

SYPHILIS

Describe the agent that causes syphilis. What challenges do its characteristics present?

Treponema pallidum is a spirochete (corkscrew-shaped bacterium). It is a systemic disease. It is spread from person to person through direct contact with an infectious lesion. The spirochetes pass through intact mucous membranes and abraded skin and are carried by the blood stream to every organ in the body rapidly, often within hours of infection.

Treponema pallidum poses special challenges in the laboratory because it cannot be grown in cultures.

How is syphilis transmitted?

Treponema pallidum is transmitted through sex (oral, anal, or vaginal) and from mother to unborn baby. There are three stages of disease if untreated, and transmission varies with the stage.

1. In stage one or primary syphilis, *T. pallidum* is transmitted from one person to another by open sores (chancres).
2. In stage two or secondary syphilis, mucous patches or condylomata lata can transmit the infection. While it is believed that all persons with primary syphilis have one or more chancres, not all persons with secondary syphilis have mucous patches or condylomata lata.
3. The third stage is not infectious, except from mother to unborn baby.

Having syphilis significantly increases the risk of transmitting and acquiring HIV.

What are the diagnostic tests for primary, secondary, congenital, and neurosyphilis?

The most accurate way to diagnose syphilis is to see the organism under the microscope using darkfield microscopy. However, darkfield microscopy is not available in many areas, and it requires syphilis lesions from which to obtain secretions.

Serology is most commonly used to diagnose syphilis using nontreponemal and treponemal tests. Nontreponemal tests (RPR and VDRL) are inexpensive and easy to perform; however, they are not specific for *T. pallidum*. Titers can be monitored over time to determine whether a person is cured in primary and secondary syphilis. Treponemal tests are used to confirm that the positive nontreponemal test is indeed caused by syphilis. Some laboratories test for syphilis using a reverse algorithm where a treponemal test is performed first and if reactive, is followed by an RPR or VDRL for confirmation. In situations when the treponemal test is reactive and the nontreponemal test is non-reactive, a second treponemal test should be performed for further evaluation.

A reactive VDRL performed on a sample of cerebrospinal fluid (CSF) is important in establishing the diagnosis of neurosyphilis although a non-reactive CSF VDRL does not rule out neurosyphilis.

What are the signs, symptoms, and infectiousness of early syphilis: incubating, primary and secondary?

Shortly after infection, patients with incubating syphilis have no clinical manifestations and usually have a nonreactive serologic test because there has not been sufficient time for antibodies to be formed.

Early syphilis refers to the first two stages of syphilis, primary and secondary syphilis, as well as latent syphilis that is less than one year in duration.

Primary syphilis is the most infectious stage. The first clinical sign is a papule (an elevated skin lesion, like a pimple), which erodes and becomes an ulcer (chancre) which often goes unnoticed, especially in women. This develops at the site of inoculation 10 to 90 days (average 21 days) after exposure to an infected sex partner. More than one chancre may be present. Without treatment the chancre will heal in 1 to 5 weeks (average 3 weeks).

Secondary syphilis is characterized by skin and mucous membrane lesions that are usually bilaterally symmetrical and found on the trunk, as well as on the hands and feet though it is important to realize that the rash of secondary syphilis does not always involve the hands and feet. These symptoms and signs last 2 to 6 weeks (average 4 weeks). The most infectious signs of secondary syphilis are moist papules (condyloma lata) in the anogenital region and mucous patches in the mouth, throat or cervix.

What is latent syphilis? How is early and late latent syphilis classified and treated? How is it transmitted?

Latent syphilis is a stage in which neither signs nor symptoms are present to suggest infection, yet spirochetes are present in the body. All cases of syphilis are latent at some time during the course of an untreated infection, including: incubating syphilis, between primary and secondary syphilis, and after secondary symptoms disappear.

Persons can receive a diagnosis of early latent syphilis if, during the year preceding the diagnosis, they had 1) a documented seroconversion or a sustained fourfold or greater increase in nontreponemal test titers; 2) unequivocal symptoms of primary or secondary syphilis; or 3) a sex partner documented to have primary, secondary, or early latent syphilis. In addition, for persons with reactive nontreponemal and treponemal tests whose only possible exposure occurred during the previous 12 months, early latent syphilis can be assumed. Treatment of early latent syphilis consists of 2.4 MU of intramuscular benzathine penicillin G.

If one or more of these criteria for early latent syphilis cannot be established, the patient should be treated for late latent syphilis (3 weekly doses of penicillin). In cases of “syphilis of unknown duration,” clinicians and partner services providers should “err” on the side of over-treatment and over-investigation.

Late latent syphilis is rarely transmitted sexually, but an untreated pregnant woman may transmit *T. pallidum* to her fetus.

What are the signs and symptoms of late syphilis?

Signs and symptoms of late syphilis range from inapparent to severe damage to one or more body systems.

Late syphilis is classified in three forms:

1. Neurosyphilis can be asymptomatic, meningeal (affecting the membranes protecting the brain or spinal cord) or parenchymatous (inflaming or destroying brain or spinal cord cells).

2. Cardiovascular syphilis most commonly weakens the aortic wall forming an aneurysm and stretching the aortic valve to cause aortic insufficiency.
3. Late benign syphilis is characterized by gumma, a tumor-like inflammatory lesion that usually affects skin and bones but also can affect organs such as the liver.

Late syphilis is not infectious because there are few spirochetes in the body.

What are the signs, symptoms, and degree of infectiousness of early and late congenital syphilis? How is congenital syphilis prevented?

Congenital syphilis is the term applied to infants who are infected with *T. pallidum* during pregnancy.

Kassowitz' law states that the longer the duration of the mother's untreated infection before pregnancy, the less likely the fetus will be infected and stillborn. Conversely, infants born to mothers in early syphilis are usually infected, and many are stillborn.

Adequate treatment of the mother early in pregnancy prevents infection of the fetus. Penicillin is the only drug shown to treat the fetus adequately.

Women treated for syphilis during the second half of pregnancy are at risk for premature labor or fetal distress if the treatment produces a Jarisch-Herxheimer reaction in the first 24 hours of treatment.

All pregnant women should be screened for syphilis as early in the pregnancy as possible and detected infections should be treated immediately.

No infant should leave the hospital without its syphilis serostatus having been determined at least once during pregnancy.

Early stage congenital syphilis is characterized by signs and symptoms before age two. Many infected infants appear normal at delivery.

Signs and symptoms of early stage congenital syphilis include: cutaneous lesions, mucous membrane lesions, bone involvement, anemia, hepatosplenomegaly, lymphadenopathy, and neurosyphilis.

Late congenital syphilis occurs in infants who remain untreated beyond two years of age.

Signs of late congenital syphilis include: interstitial keratitis, mulberry or Moon's molars, Hutchinson's teeth, eighth nerve deafness, bone involvement, cutaneous involvement, Clutton's joints, and neurosyphilis.

What are the recommended therapies for early syphilis and for late latent syphilis?

CDC's STD Treatment Guidelines describe in full all recommended therapies.

The recommended treatment for primary, secondary, or early latent syphilis is a single dose of 2.4 million units of intramuscular benzathine penicillin G (Bicillin).

Treatment for late latent syphilis of more than one year's duration is 7.2 million units of intramuscular benzathine penicillin G administered as three doses of 2.4 million units each at one week intervals.

If a patient cannot take penicillin, doxycycline is an alternative. Penicillin is the only recommended treatment for pregnant women and desensitization is required if a penicillin allergy is present.

What are the considerations for co-infection of syphilis and HIV?

Syphilis increases the risk of HIV being transmitted or acquired.

Individuals with HIV infection who are co-infected with syphilis have an increased risk of syphilis complications.

Careful follow-up therapy with particular attention to neurologic symptoms and signs is essential. Patients co-infected with HIV and early syphilis should return for serologic testing at three, six, nine, twelve, and twenty-four months after therapy. All syphilis patients should be strongly encouraged to have an HIV test at the time of diagnosis and again three months later.