, et al. *Mycoplasma genitalium* incidence, persistence, concordance between partners and progression: systematic review and meta-analysis. Sex Transm Infect. 2019 Aug;95:328-335.

[\[PubMed Abstract\]](#) -

21. Manhart LE, Kay N. *Mycoplasma genitalium*: Is It a Sexually Transmitted Pathogen? Curr Infect Dis Rep. 2010;12:306-13.

[\[PubMed Abstract\]](#) -

22. Tosh AK, Van Der Pol B, Fortenberry JD, et al. *Mycoplasma genitalium* among adolescent women and their partners. J Adolesc Health. 2007 May;40:412-7.

[\[PubMed Abstract\]](#) -

23. Xiao L, Waites KB, Van Der Pol B, Aaron KJ, Hook EW 3rd, Geisler WM. *Mycoplasma genitalium* Infections With Macrolide and Fluoroquinolone Resistance-Associated Mutations in Heterosexual African American Couples in Alabama. Sex Transm Dis. 2019;46:18-24.

[\[PubMed Abstract\]](#) -

24. Justel M, Alexandre I, Martínez P, et al. Vertical transmission of bacterial eye infections, Angola, 2011-2012. Emerg Infect Dis. 2015;21:471-3.

[[PubMed Abstract](#)] -

25. Luki N, Lebel P, Boucher M, Doray B, Turgeon J, Brousseau R. Comparison of polymerase chain reaction assay with culture for detection of genital mycoplasmas in perinatal infections. *Eur J Clin Microbiol Infect Dis*. 1998;17:255-63.
[[PubMed Abstract](#)] -
26. Björnelius E, Jensen JS, Lidbrink P. Conjunctivitis associated with *Mycoplasma genitalium* infection. *Clin Infect Dis*. 2004 Oct 1;39:e67-9.
[[PubMed Abstract](#)] -
27. Cohen CR, Nosek M, Meier A, et al. *Mycoplasma genitalium* infection and persistence in a cohort of female sex workers in Nairobi, Kenya. *Sex Transm Dis*. 2007 May;34:274-9.
[[PubMed Abstract](#)] -
28. Romano SS, Jensen JS, Lowens MS, et al. Long Duration of Asymptomatic *Mycoplasma genitalium* Infection After Syndromic Treatment for Nongonococcal Urethritis. *Clin Infect Dis*. 2019;69:113-120.
[[PubMed Abstract](#)] -
29. Ring A, Balakrishna S, Imkamp F, et al. High Rates of Asymptomatic *Mycoplasma genitalium* Infections With High Proportion of Genotypic Resistance to First-Line Macrolide Treatment Among Men Who Have Sex With Men Enrolled in the Zurich Primary HIV Infection Study. *Open Forum Infect Dis*. 2022;9:ofac217.
[[PubMed Abstract](#)] -
30. Kim CM, Manhart LE, Wood GE. Serum and Urethral Antibody Response in *Mycoplasma genitalium* -Infected Men. *Sex Transm Dis*. 2023 Oct 1;50:e26-e29.
[[PubMed Abstract](#)] -
31. Machalek DA, Tao Y, Shilling H, et al. Prevalence of mutations associated with resistance to macrolides and fluoroquinolones in *Mycoplasma genitalium*: a systematic review and meta-analysis. *Lancet Infect Dis*. 2020;20:1302-14.
[[PubMed Abstract](#)] -
32. Centers for Disease Control and Prevention (CDC). Antibiotic Resistance Threats in the United States, 2019. Atlanta, GA: U.S. Department of Health and Human Services, CDC. Revised December 2019.
[[CDC](#)] -
33. Lau A, Bradshaw CS, Lewis D, et al. The efficacy of azithromycin for the treatment of genital *Mycoplasma genitalium*: a systematic review and meta-analysis. *Clin Infect Dis*. 2015;61:1389-99.
[[PubMed Abstract](#)] -
34. Wood GE, Kim CM, Aguila LKT, Cichewicz RH. *In Vitro* Susceptibility and Resistance of *Mycoplasma genitalium* to Nitroimidazoles. *Antimicrob Agents Chemother*. 2023;67:e0000623.
[[PubMed Abstract](#)] -
35. Wood GE, Jensen NL, Astete S, et al. Azithromycin and Doxycycline Resistance Profiles of U.S. *Mycoplasma genitalium* Strains and Their Association with Treatment Outcomes. *J Clin Microbiol*. 2021;59:e0081921.
[[PubMed Abstract](#)] -
36. Woese CR, Stackebrandt E, Ludwig W. What are mycoplasmas: the relationship of tempo and mode in bacterial evolution. *J Mol Evol*. 1984-1985;21:305-16.
[[PubMed Abstract](#)] -

37. Bachmann LH, Kirkcaldy RD, Geisler WM, et al. Prevalence of *Mycoplasma genitalium* Infection, Antimicrobial Resistance Mutations, and Symptom Resolution Following Treatment of Urethritis. Clin Infect Dis. 2020;71:e624-e632.
[[PubMed Abstract](#)] -
38. Workowski KA, Bachmann LH, Chan PA, et al. Sexually transmitted infections treatment guidelines, 2021. *Mycoplasma genitalium*. MMWR Recomm Rep. 2021;70(No. RR-4):1-187.
[[2021 STI Treatment Guidelines](#)] -
39. Jensen JS, Bradshaw C. Management of *Mycoplasma genitalium* infections - can we hit a moving target? BMC Infect Dis. 2015;15:343.
[[PubMed Abstract](#)] -
40. Durukan D, Read TRH, Murray G, et al. Resistance-Guided Antimicrobial Therapy Using Doxycycline-Moxifloxacin and Doxycycline-2.5 g Azithromycin for the Treatment of *Mycoplasma genitalium* Infection: Efficacy and Tolerability. Clin Infect Dis. 2020;71:1461-8.
[[PubMed Abstract](#)] -
41. Berçot B, Charreau I, Rousseau C, et al. High Prevalence and High Rate of Antibiotic Resistance of *Mycoplasma genitalium* Infections in Men Who Have Sex With Men: A Substudy of the ANRS IPERGAY Pre-exposure Prophylaxis Trial. Clin Infect Dis. 2021;73:e2127-e2133.
[[PubMed Abstract](#)] -
42. Le Roy C, Touati A, Balcon C, et al. Identification of 16S rRNA mutations in *Mycoplasma genitalium* potentially associated with tetracycline resistance in vivo but not selected in vitro in *M. genitalium* and *Chlamydia trachomatis*. J Antimicrob Chemother. 2021;76:1150-4.
[[PubMed Abstract](#)] -
43. Clarke EJ, Vodstrcil LA, Plummer EL, et al. Efficacy of Minocycline for the Treatment of *Mycoplasma genitalium*. Open Forum Infect Dis. 2023;10:ofad427.
[[PubMed Abstract](#)] -
44. Hamasuna R, Jensen JS, Osada Y. Antimicrobial susceptibilities of *Mycoplasma genitalium* strains examined by broth dilution and quantitative PCR. Antimicrob Agents Chemother. 2009;53:4938-9.
[[PubMed Abstract](#)] -
45. Li Y, Le WJ, Li S, Cao YP, Su XH. Meta-analysis of the efficacy of moxifloxacin in treating *Mycoplasma genitalium* infection. Int J STD AIDS. 2017;28:1106-14.
[[PubMed Abstract](#)] -
46. Li Y, Su X, Le W, et al. *Mycoplasma genitalium* in Symptomatic Male Urethritis: Macrolide Use Is Associated With Increased Resistance. Clin Infect Dis. 2020;70:805-10.
[[PubMed Abstract](#)] -
47. Murray GL, Plummer EL, Bodiyaadu K, et al. *gyrA* Mutations in *Mycoplasma genitalium* and Their Contribution to Moxifloxacin Failure: Time for the Next Generation of Resistance-Guided Therapy. Clin Infect Dis. 2023;76:2187-95.
[[PubMed Abstract](#)] -
48. Read TRH, Jensen JS, Fairley CK, et al. Use of Pristinamycin for Macrolide-Resistant *Mycoplasma genitalium* Infection. Emerg Infect Dis. 2018;24:328-35.
[[PubMed Abstract](#)] -

49. Palich R, Gardette M, Bébéar C, Caumes É, Pereyre S, Monsel G. Initial Failure of Pristinamycin Treatment in a Case of Multidrug-Resistant *Mycoplasma genitalium* Urethritis Eventually Treated by Sequential Therapy. *Sex Transm Dis.* 2021;48:e163-e164.
[[PubMed Abstract](#)] -
50. Waites KB, Crabb DM, Atkinson TP, Geisler WM, Xiao L. Omadacycline Is Highly Active In Vitro against *Mycoplasma genitalium*. *Microbiol Spectr.* 2022;10:e0365422.
[[PubMed Abstract](#)] -
51. Liscynesky C, Lipps A, Bazan JA. Successful Treatment of *Mycoplasma genitalium* Urethritis With High-Dose Tinidazole. *Sex Transm Dis.* 2025;52:e2-e4.
[[PubMed Abstract](#)] -
52. Moi H, Reinton N, Moghaddam A. *Mycoplasma genitalium* in women with lower genital tract inflammation. *Sex Transm Infect.* 2009 Feb;85:10-4.
[[PubMed Abstract](#)] -
53. Högdahl M, Kihlström E. Leucocyte esterase testing of first-voided urine and urethral and cervical smears to identify *Mycoplasma genitalium*-infected men and women. *Int J STD AIDS.* 2007 Dec;18:835-8.
[[PubMed Abstract](#)] -
54. Olson E, Gupta K, Van Der Pol B, Galbraith JW, Geisler WM. *Mycoplasma genitalium* infection in women reporting dysuria: A pilot study and review of the literature. *Int J STD AIDS.* 2021;32:1196-1203.
[[PubMed Abstract](#)] -
55. Manhart LE, Gaydos CA, Taylor SN, et al. Characteristics of *Mycoplasma genitalium* Urogenital Infections in a Diverse Patient Sample from the United States: Results from the Aptima *Mycoplasma genitalium* Evaluation Study (AMES). *J Clin Microbiol.* 2020 Jun 24;58:.
[[PubMed Abstract](#)] -
56. Schwebke JR, Nyirjesy P, Dsouza M, Getman D. Vaginitis and risk of sexually transmitted infections: results of a multi-center U.S. clinical study using STI nucleic acid amplification testing. *J Clin Microbiol.* 2024;62:e0081624.
[[PubMed Abstract](#)] -
57. Falk L. The overall agreement of proposed definitions of mucopurulent cervicitis in women at high risk of Chlamydia infection. *Acta Derm Venereol.* 2010;90:506-11.
[[PubMed Abstract](#)] -
58. Gaydos C, Maldeis NE, Hardick A, Hardick J, Quinn TC. *Mycoplasma genitalium* as a contributor to the multiple etiologies of cervicitis in women attending sexually transmitted disease clinics. *Sex Transm Dis.* 2009 Oct;36:598-606.
[[PubMed Abstract](#)] -
59. Oakeshott P, Kerry S, Aghaizu A, et al. Randomised controlled trial of screening for *Chlamydia trachomatis* to prevent pelvic inflammatory disease: the POPI (prevention of pelvic infection) trial. *BMJ.* 2010;340:c1642.
[[PubMed Abstract](#)] -
60. Wiesenfeld HC, Meyn LA, Darville T, Macio IS, Hillier SL. A Randomized Controlled Trial of Ceftriaxone and Doxycycline, With or Without Metronidazole, for the Treatment of Acute Pelvic Inflammatory Disease. *Clin Infect Dis.* 2021;72:1181-9.
[[PubMed Abstract](#)] -

61. Htaik K, Vodstrcil LA, Plummer EL, et al. Systematic review and meta-analysis of the association between *Mycoplasma genitalium* and Pelvic inflammatory disease (PID). Clin Infect Dis. 2024 Jun 7. Online ahead of print.
[PubMed Abstract] -
62. Towns JM, Williamson DA, Bradshaw CS. Case of *Mycoplasma genitalium* pelvic inflammatory disease with perihepatitis. Sex Transm Infect. 2021 Dec;97:628.
[PubMed Abstract] -
63. Bjartling C, Osseer S, Persson K. The association between *Mycoplasma genitalium* and pelvic inflammatory disease after termination of pregnancy. BJOG. 2010 Feb;117:361-4.
[PubMed Abstract] -
64. Latimer RL, Read TRH, Vodstrcil LA, et al. Clinical Features and Therapeutic Response in Women Meeting Criteria for Presumptive Treatment for Pelvic Inflammatory Disease Associated With *Mycoplasma genitalium*. Sex Transm Dis. 2019;46:73-9.
[PubMed Abstract] -
65. Cohen CR, Mugo NR, Astete SG, et al. Detection of *Mycoplasma genitalium* in women with laparoscopically diagnosed acute salpingitis. Sex Transm Infect. 2005;81:463-6.
[PubMed Abstract] -
66. Clausen HF, Fedder J, Drasbek M, et al. Serological investigation of *Mycoplasma genitalium* in infertile women. Hum Reprod. 2001;16:1866-74.
[PubMed Abstract] -
67. Svenstrup HF, Fedder J, Kristoffersen SE, Trolle B, Birkelund S, Christiansen G. *Mycoplasma genitalium*, *Chlamydia trachomatis*, and tubal factor infertility--a prospective study. Fertil Steril. 2008;90:513-20.
[PubMed Abstract] -
68. Lokken EM, Kabare E, Oyaro B, et al. A prospective preconception cohort study of the association between *Mycoplasma genitalium* and fecundability in Kenyan women trying to conceive. Hum Reprod. 2023;38:2020-7.
[PubMed Abstract] -
69. Peipert JF, Zhao Q, Schreiber CA, et al. Intrauterine device use, sexually transmitted infections, and fertility: a prospective cohort study. Am J Obstet Gynecol. 2021;225:157.e1-157.e9.
[PubMed Abstract] -
70. Ashshi AM, Batwa SA, Kutbi SY, Malibary FA, Batwa M, Refaat B. Prevalence of 7 sexually transmitted organisms by multiplex real-time PCR in Fallopian tube specimens collected from Saudi women with and without ectopic pregnancy. BMC Infect Dis. 2015;15:569.
[PubMed Abstract] -
71. Frenzer C, Egli-Gany D, Vallely LM, Vallely AJ, Low N. Adverse pregnancy and perinatal outcomes associated with *Mycoplasma genitalium*: systematic review and meta-analysis. Sex Transm Infect. 2022;98:222-7.
[PubMed Abstract] -
72. Averbach SH, Hacker MR, Yiu T, Modest AM, Dimitrakoff J, Ricciotti HA. *Mycoplasma genitalium* and preterm delivery at an urban community health center. Int J Gynaecol Obstet. 2013;123:54-7.
[PubMed Abstract] -

73. Perin J, Coleman JS, Ronda J, Neibaur E, Gaydos CA, Trent M. Maternal and Fetal Outcomes in an Observational Cohort of Women With *Mycoplasma genitalium* Infections. *Sex Transm Dis.* 2021;48:991-6.
[[PubMed Abstract](#)] -
74. Taylor-Robinson D, Jensen JS. *Mycoplasma genitalium*: from Chrysalis to multicolored butterfly. *Clin Microbiol Rev.* 2011;24:498-514.
[[PubMed Abstract](#)] -
75. Wetmore CM, Manhart LE, Lowens MS, et al. Demographic, behavioral, and clinical characteristics of men with nongonococcal urethritis differ by etiology: a case-comparison study. *Sex Transm Dis.* 2011;38:180-6.
[[PubMed Abstract](#)] -
76. Llata E, Tromble E, Schumacher C, et al. Should We Be Testing for *Mycoplasma genitalium* on Initial Presentation? Trends in Persistent/Recurrent Urethritis Among Men Presenting for Care in STD Clinics, 2015-2019, STD Surveillance Network. *Sex Transm Dis.* 2024;51:493-8.
[[PubMed Abstract](#)] -
77. Eickhoff JH, Frimodt-Møller N, Walter S, Frimodt-Møller C. A double-blind, randomized, controlled multicentre study to compare the efficacy of ciprofloxacin with pivampicillin as oral therapy for epididymitis in men over 40 years of age. *BJU Int.* 1999;84:827-34.
[[PubMed Abstract](#)] -
78. Ito S, Tsuchiya T, Yasuda M, Yokoi S, Nakano M, Deguchi T. Prevalence of genital mycoplasmas and ureaplasmas in men younger than 40 years-of-age with acute epididymitis. *Int J Urol.* 2012;19:234-8.
[[PubMed Abstract](#)] -
79. Latimer RL, Shilling HS, Vodstrcil LA, et al. Prevalence of *Mycoplasma genitalium* by anatomical site in men who have sex with men: a systematic review and meta-analysis. *Sex Transm Infect.* 2020;96:563-570.
[[PubMed Abstract](#)] -
80. Nakashima K, Shigehara K, Kawaguchi S, et al. Prevalence of human papillomavirus infection in the oropharynx and urine among sexually active men: a comparative study of infection by papillomavirus and other organisms, including *Neisseria gonorrhoeae*, *Chlamydia trachomatis*, *Mycoplasma* spp., and *Ureaplasma* spp. *BMC Infect Dis.* 2014;14:43.
[[PubMed Abstract](#)] -
81. Zanotta N, Delbue S, Signorini L, et al. Merkel Cell Polyomavirus Is Associated with Anal Infections in Men Who Have Sex with Men. *Microorganisms.* 2019;7(2):54.
[[PubMed Abstract](#)] -
82. Dubbink JH, de Waaij DJ, Bos M, et al. Microbiological Characteristics of *Chlamydia trachomatis* and *Neisseria gonorrhoeae* Infections in South African Women. *J Clin Microbiol.* 2016 Jan;54:200-3.
[[PubMed Abstract](#)] -
83. Khosropour CM, Jensen JS, Soge OO, et al. High Prevalence of Vaginal and Rectal *Mycoplasma genitalium* Macrolide Resistance Among Female Sexually Transmitted Disease Clinic Patients in Seattle, Washington. *Sex Transm Dis.* 2020 May;47:321-325.
[[PubMed Abstract](#)] -
84. Berti V, Blondel J, Spindler L, et al. Infective anoproctitis in men having sex with men: Don't forget *Mycoplasma genitalium*. *Infect Dis Now.* 2023;53:104771.

[[PubMed Abstract](#)] -

85. Chow EPF, Lee D, Bond S, et al. Nonclassical Pathogens as Causative Agents of Proctitis in Men who Have Sex With Men. *Open Forum Infect Dis*. 2021;8:ofab137.
[[PubMed Abstract](#)] -
86. Francis SC, Kent CK, Klausner JD, et al. Prevalence of rectal *Trichomonas vaginalis* and *Mycoplasma genitalium* in male patients at the San Francisco STD clinic, 2005-2006. *Sex Transm Dis*. 2008;35:797-800.
[[PubMed Abstract](#)] -
87. Read TRH, Murray GL, Danielewski JA, et al. Symptoms, Sites, and Significance of *Mycoplasma genitalium* in Men Who Have Sex with Men. *Emerg Infect Dis*. 2019;25:719-727.
[[PubMed Abstract](#)] -
88. Chrisment D, Machelart I, Wirth G, et al. Reactive arthritis associated with *Mycoplasma genitalium* urethritis. *Diagn Microbiol Infect Dis*. 2013;77:278-9.
[[PubMed Abstract](#)] -
89. Taylor-Robinson D, Gilroy CB, Horowitz S, Horowitz J. *Mycoplasma genitalium* in the joints of two patients with arthritis. *Eur J Clin Microbiol Infect Dis*. 1994;13:1066-9.
[[PubMed Abstract](#)] -
90. Idahl A, Jurstrand M, Olofsson JI, Fredlund H. *Mycoplasma genitalium* serum antibodies in infertile couples and fertile women. *Sex Transm Infect*. 2015 Dec;91:589-91.
[[PubMed Abstract](#)] -
91. Jurstrand M, Jensen JS, Magnuson A, Kamwendo F, Fredlund H. A serological study of the role of *Mycoplasma genitalium* in pelvic inflammatory disease and ectopic pregnancy. *Sex Transm Infect*. 2007;83:319-23.
[[PubMed Abstract](#)] -
92. Chiribau CB, Schmedes S, Dong Y, et al. Detection of resistance to macrolides and fluoroquinolones in *Mycoplasma genitalium* by targeted next-generation sequencing. *Microbiol Spectr*. 2024;12:e0384523.
[[PubMed Abstract](#)] -
93. Jensen JS, Bradshaw CS, Tabrizi SN, Fairley CK, Hamasuna R. Azithromycin treatment failure in *Mycoplasma genitalium*-positive patients with nongonococcal urethritis is associated with induced macrolide resistance. *Clin Infect Dis*. 2008;47:1546-53.
[[PubMed Abstract](#)] -
94. Le Roy C, Pereyre S, Hénin N, Bébéar C. French Prospective Clinical Evaluation of the Aptima *Mycoplasma genitalium* CE-IVD Assay and Macrolide Resistance Detection Using Three Distinct Assays. *J Clin Microbiol*. 2017;55:3194-3200.
[[PubMed Abstract](#)] -
95. Murray GL, Bodiya K, Vodstrcil LA, et al. parC Variants in *Mycoplasma genitalium*: Trends over Time and Association with Moxifloxacin Failure. *Antimicrob Agents Chemother*. 2022;66:e0027822.
[[PubMed Abstract](#)] -
96. Jensen JS, Cusini M, Gomberg M, Moi H, Wilson J, Unemo M. 2021 European guideline on the management of *Mycoplasma genitalium* infections. *J Eur Acad Dermatol Venereol*. 2022;36:641-50.
[[PubMed Abstract](#)] -

97. Johnson KA, Sankaran M, Kohn RP, Bacon O, Cohen SE. Testing for *Mycoplasma genitalium* and Using Doxycycline as First-Line Therapy at Initial Presentations for Non-Gonococcal Urethritis (NGU) Correlate With Reductions in Persistent NGU. Clin Infect Dis. 2023;76:1674-7.
[PubMed Abstract] -
98. Manhart LE, Geisler WM, Bradshaw CS, Jensen JS, Martin DH. Weighing Potential Benefits and Harms of *Mycoplasma genitalium* Testing and Treatment Approaches. Emerg Infect Dis. 2022;28:e220094.
[PubMed Abstract] -
99. Schwebke JR, Rompalo A, Taylor S, et al. Re-evaluating the treatment of nongonococcal urethritis: emphasizing emerging pathogens--a randomized clinical trial. Clin Infect Dis. 2011;52:163-70.
[PubMed Abstract] -
100. Mena LA, Mroczkowski TF, Nsuami M, Martin DH. A randomized comparison of azithromycin and doxycycline for the treatment of *Mycoplasma genitalium*-positive urethritis in men. Clin Infect Dis. 2009;48:1649-54.
[PubMed Abstract] -
101. Manhart LE, Gillespie CW, Lowens MS, et al. Standard treatment regimens for nongonococcal urethritis have similar but declining cure rates: a randomized controlled trial. Clin Infect Dis. 2013;56:934-42.
[PubMed Abstract] -
102. Workowski KA, Bachmann LH, Chan PA, et al. Sexually transmitted infections treatment guidelines, 2021. Pelvic inflammatory disease (PID). MMWR Recomm Rep. 2021;70(No. RR-4):1-187.
[2021 STI Treatment Guidelines] -
103. Haggerty CL, Totten PA, Astete SG, Ness RB. *Mycoplasma genitalium* among women with nongonococcal, nonchlamydial pelvic inflammatory disease. Infect Dis Obstet Gynecol. 2006;2006:30184.
[PubMed Abstract] -
104. Cohlman SQ. Tetracycline staining of teeth. Teratology. 1977;15:127-9.
[PubMed Abstract] -
105. Czeizel AE, Rockenbauer M. Teratogenic study of doxycycline. Obstet Gynecol. 1997;89:524-8.
[PubMed Abstract] -
106. Bar-Oz B, Moretti ME, Boskovic R, O'Brien L, Koren G. The safety of quinolones—a meta-analysis of pregnancy outcomes. Eur J Obstet Gynecol Reprod Biol. 2009;143:75-8.
[PubMed Abstract] -
107. Watanabe T, Fujikawa K, Harada S, Ohura K, Sasaki T, Takayama S. Reproductive toxicity of the new quinolone antibacterial agent levofloxacin in rats and rabbits. Arzneimittelforschung. 1992;43:374-7.
[PubMed Abstract] -

References

- Fox-Lewis S, Forster R, Basu I, Blakiston M, McAuliffe G. The association between antimicrobial resistance mutations and treatment outcomes for *Mycoplasma genitalium* infections from 2018 to 2022: a cross-sectional study from Auckland, New Zealand. Sex Health. 2024;21:SH24166.
[PubMed Abstract] -
- Giacani L, Bradshaw CS, Muzny CA, et al. Antimicrobial Resistance in Curable Sexually Transmitted

[[PubMed Abstract](#)] -

- Hoffman A, Dolezal KA, Powell R. Dysuria: Evaluation and Differential Diagnosis in Adults. Am Fam Physician. 2025;111:37-46.
[PubMed Abstract] -
- Kobori Y, Yoshida N, Manda K, Onoe Y, Hamasuna R. Outcomes of Sequential Therapy With Minocycline and Sitaflaxacin Versus Sitaflaxacin Monotherapy for *Mycoplasma genitalium* Infections. Int J Urol. 2025 Mar 14. [Online ahead of print]
[PubMed Abstract] -
- Le Roy C, Pereyre S, Bébéar C. Evaluation of two commercial real-time PCR assays for detection of *Mycoplasma genitalium* in urogenital specimens. J Clin Microbiol. 2014;52:971-3.
[PubMed Abstract] -
- Liscynesky C, Lipps A, Bazan JA. Successful Treatment of *Mycoplasma genitalium* Urethritis With High-Dose Tinidazole. Sex Transm Dis. 2025;52:e2-e4.
[PubMed Abstract] -
- Oakeshott P, Aghaizu A, Hay P, et al. Is *Mycoplasma genitalium* in women the "New Chlamydia?" A community-based prospective cohort study. Clin Infect Dis. 2010;51:1160-6.
[PubMed Abstract] -
- Read TRH, Fairley CK, Murray GL, et al. Outcomes of Resistance-guided Sequential Treatment of *Mycoplasma genitalium* Infections: A Prospective Evaluation. Clin Infect Dis. 2019;68:554-60.
[PubMed Abstract] -
- Soni S, Horner P, Rayment M, et al. British Association for Sexual Health and HIV national guideline for the management of infection with *Mycoplasma genitalium* (2018). Int J STD AIDS. 2019;956462419825948.
[PubMed Abstract] -
- Yuan M, Le W, Zhao Y, Gan L, Li S, Su X. Efficacy of Doxycycline-Sitaflaxacin Sequential Therapy for Urogenital *Mycoplasma genitalium* Infection in Nanjing, China. Sex Transm Dis. 2025;52:259-65.
[PubMed Abstract] -

Figures

Figure 1 *Mycoplasma genitalium*

Illustration credit: Cognition Studio, Inc.; Gwendolyn E. Wood, PhD; Lisa E. Manhart, PhD, MPH; and David H. Spach, MD

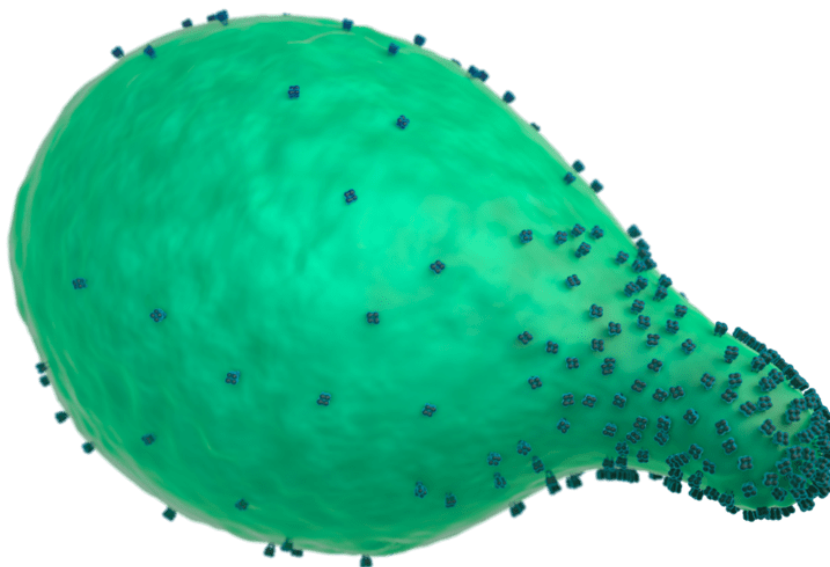


Figure 2 *Mycoplasma genitalium* Prevalence in Sexual Health Clinics in United States

Source: Manhart LE, Leipertz G, Soge OO, et al. *Mycoplasma genitalium* in the US (MyGeniUS): Surveillance Data From Sexual Health Clinics in 4 US Regions. Clin Infect Dis. 2023;77:1449-59.

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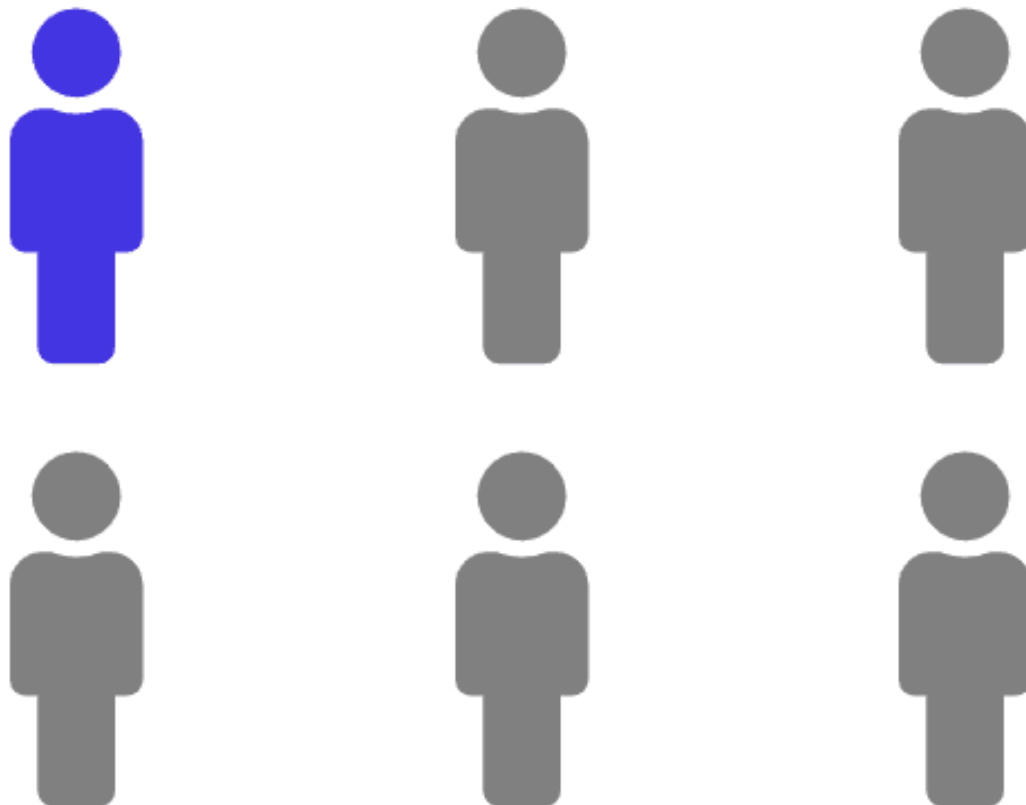
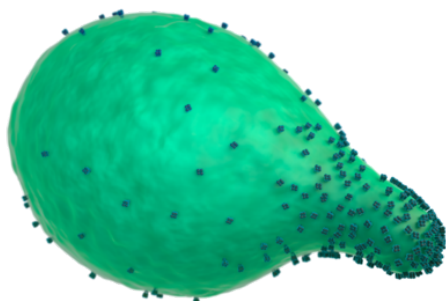


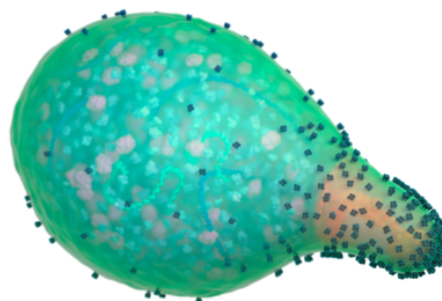
Figure 3 *Mycoplasma genitalium* Structure

Illustration credit: Cognition Studio, Inc.; Gwendolyn E. Wood, PhD; Lisa E. Manhart, PhD, MPH; and David H. Spach, MD

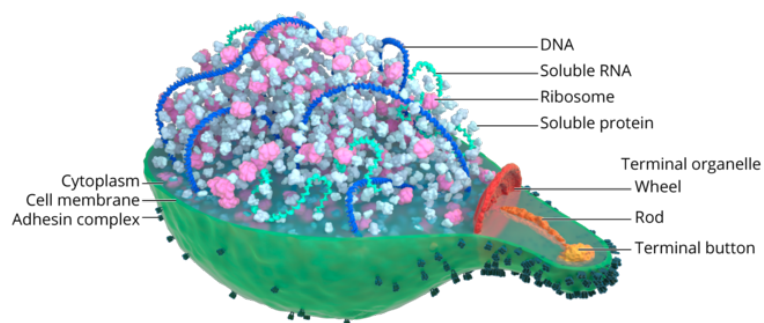
Mycoplasma genitalium



Mycoplasma genitalium
Translucent



Mycoplasma genitalium
Hemisection



Mycoplasma genitalium
Terminal organelle

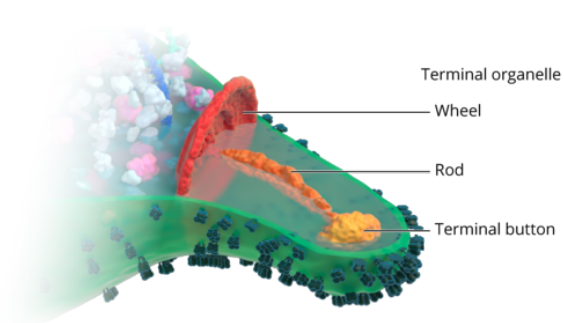


Figure 4 Distribution of Azithromycin MICs Performed on 56 *Mycoplasma genitalium* Clinical Isolates from 2007-2011

Abbreviation: (MICs) = Minimum Inhibitory Concentrations
 Isolates with Azithromycin MIC ≥ 8 m/mL correlated

Source: Wood GE, Jensen NL, Astete S, et al. Azithromycin and Doxycycline Resistance Profiles of U.S. em>*Mycoplasma genitalium* Strains and Their Association with Treatment Outcomes. J Clin Microbiol. 2021;59:e0081921.

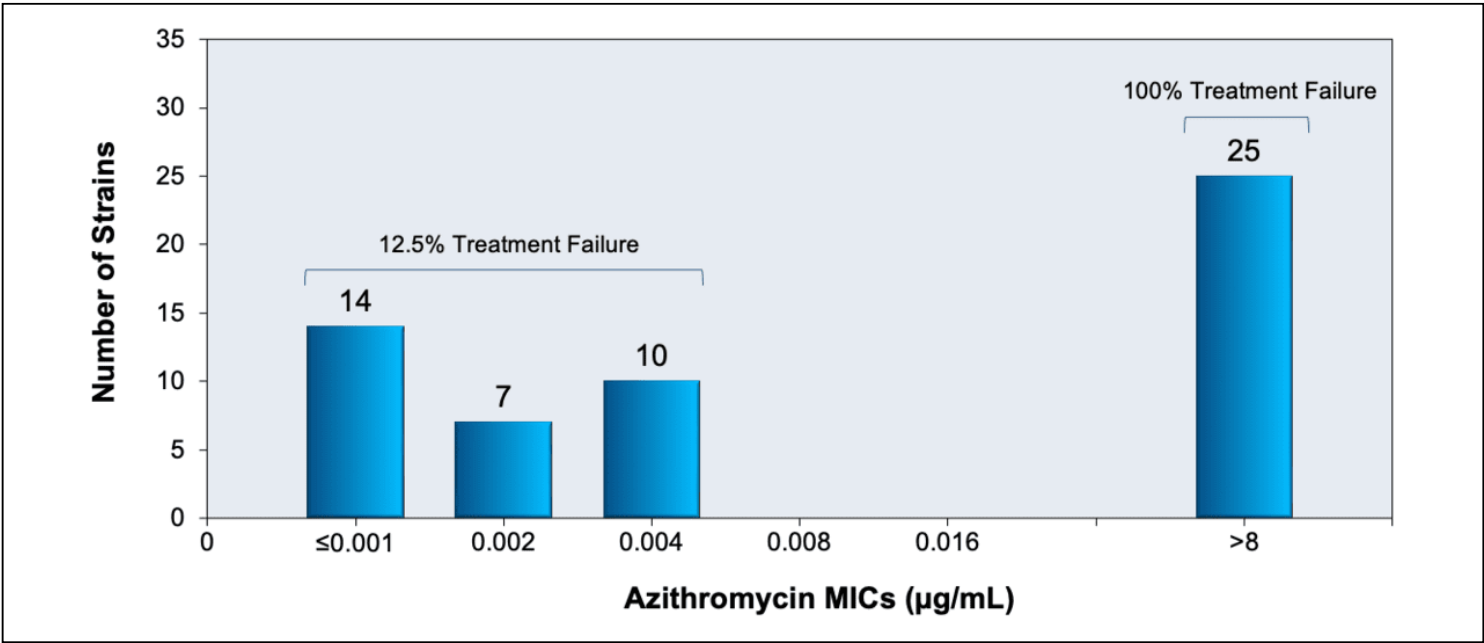


Figure 5 Distribution of Doxycycline MICs Performed on 62 *Mycoplasma genitalium* Strains Cultured

Abbreviation: (MICs) = Minimum Inhibitory Concentrations

Source: Wood GE, Jensen NL, Astete S, et al. Azithromycin and Doxycycline Resistance Profiles of U.S. em>Mycoplasma genitalium Strains and Their Association with Treatment Outcomes. J Clin Microbiol. 2021;59:e0081921.

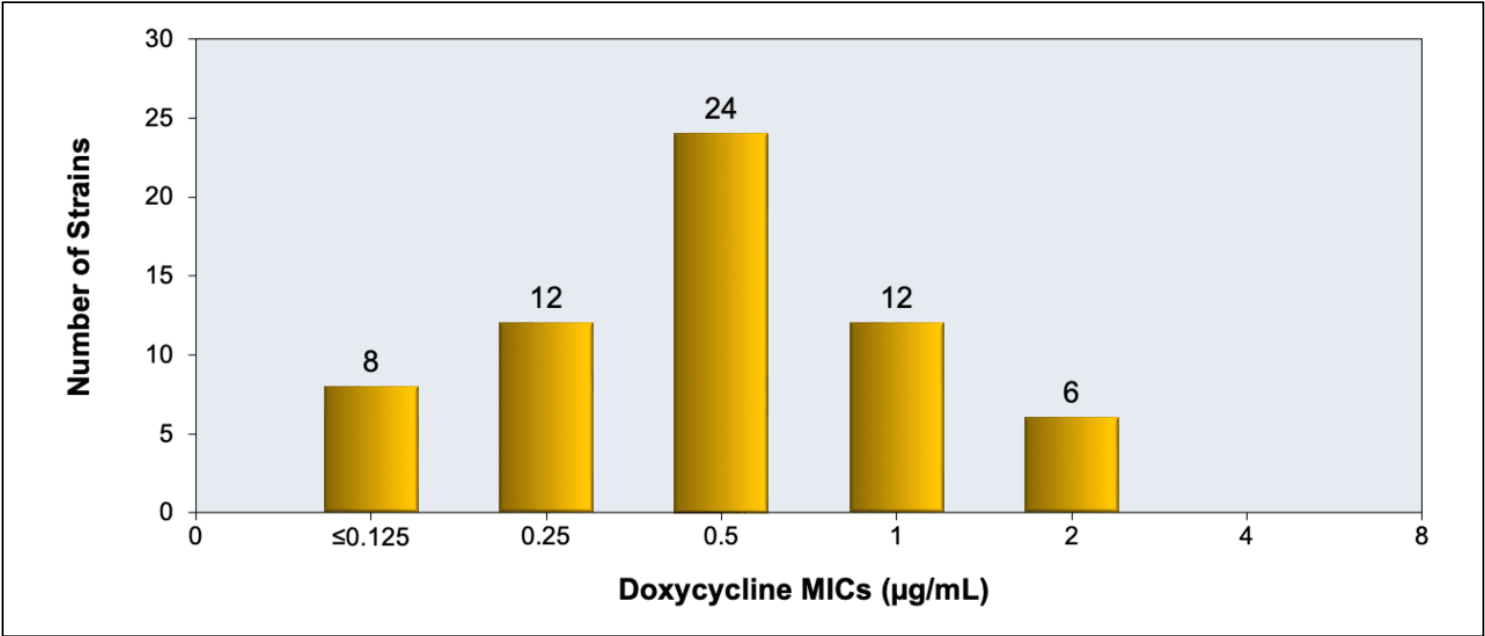


Figure 6 Cervicitis with Purulent Cervical Discharge

Illustration: Cognition Studio, Inc. and David H. Spach, MD

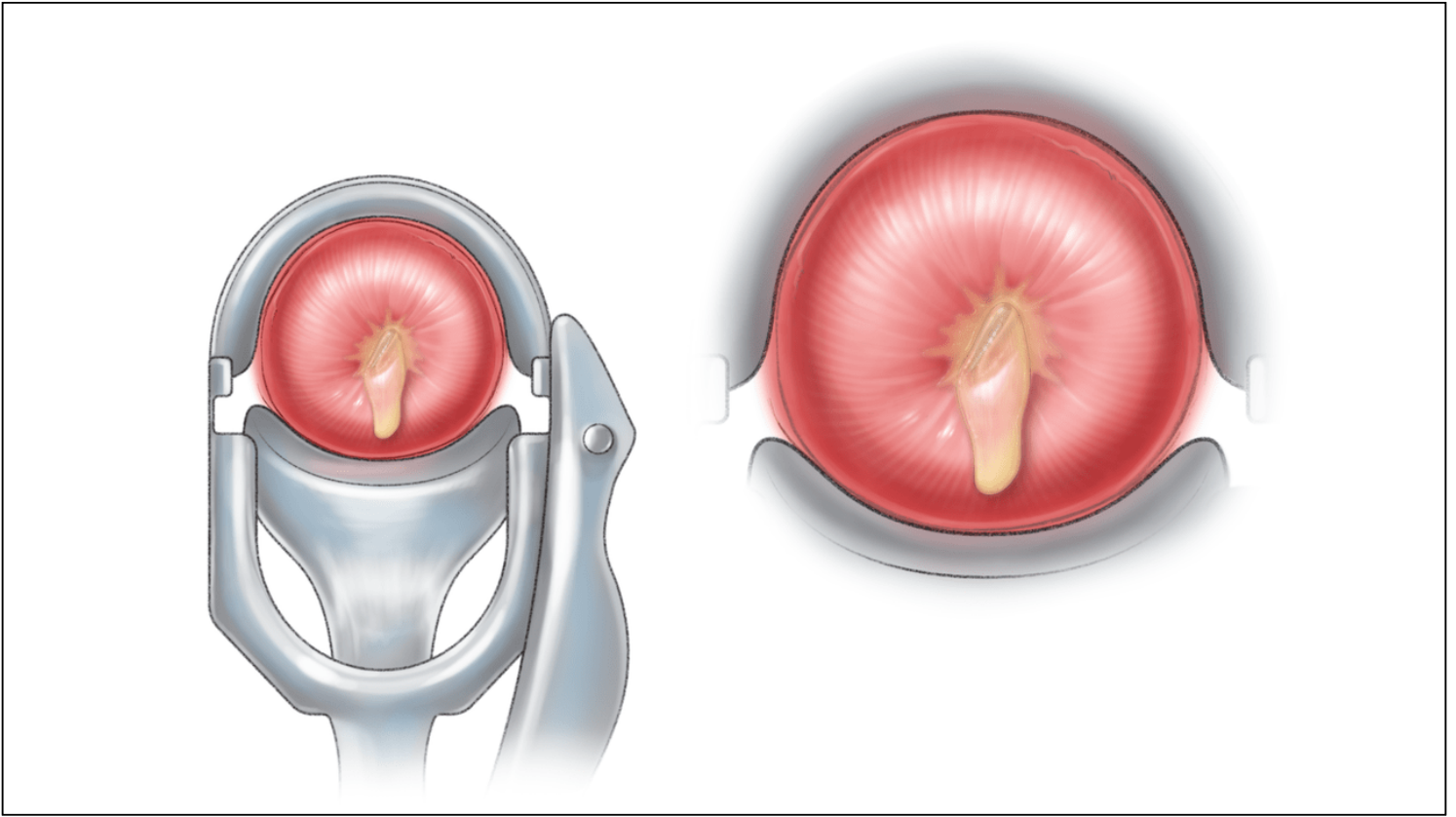


Figure 7 Pelvic Inflammatory Disease

Illustration: Cognition Studio, Inc. and David H. Spach, MD

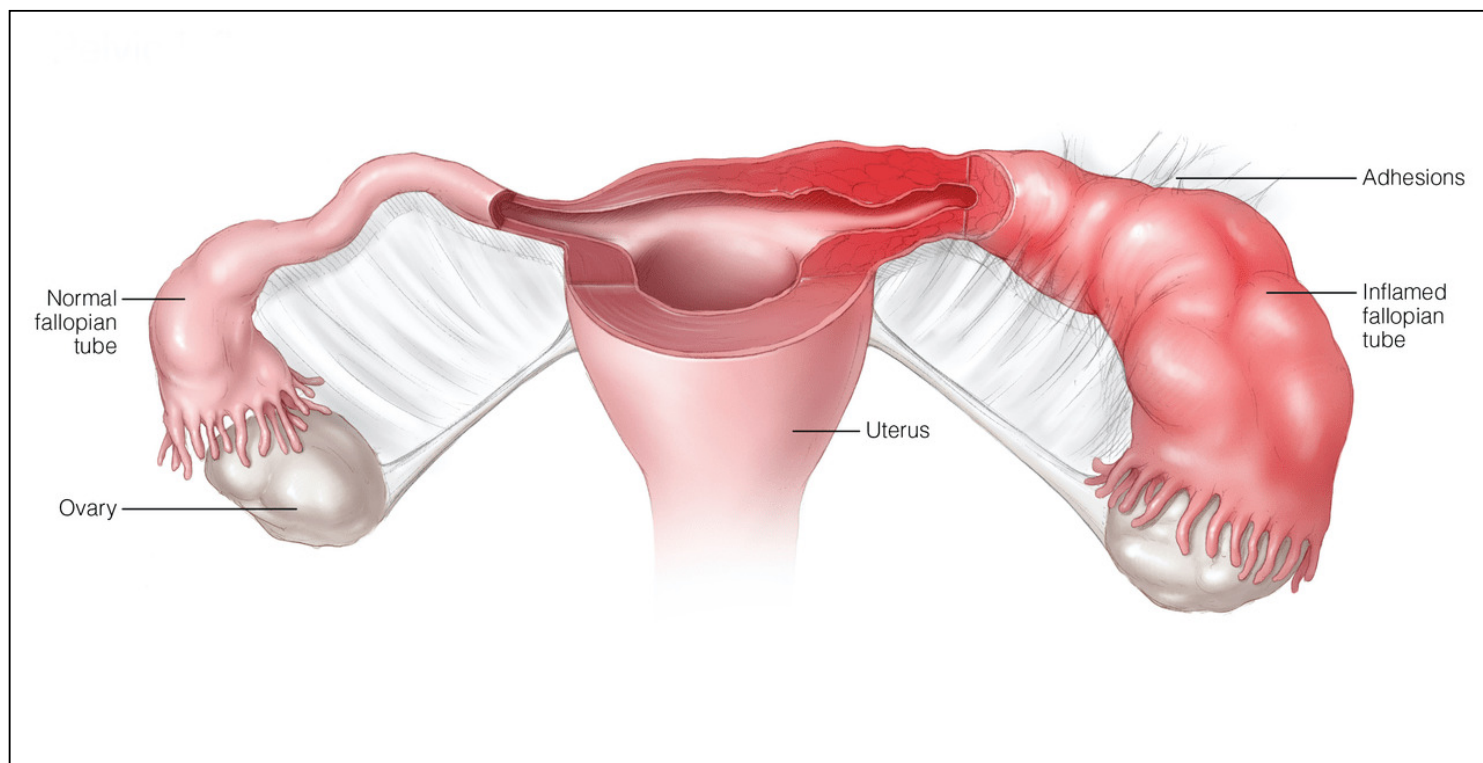


Figure 8 Tubal Occlusion Following Salpingitis

Illustration: Cognition Studio, Inc. and David H. Spach, MD

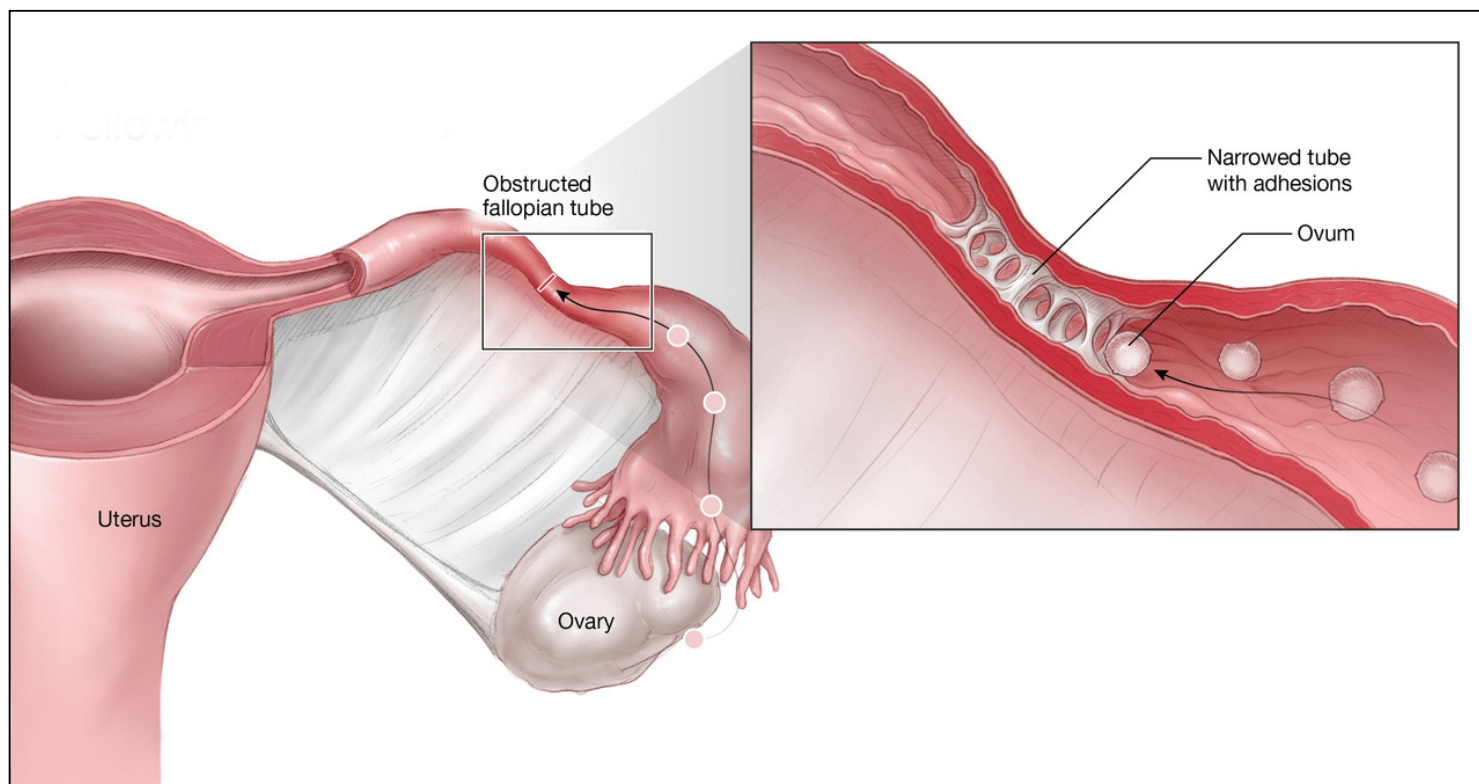


Figure 9 Proctitis

Illustration: Cognition Studio, Inc. and David H. Spach, MD

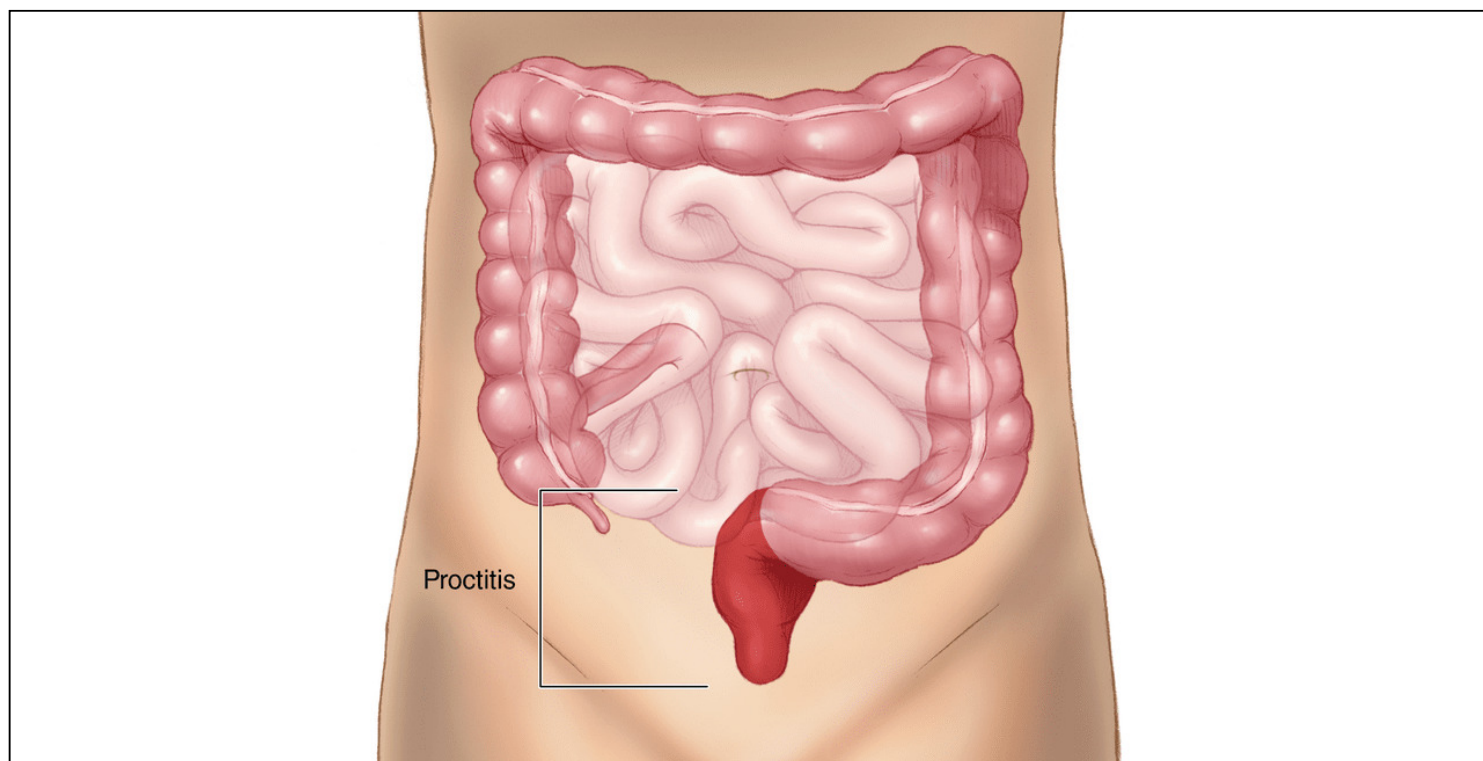


Figure 10 Efficacy of Azithromycin and Doxycycline Monotherapy in the Treatment of *Mycoplasma genitalium* in 3 Randomized Comparative Trials

Source: (1) Mena LA, Mroczkowski TF, Nsuami M, Martin DH. A randomized comparison of azithromycin and doxycycline for the treatment of *Mycoplasma genitalium*-positive urethritis in men. Clin Infect Dis. 2009;48:1649-54. (2) Schwebke JR, Rompalo A, Taylor S, et al. Re-evaluating the treatment of nongonococcal urethritis: emphasizing emerging pathogens--a randomized clinical trial. Clin Infect Dis. 2011;52:163-70. (3) Manhart LE, Gillespie CW, Lowens MS, et al. Standard treatment regimens for nongonococcal urethritis have similar but declining cure rates: a randomized controlled trial. Clin Infect Dis. 2013;56:934-42.

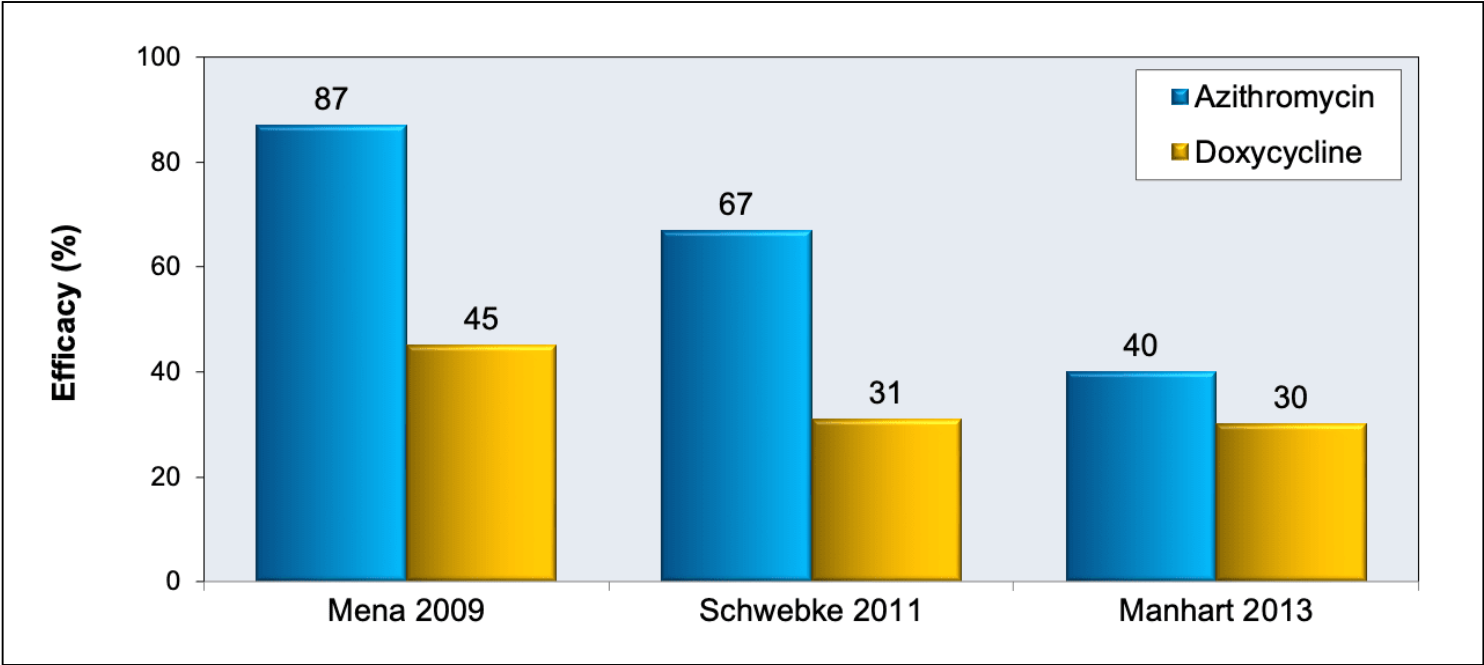


Table 1.

***Mycoplasma genitalium* Testing Recommendations**

| Type of Test | Definition | Recommendation |
|------------------------|--|--|
| Screening Test | Testing of asymptomatic people with the goal of preventing disease sequelae and prevent transmission to others | Routine testing of asymptomatic people is recommended. |
| Diagnostic Test | Testing of symptomatic persons to direct treatment decisions | <p>Testing recommended for:</p> <ul style="list-style-type: none"> • Men with persistent or recurrent symptoms • Women with persistent or recurrent symptoms <p>Testing should be considered for:</p> <ul style="list-style-type: none"> • Women with pelvic inflammatory disease |

Source:

- Wetmore CM, Manhart LE, Lowens MS, et al. Demographic, behavioral, and clinical characteristics of men with nongonococcal urethritis differ by etiology: a case-comparison study. Sex Transm Dis. 2011;38:180-6. [[PubMed Abstract](#)]
- Workowski KA, Bachmann LH, Chan PA, et al. Sexually transmitted infections treatment guidelines, 2021. *Mycoplasma genitalium*. MMWR Recomm Rep. 2021;70(No. RR-4):1-187. [[2021 STI Treatment Guidelines](#)]

**Table 2. 2021 STI Treatment Guidelines: *Mycoplasma genitalium*
Recommended Regimens if *M. genitalium* Resistance Testing is Available**

Recommended if macrolide sensitive:

Doxycycline followed by Azithromycin

Doxycycline 100 mg orally 2 times/day for 7 days, followed by Azithromycin 1 g orally initial dose, followed by 500 mg orally once daily for 3 additional days (2.5 g total of Azithromycin)

Recommended if macrolide resistant:

Doxycycline followed by Moxifloxacin

Doxycycline 100 mg orally 2 times/day for 7 days, followed by Moxifloxacin 400 mg orally once daily for 7 days

Source: Workowski KA, Bachmann LH, Chan PA, et al. Sexually transmitted infections treatment guidelines, 2021. *Mycoplasma genitalium*. MMWR Recomm Rep. 2021;70(No. RR-4):1-187. [[2021 STI Treatment Guidelines](#)]

Table 3. 2021 STI Treatment Guidelines: *Mycoplasma genitalium*
Recommended Regimens if *M. genitalium* Resistance Testing is Not Available

Recommended if *M. genitalium* is detected by an FDA-cleared NAAT:

Doxycycline followed by Moxifloxacin

Doxycycline 100 mg orally 2 times/day for 7 days, followed by Moxifloxacin 400 mg orally once daily for 7 days

Source: Workowski KA, Bachmann LH, Chan PA, et al. Sexually transmitted infections treatment guidelines, 2021. *Mycoplasma genitalium*. MMWR Recomm Rep. 2021;70(No. RR-4):1-187. [[2021 STI Treatment Guidelines](#)]

