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*Narrative Review*

## **Syphilis Disease and Teens: What Parents Need to Know and What They Need to Be Sure Their Teens Know**

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### **KEYWORDS**

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### **ABSTRACT**

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Sexually transmitted diseases (STDs) affect individuals of all ages, but they take an especially heavy toll on adolescents, who are particularly vulnerable due to both behavioral and biological factors. “Syphilis is one of the most significant sexually transmitted diseases. Although it is relatively uncommon in pediatric populations, it is essential for pediatricians to be able to recognize its clinical manifestations and to be familiar with the diagnostic tests required for accurate identification.

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## Introduction

The COVID-19 pandemic had a detrimental impact on adolescent education and their interaction with peers and adults, secondary to the limitation of school and recreational activities, with repercussions on social and sexual life. Based on a study performed in the metropolitan city of Bologna, the most common source of sexual and reproductive health education was the web, followed by peers (friends). A total of 61.3% of 17-year-olds already had sexual intercourse, and 90% of 15-year-olds had experienced romantic or sexual attraction (1).

Sexually transmitted diseases (STDs) affect individuals of all ages but they take particularly heavy toll on young people (2). Adolescents are particularly vulnerable to STDs due to a combination of behavioral and biological factors and may face barriers to accessing sexual health services. Among sexually active adolescents, those who do not use condoms consistently are men who have sex with men (MSM) (3).

In 2023 almost half of all reported cases of chlamydia, gonorrhea, and syphilis in the United States were

among adolescents and young adults aged 15-24 (4).

Studies in Italy also indicate a concerning rise in STDs among adolescents and young adults. The most frequent genital infection reported among Italian adolescents used to be vulvovaginal candidiasis (35% vs. 23.9% of adult people). HSV was found in 1.8% of teen-agers (vs. 0.6%) and when requested, Chlamydia trachomatis and mycoplasmas were found respectively in 16.6% (vs. 1.1%) and 50% (vs. 28%) of cases (3). A 2020-2021 surveillance system in Italy showed an 18% increase in STIs overall, with significant increases in Chlamydia, gonorrhea, and syphilis; MSM are at particular risk for syphilis infection (1).

With the rise in acquired syphilis infections, the incidence of congenital syphilis has also increased and according to CDC: 1 % increase in total syphilis (all stages and congenital syphilis combined) was reported in 2023(5).

People from racial and ethnic minority groups are experiencing the brunt of the newborn syphilis epidemic (5).

## Syphilis

Venereal syphilis infection occurs after the spirochete *Treponema pallidum* subspecies directly penetrates the mucous membranes or enters through the breaches in the skin that result from sexual contact. The spirochete is long and flat, so can easily penetrate human tissue and vascular structures via an undulating, corkscrew movement. This early and widespread hematogenous dissemination explains the eventual widespread involvement of the disease. The outer membrane of the spirochete lacks both lipopolysaccharide and toll-like receptor 2 this helps the spirochete to evade detection by the innate immune system and help to explain the lack of systemic inflammation in primary syphilis.

In the first stage of infection there is usually a firm, round, painless sore (chancre) where the infection entered the body. Chancres are most often seen in men at the head of the penis, but can erupt anywhere that direct contact occurred (Fig. 1). Chancres have been reported in the vagina, cervix, in and around the rectum, in the mouth, and even on the fingers and neck. *Treponema pallidum* cannot be cultured. Diagnostic tests using dark-field microscopy or tests to detect *T pallidum* from lesion exudate are rarely and not easily performed. The chancre usually heals spontaneously without scarring within 4–6 weeks, but as it is painless it may

go unnoticed and with treatment it will likely regress more quickly (within 2–3 days). Regional lymphadenopathy may or may not be present and may or may not be tender. Once opsonization occurs, spirochetes are more easily located and destroyed, causing a systemic inflammatory response and tissue damage that leads to the wide variety of clinical manifestations of secondary syphilis. Around 6–8 weeks after the healing of the chancre, secondary syphilis usually develops. The findings in secondary syphilis include generalized lymphadenopathy, a non-pruritic, maculopapular rash that often involves the palms and soles (Fig. 2). However, the rash of secondary syphilis can be highly variable and be localized or widespread and manifest as pustular or scaly in appearance (as opposed to the classic maculopapular description). In intertriginous areas (particularly the anogenital region), these lesions can coalesce to form condylomata lata, plaques resembling flat warts or anogenital psoriasis. Gray mucus patches may also be found on the oral or genital mucosa. Because of its diverse and variable signs that resemble those of other diseases, making diagnosis challenging, syphilis is classically nicknamed “the great imitator”. All of these lesions are highly infectious through contact. Flu-like symptoms, such as sore throat, fever, and myalgias, are

common. Other end-organ manifestations, including hepatosplenomegaly, hepatitis, nephrotic syndrome, aseptic meningitis, uveitis, and generalized lymphadenopathy, have also been described. If untreated, syphilis can progress to a latent stage. There are no clinical manifestations during this stage, and the disease can only be detected via serologic testing. Screening with a non-treponemal test followed by treponemal testing can confirm the diagnosis. The non-treponemal tests detect the presence of an immune system product that

is produced in response to an infection with *T. pallidum* (a non-specific cardiolipin-cholesterol-lecithin reagin antigen). The treponemal tests detect antibodies to *T. pallidum*. The serologic diagnosis of syphilis relies on the combination of a reactive non-treponemal test and treponemal test. In the usual sequence of syphilis serologic testing, a non-treponemal test (RPR or VDRL) is performed followed by a treponemal test (6).



**Fig. 1.** *Chancre.*



**Fig. 2.** *Plantar rash in a patient with secondary syphilis.*

The latent stage is then subdivided into early, late, and unknown latency. Early latent syphilis occurs within a year of infection – if the date of infection is over a year ago or unknown, the patient is treated as having late latent syphilis. About one quarter of those in early latency will have a recurrence of secondary syphilis symptoms, usually within the first year. Primary and secondary syphilis carry the highest risk for vertical transmission, but even with late latent syphilis and low titers, the risk of transmission is still significant.

After a variable period of latency, the disease may progress in about one-third of those infected to late manifestations of syphilis such as cardiovascular syphilis, gummas, or tabes dorsalis. Neurosyphilis can occur at any time during the course of the infection.

According to CDC guidelines, Syphilis is treated with parenteral penicillin G (5). In very typical cases, treatment should be initiated based on clinical suspicion alone before laboratory results are available.

For primary, secondary, or early latent syphilis, a single dose of 2.4 million units IM is given. Late latent syphilis or syphilis of unknown duration is treated with 2.4 million units of benzathine penicillin G IM once a week for 3 weeks.

Despite the fact that penicillin has been used to treat

syphilis for more than 60 years, there has never been a documented case of penicillin resistance.

Post treatment monitoring is essential to confirm successful eradication of syphilis.

Although not often found in a pediatric population, with the increasing incidence of syphilis infections, pediatric providers should have a low threshold for syphilis screening in adolescents and a high index of suspicion for congenital syphilis in infants.

Obtain a thorough sexual and social history, including the number of sexual partners, condom use, history of STDs in the patient and their partners, intravenous (IV) drug use, and exposure to blood products is mandatory.

Medical professionals must act as “role models” for open, positive, and inclusive parent-adolescent sex and STDs communication, should be aware of the type of misinformation available online and be prepared to combat fake news with evidence-based practice.

Pediatricians and dermatologists should assume that children with acquired syphilis have been infected through sexual abuse, unless another mechanism of transmission is identified.

Self-testing could be a safe, acceptable and effective way to increase access to syphilis testing in adolescents.

## References

1. Montalti M, Salussolia A, Masini A, Manieri E, Rallo F, Marini S, Agosta M, Paternò M, Stillo M, Resi D, Guaraldi F, Gori D, Dallolio L. Sexual and Reproductive Health and Education of Adolescents during COVID-19 Pandemic, Results from “Come Te La Passi?”-Survey in Bologna, Italy. *Int J Environ Res Public Health*. 2022; 19(9):5147.
2. Sieving RE, Gewirtz O'Brien JR, Saftner MA, Argo TA. Sexually Transmitted Diseases Among US Adolescents and Young Adults: Patterns, Clinical Considerations, and Prevention. *Nurs Clin North Am*. 2019; 54(2):207-225.
3. De Seta F, Piccoli M, De Santo D, Sartore A, Grimaldi E, Panerari F, Ricci G, Guaschino S. Le malattie sessualmente trasmesse in età adolescenziale [Sexually transmitted diseases in adolescence]. *Minerva Ginecol*. 2000;52:(12 Suppl 1):19-24.
4. Drago F, Ciccarese G, Zangrillo F, Gasparini G, Cogorno L, Riva S, Javor S, Cozzani E, Broccolo F, Esposito S, Parodi A. A Survey of Current Knowledge on Sexually Transmitted Diseases and Sexual Behaviour in Italian Adolescents. *Int J Environ Res Public Health*. 2016; 13(4):422.
5. <https://www.cdc.gov/sti-statistics/annual-summary.html>.
6. Ortiz DA, Shukla MR, Loeffelholz MJ. The Traditional or Reverse Algorithm for Diagnosis of Syphilis: Pros and Cons. *Clin Infect Dis*. 2020; 71(Suppl 1):S43-S51.
7. Labudde EJ, Lee J. A Review of Syphilis Infection in Pediatric Patients. *Pediatr Rev*. 2024; 45(7):373-380. doi: 10.1542/pir.2023-006309. PMID: 38945983.
8. Zhang Y, Tapa J, Johnson CC, Phillips TR, Fairley CK, Ameyan W, Mello MB, Chow EPF, Chidarikire T, Ong JJ. HIV, hepatitis, and syphilis self-testing among adolescents and young adults: A systematic review and meta-analysis. *J Infect Public Health*. 2025; 18(6):102764.