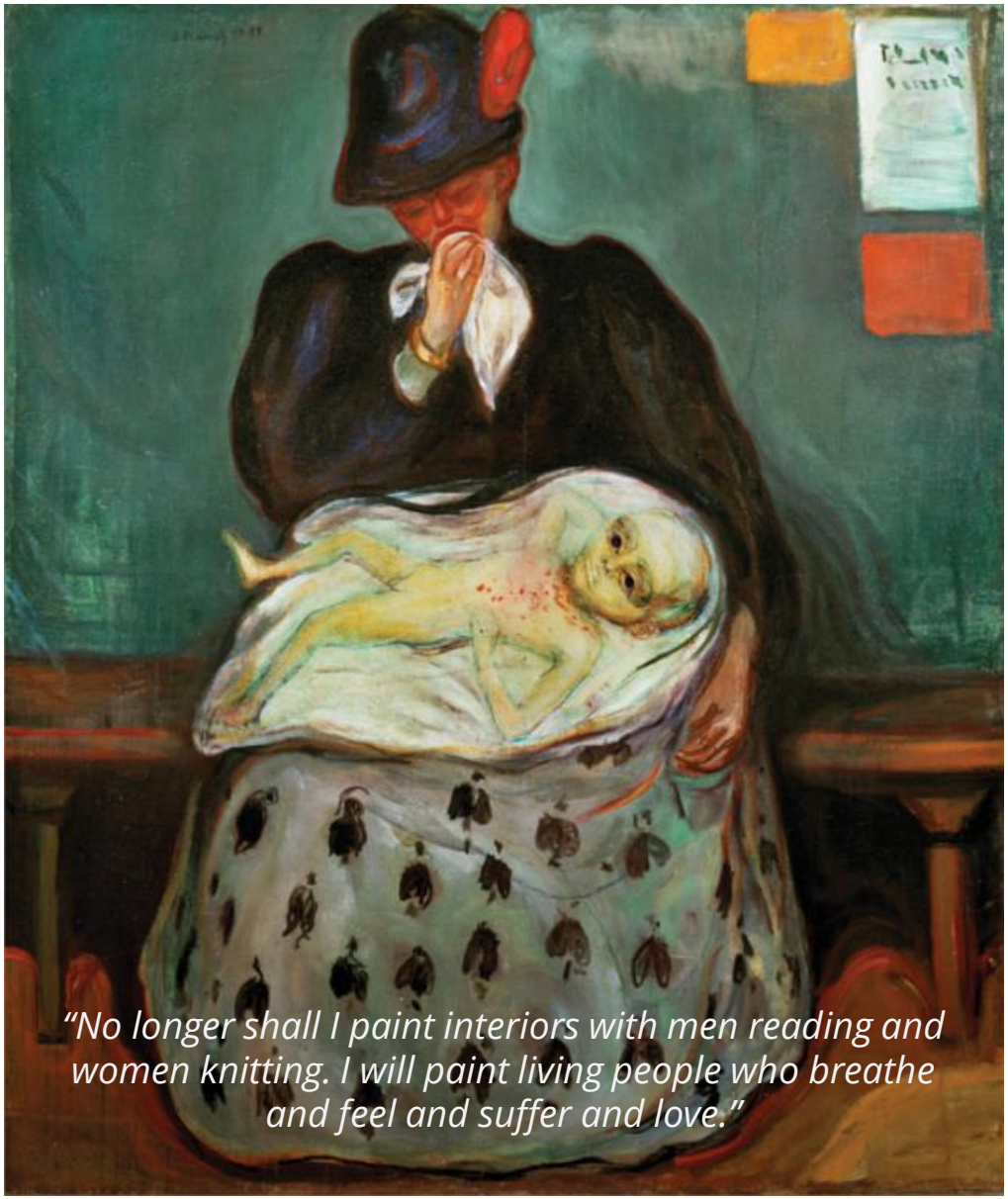

Edvard Munch (1863–1944), *Inheritance*, 1897–1899. Oil on canvas, 55.5 in × 47.25 in/141 cm × 120 cm. Munch Museum, Oslo, Norway. Photo credit: Erich Lessing. Digital image from Art Resource, New York, New York, USA.

Congenital Syphilis

Jennifer A. Hudson, MD
Medical Director for Newborn Services
Greenville Memorial Hospital
Prisma Health, Greenville SC

SC Birth Outcomes Symposium
October 30, 2024

PRISMA HEALTH
Children's Hospital

DID YOU KNOW?

30	DIFFERENT BACTERIA, VIRUSES AND PARASITES ARE KNOWN TO BE TRANSMITTED THROUGH SEXUAL CONTACT.
8	OF THESE ARE LINKED TO THE GREATEST INCIDENCE OF SEXUALLY TRANSMITTED DISEASE.
4	OF THESE 8 ARE CURRENTLY CURABLE: SYPHILIS, GONORRHOEA, CHLAMYDIA AND TRICHOMONIASIS.
4	ARE VIRAL INFECTIONS AND ARE INCURABLE: HEPATITIS B, HERPES SIMPLEX VIRUS (HSV OR HERPES), HIV, AND HUMAN PAPILLOMAVIRUS (HPV).

Flo.health

Sexually Transmitted Infections

DISPARITIES IN STDs

As in past years, there were significant disparities in rates of reported STDs. In 2019, over half (55.4%) of reported cases of STDs were among adolescents and young adults aged 15-24 years. Disparities continue to persist in rates of reported STDs among some racial minority or Hispanic groups when compared with rates among non-Hispanic Whites. In 2019, 30.6% of all cases of chlamydia, gonorrhea, and P&S syphilis were among non-Hispanic Blacks, even though they made up only approximately 12.5% of the US population. MSM are disproportionally impacted by STDs, including P&S syphilis and gonorrhea.

It is important to note that these disparities are unlikely explained by differences in sexual behavior and rather reflect differential access to quality sexual health care, as well as differences in sexual network characteristics. For example, in communities with higher prevalence of STDs, with each sexual encounter, people face a greater chance of encountering an infected partner than those in lower prevalence settings do, regardless of similar sexual behavior patterns. Acknowledging inequities in STD rates is a critical first step toward empowering affected groups and the public health community to collaborate in addressing systemic inequities in the burden of disease — with the ultimate goal of minimizing the health impacts of STDs on individuals and populations.

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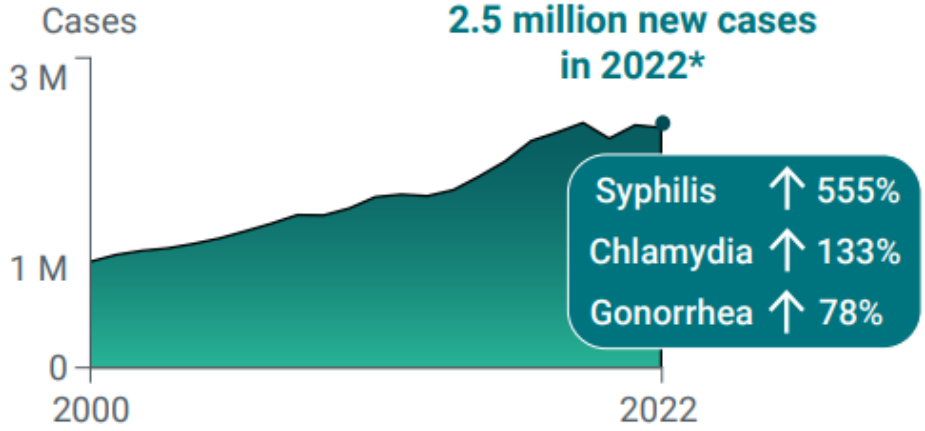
Chlamydia, gonorrhea, and syphilis cases have been increasing for years.



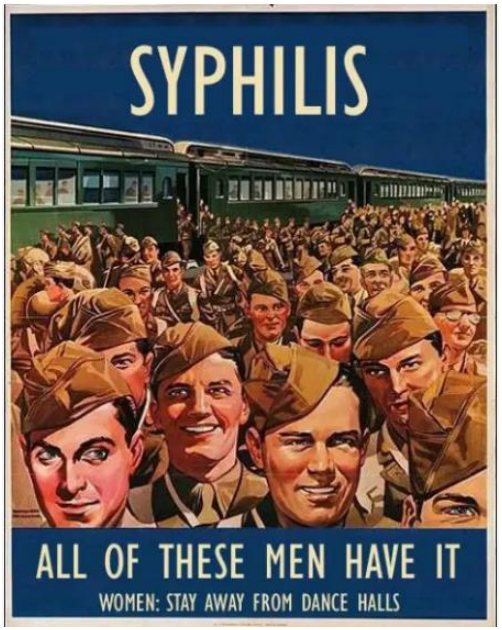
People most affected by STIs include:

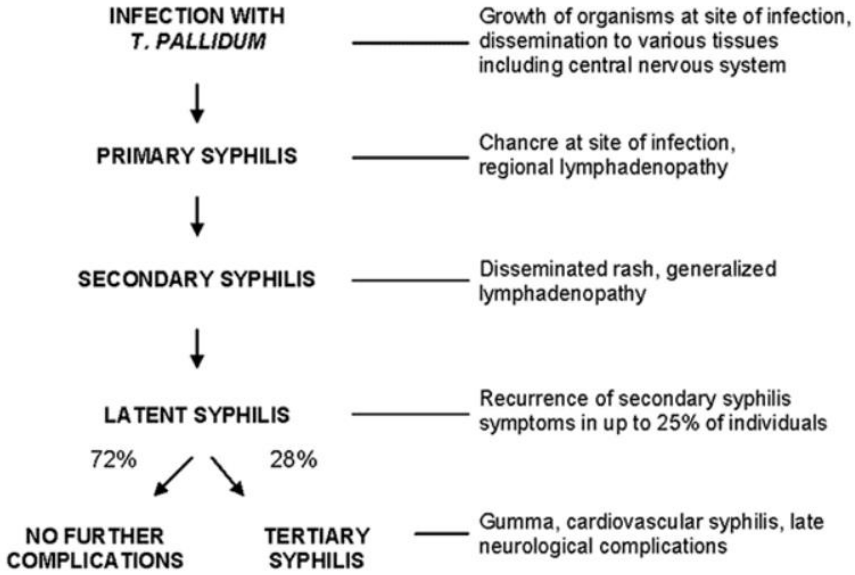
- → Adolescents and people aged 15-24 years
- → Gay, bisexual, and other men who have sex with men
- → Pregnant people
- → People from some racial and ethnic minority groups

Use of opioids and other substances has been linked to increasing STIs and outbreaks of infectious diseases.

3x
More Likely

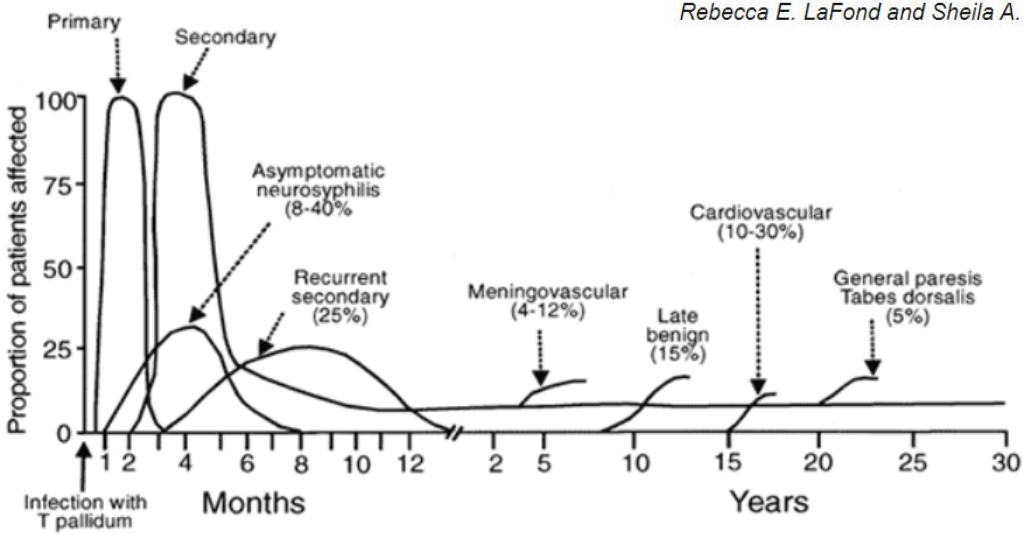
Young adults who used an illicit drug* in the past year were **3 times** more likely to get an STI.

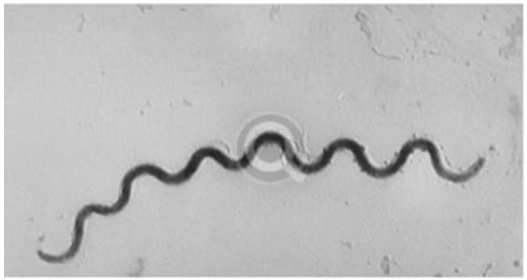




Natural history of untreated syphilis.

Rebecca E. LaFond and Sheila A. Lukehart. Biological Basis for Syphilis. Clin. Microbiol. Rev. 2006; 19(1):29-49





Natural course of untreated syphilis *– showing time frames and the approximate proportion of persons developing different forms of clinical disease (in parentheses). It is not known what proportion of initially infected persons develop primary or secondary manifestations.*

Sutton, M, Dorell, C, Glob. libr. women's med., 2009.

In 2022, there were
207,255 cases of syphilis
reported in the United States.

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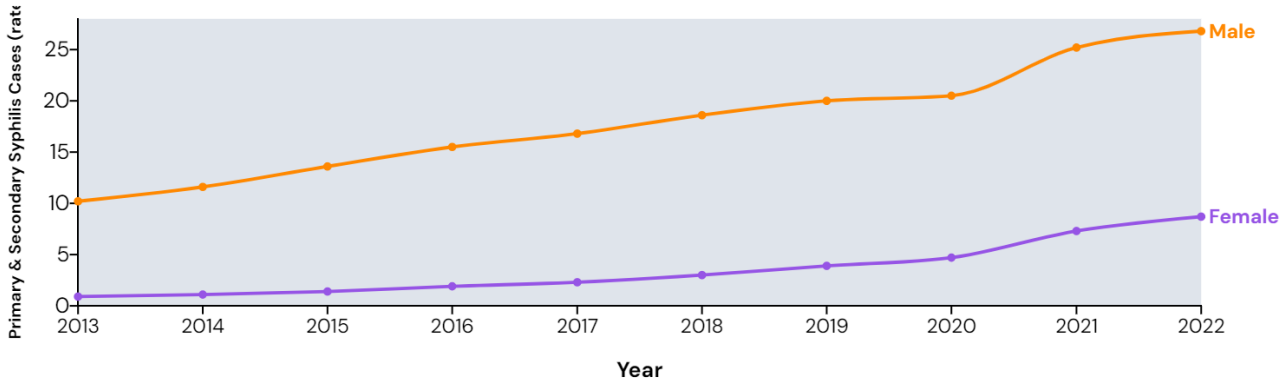
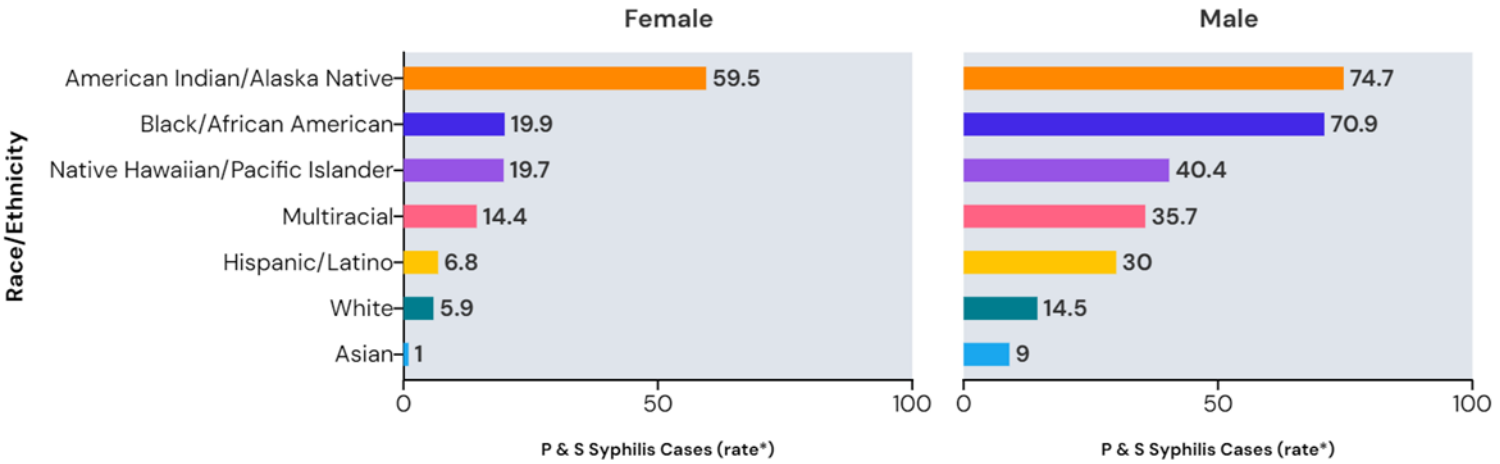
For both males and females, rates increased significantly from 2013 to 2022, with an 867% increase in females and a 163% increase in males.



*Per 100,000 population

The highest rates of primary and secondary syphilis cases for both females and males occurred among American Indian/Alaska Native persons.



*Per 100,000 population

CDC's 2022 STI Surveillance Report underscores that STIs must be a public health priority

Yet again, more than 2.5 million cases of chlamydia, gonorrhea, and syphilis were reported in the United States

[Sexually Transmitted Infections Surveillance, 2022 (cdc.gov)]

Healthy People 2030

Reduce the syphilis rate in females — STI-03

- Objective Overview
- Data
- Data Methodology and Measurement
- Evidence-Based Resources

Add to Custom List

Status: Getting worse ⊖ Learn more about our data release schedule

Most Recent Data: **18.7** cases of primary and secondary syphilis per 100,000 females (2022)

Target: **4.6** per 100,000

Desired Direction: **Decrease desired**

Baseline: **5.1** cases of primary and secondary syphilis per 100,000 females aged 15 to 44 years were reported in 2017

See detailed data for this objective

Reduce the rate of primary and secondary syphilis in females

Target-Setting Method: Percent improvement

Data Source: National Notifiable Diseases Surveillance System (NNDSS), CDC/CSELS

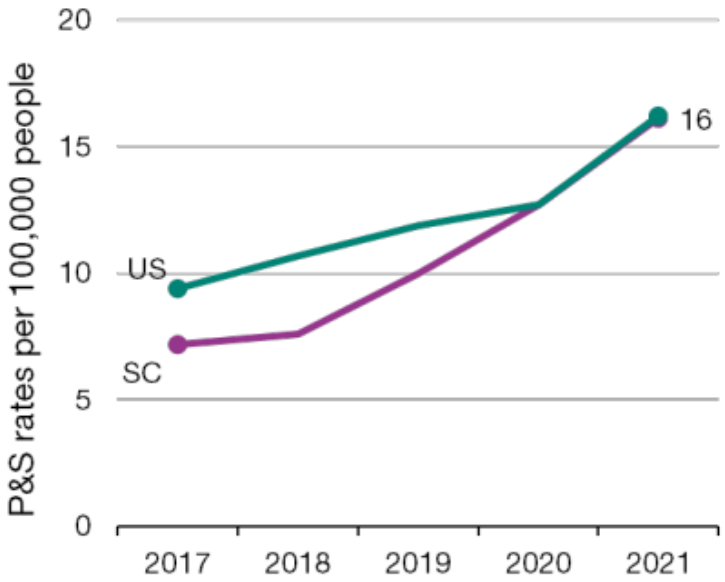
[Reduce the syphilis rate in females — STI-03 - Healthy People 2030 | health.gov]

CDC | Spotlight on Sexually Transmitted Infections & Prevention

South Carolina

Syphilis & congenital syphilis rates are rising in the US and South Carolina

Primary and secondary (P&S) syphilis are the most infectious stages of syphilis and represent new infections. From 2017 to 2021, P&S syphilis rates per 100,000 people **rose 72% in the US** and **rose 124% in South Carolina**.



Congenital syphilis (CS) occurs when syphilis is passed to a baby during pregnancy. The growing rate of CS per 100,000 live births in the US mirrors the rising rates of P&S syphilis.

From 2017 to 2021, CS rates rose 219% in the US and rose 137% in South Carolina.

Routine screening and timely treatment of syphilis can prevent mother-to-child transmission during pregnancy.

cdc_135838_DS1.pdf

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County-level Syphilis Rates to Direct Screening Efforts | CDC NCHHSTP

Prevention-focused policies can help reduce STI rates

Prenatal Syphilis Screening is legally required during the first visit only in South Carolina. CDC recommends all pregnant women should be screened for syphilis at the first prenatal visit, and at 28 weeks and delivery if the mother lives in a community with high syphilis rates or is at risk for syphilis.

Expedited Partner Therapy (EPT) provides patients' sex partners with STI treatment without a physical exam. **EPT is authorized** for treating chlamydia and gonorrhea in South Carolina.

Doctors are also noticing a growing number of women who are treated for syphilis but reinfected during pregnancy. Amid rising cases and stagnant resources, some states have focused disease investigations on pregnant women of childbearing age; they can no longer prioritize treating sexual partners who are also infected.

REPORTING REQUIREMENTS

Laws and regulations in all states require clinicians, laboratories, or both to report persons diagnosed with syphilis (including congenital syphilis) to local public health authorities. Reporting can be done by medical providers, laboratories, or both.

cdc_135838_DS1.pdf

Syphilis testing can be difficult to interpret…

Performance of Serologic Tests for Syphilis

The common patterns for serologic reactivity with syphilis tests depend on the specific test used, the stage of syphilis, and whether the person has received treatment for syphilis.[44,45,49] The sensitivity of serologic testing also varies based on the test used and the stage of syphilis (Table 1).[43,45] Serologic testing for syphilis has the highest yield for secondary syphilis. Serologic tests for syphilis may be negative during very early primary syphilis, especially with nontreponemal tests.[44,49] Thus, when serologic tests do not correspond with clinical findings suggestive of primary syphilis, presumptive treatment is recommended if the person has known risk factors for syphilis; in this setting, use of other tests, such as dark-field microscopy, biopsy, or PCR, should be considered.

- **False-Positive Reactions**: With both nontreponemal and treponemal serologic tests for syphilis, false-positive reactions can occur.[50] The most common causes of false-positive test results include older age, autoimmune disorders, cardiovascular disease, pregnancy, malaria, leprosy, other spirochete infections, and recent immunizations.[27,51]

- **False-Negative Reaction ("Prozone Effect")**: False-negative reactions infrequently occur with nontreponemal testing due to the "prozone effect."[52] The prozone effect occurs when very high serum antibodies supersaturate the antigens used in the nontreponemal assay, thereby interfering with the antigen-antibody lattice network needed to visualize a flocculation reaction.[52,53] Overall, this occurs in less than 2% of cases of syphilis.[52,54] This false-negative reaction is most likely to occur in patients with secondary syphilis and HIV infection. If clinical suspicion of secondary syphilis is high and the nontreponemal testing is negative, the clinician should alert the laboratory of a suspected prozone effect, and the laboratory should reevaluate the clinical sample after diluting the serum, typically a 1/16 dilution.

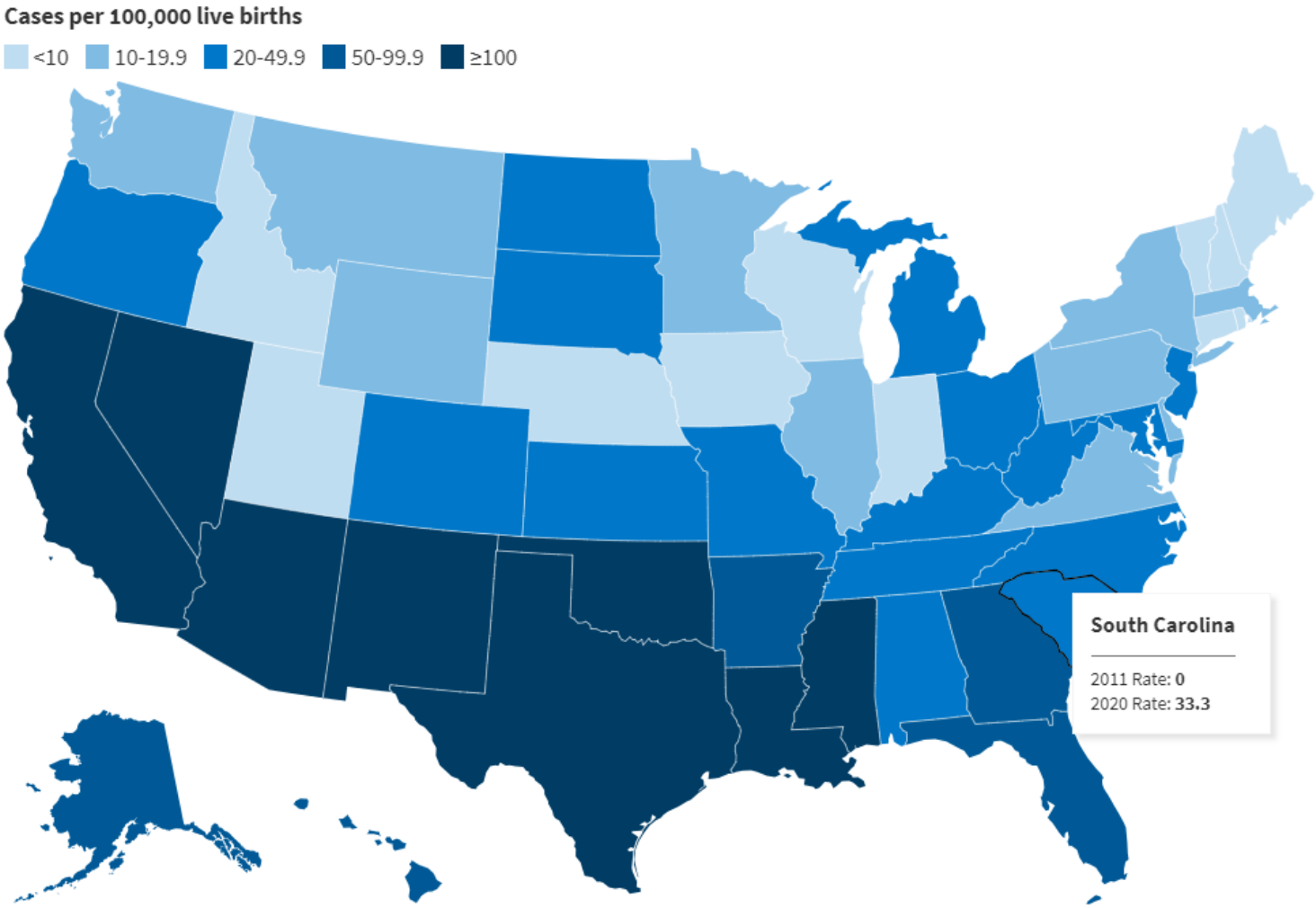
Other Management Considerations

The following recommendations should be considered for pregnant women with syphilis infection:

- Certain evidence indicates that additional therapy is beneficial for pregnant women to prevent congenital syphilis. For women who have primary, secondary, or early latent syphilis, a second dose of benzathine penicillin G 2.4 million units IM can be administered 1 week after the initial dose (*641–643*).
- When syphilis is diagnosed during the second half of pregnancy, management should include a sonographic fetal evaluation for congenital syphilis. However, this evaluation should not delay therapy. Sonographic signs of fetal or placental syphilis (e.g., hepatomegaly, ascites, hydrops, fetal anemia, or a thickened placenta) indicate a greater risk for fetal treatment failure (*644*); cases accompanied by these signs should be managed in consultation with obstetric specialists. A second dose of benzathine penicillin G 2.4 million units IM after the initial dose might be beneficial for fetal treatment in these situations.
- Women treated for syphilis during the second half of pregnancy are at risk for premature labor or fetal distress if the treatment precipitates the Jarisch-Herxheimer reaction (*590*). These women should be advised to seek obstetric attention after treatment if they notice any fever, contractions, or decrease in fetal movements. Stillbirth is a rare complication of treatment; however, concern for this complication should not delay necessary treatment. No data are available to support that corticosteroid treatment alters the risk for treatment-related complications during pregnancy.
- Missed doses >9 days between doses are not acceptable for pregnant women receiving therapy for late latent syphilis (*613*). An optimal interval between doses is 7 days for pregnant women. If a pregnant woman does not return for the next dose on day 7, every effort should be made to contact her and link her to immediate treatment within 2 days to avoid retreatment. Pregnant women who miss a dose of therapy should repeat the full course of therapy.
- All women who have syphilis should be offered testing for HIV at the time of diagnosis.

[Syphilis During Pregnancy - STI Treatment Guidelines (cdc.gov)]

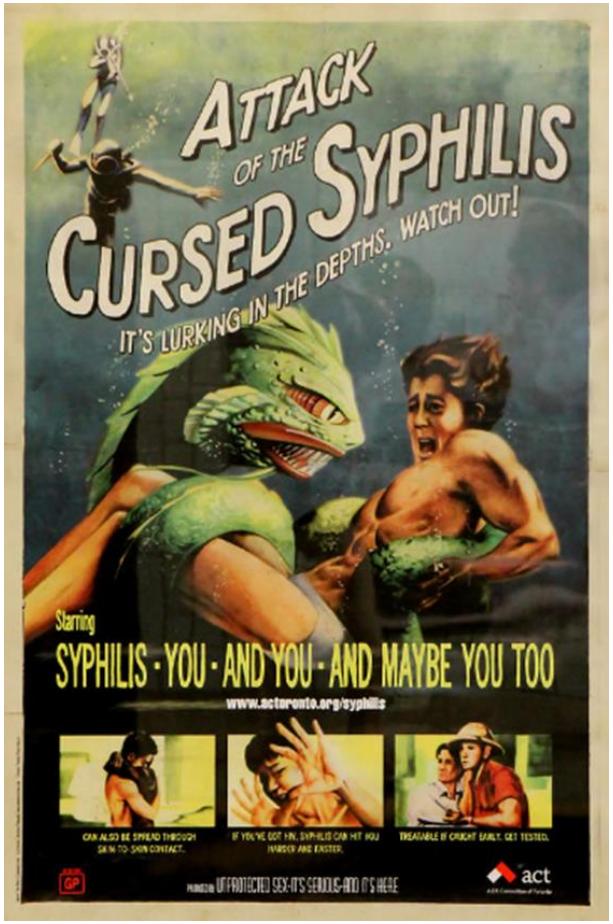
Congenital Syphilis



Source: U.S. Centers for Disease Control and Prevention

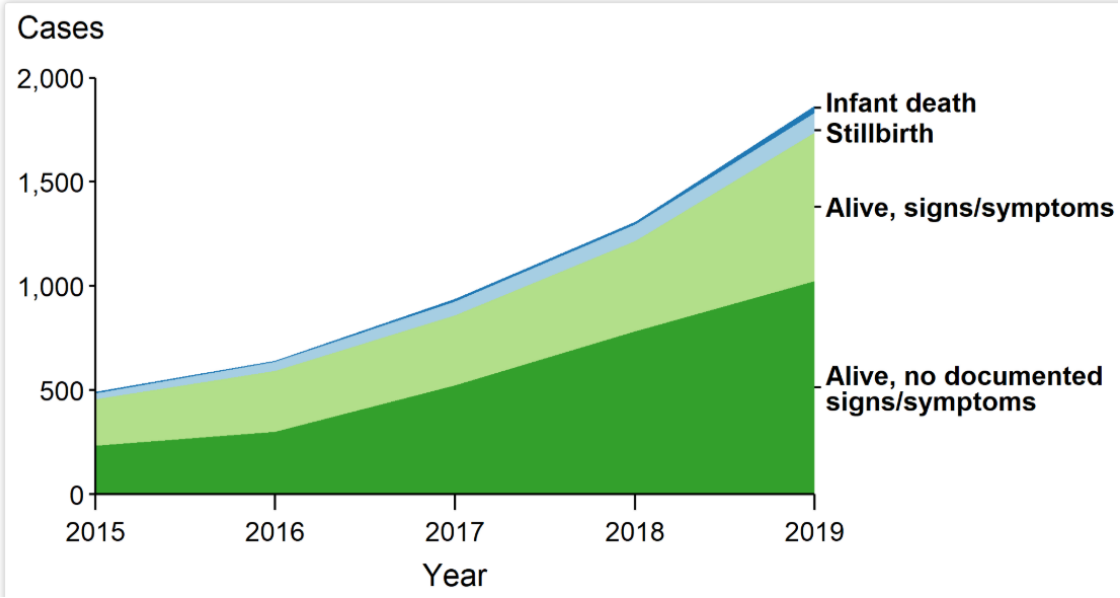
Phillip Reese for KHN Embed Download image

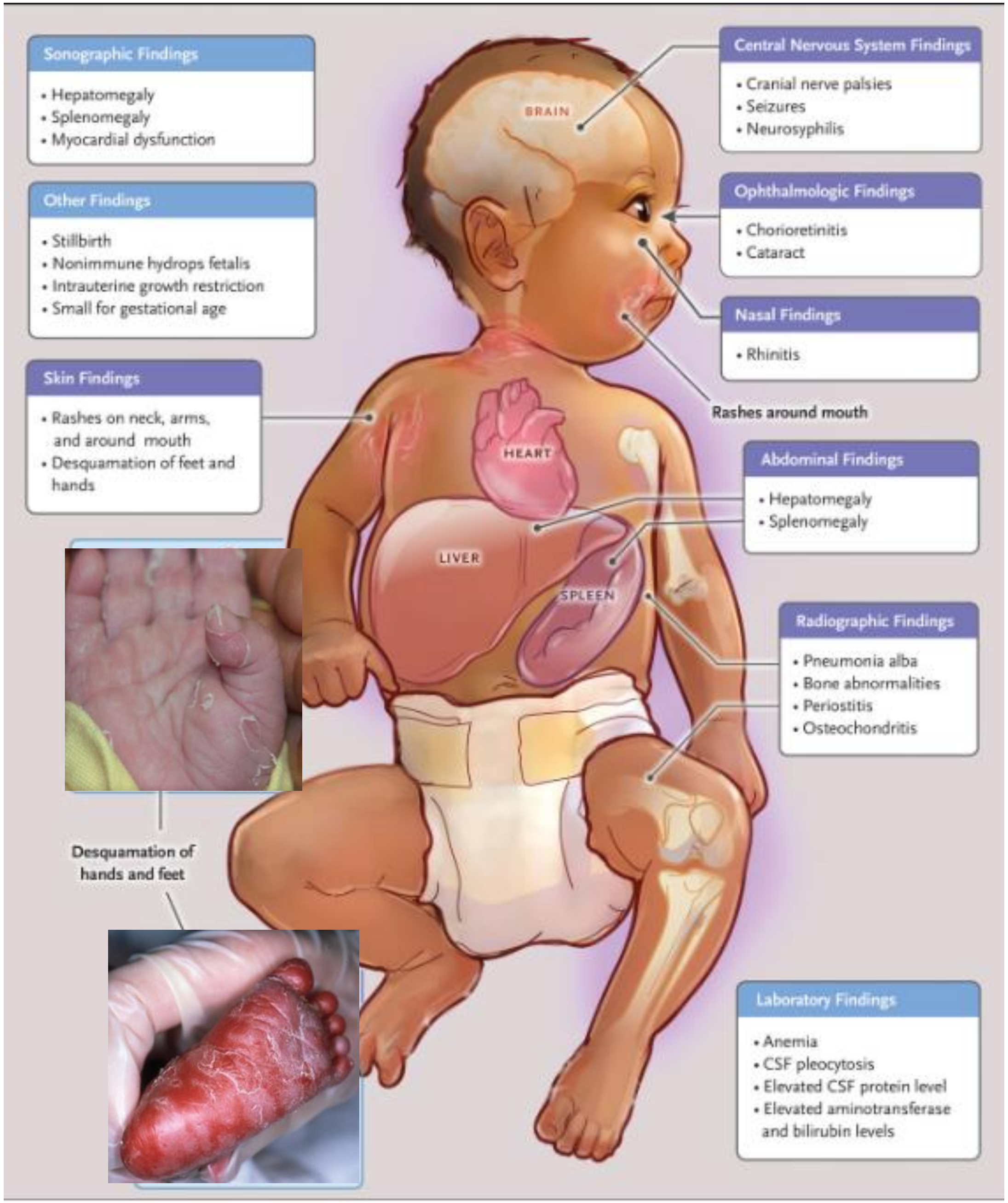
KHN



The World Health Organization reports: "Congenital syphilis is the second leading cause of preventable stillbirth globally, preceded only by malaria."

Congenital Syphilis — Reported Cases by Vital Status and Clinical Signs and Symptoms* of Infection, United States, 2015–2019





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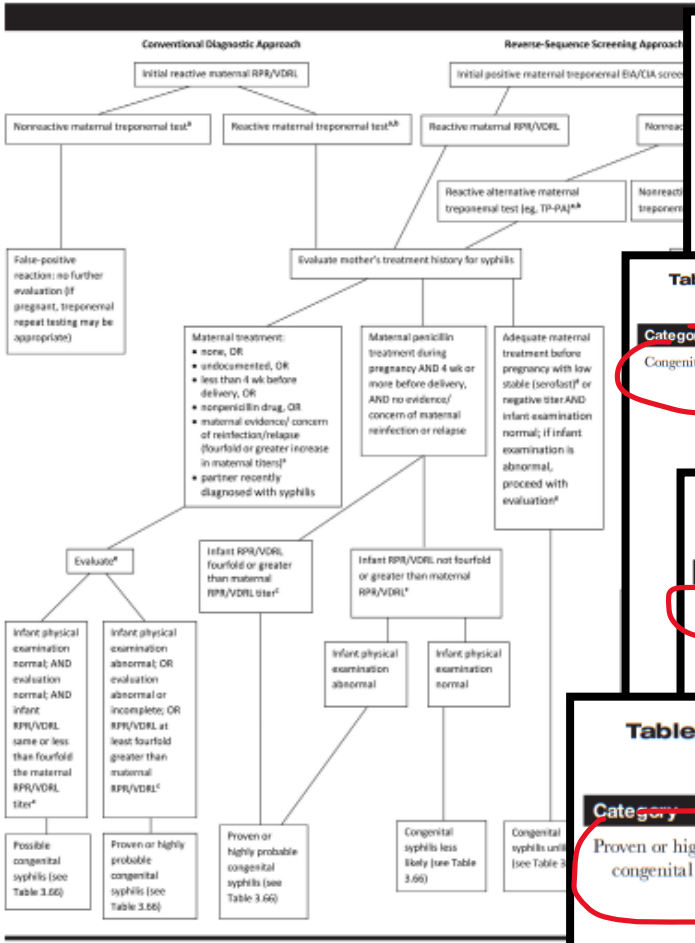
Stafford et al., *N Engl J Med*, 2024

FIG 3.15. ALGORITHM FOR DIAGNOSTIC APPROACH OF INFANTS BORN TO MOTHERS WITH REACTIVE SEROLOGIC TESTS FOR SYPHILIS.



RPR indicates rapid plasma reagin; VDRL, Venereal Disease Research Laboratory.
[a] *Treponema pallidum* particle agglutination (TP-PA) (which is the preferred treponemal te
absorption (FTA-ABS).
[b] Test for human immunodeficiency virus (HIV) antibody. Infants of HIV-infected moth
treatment for syphilis.
[c] A fourfold change in titer is the same as a change of 2 dilutions. For example, a titer o
of 1:16, and a titer of 1:4 is fourfold lower than a titer of 1:16. When comparing titer
should be used (eg, if the initial test was an RPR, the follow-up test should also be an
[d] Stable VDRL titers 1:2 or less or RPR 1:4 or less beyond 1 year after successful treatm
[e] Complete blood cell (CBC) and platelet count; cerebrospinal fluid (CSF) examination
VDRL; other tests as clinically indicated (eg, chest radiographs, long-bone radiograph
neuroimaging, and auditory brainstem response). For neonates, pathologic examination of the placenta or umbilical cord with
specific fluorescent antitreponemal antibody staining, if possible.

Table 3.66. Evaluation and Treatment of Infants *Up To 1 Month of Age* With Possible, Probable, or Confirmed Congenital Syphilis,[a] continued

Category	Findings	Recommended Evaluation	Treatment
Congenital syphilis is unlikely	Normal infant examination AND A serum quantitative nontreponemal	Not recommended	None, but infants with reactive nontreponemal tests should be followed serologically to ensure test result returns to negative

Table 3.66. Evaluation and Treatment of Infants *Up To 1 Month of Age* With Possible, Probable, or Confirmed Congenital Syphilis,[a] continued

Category	Findings	Recommended Evaluation	Treatment
Congenital syphilis less likely	Normal infant examination AND A serum quantitative nontreponemal serologic titer equal to or less than	Not recommended	Benzathine penicillin G, 50 000 U/kg, IM, single dose (**preferred**) Alternatively, infants whose mothers' nontreponemal titers decreased at least fourfold after appropriate therapy for

Table 3.66. Evaluation and Treatment of Infants *Up To 1 Month of Age* With Possible, Probable, or Confirmed Congenital Syphilis,[a] continued

Category	Findings	Recommended Evaluation	Treatment
Possible congenital syphilis	Normal infant examination AND A serum quantitative nontreponemal	CSF analysis (CSF VDRL, cell count, and protein) CBC count with differential and platelet count	Aqueous crystalline penicillin G, 50 000 U/kg, IV, every 12 h (1 wk or younger), then every 8 h for infants older than 1 wk, for a total of 10 days of therapy[b] (**preferred**)

Table 3.66. Evaluation and Treatment of Infants *Up To 1 Month of Age* With Possible, Probable, or Confirmed Congenital Syphilis[a]

Category	Findings	Recommended Evaluation	Treatment
Proven or highly probable congenital syphilis	Abnormal physical examination consistent with congenital syphilis OR A serum quantitative nontreponemal serologic titer fourfold higher than the mother's titer OR A positive result of darkfield test or PCR assay of lesions or body fluid(s)	CSF analysis (CSF VDRL, cell count, and protein) CBC count with differential and platelet count Other tests (as clinically indicated): Long-bone radiography Chest radiography Aminotransferases Neuroimaging Ophthalmologic examination Auditory brain stem response	Aqueous crystalline penicillin G, 50 000 U/kg, IV, every 12 hours (1 wk or younger), then every 8 h for infants older than 1 wk, for a total of 10 days of therapy[b] (**preferred**) OR Procaine penicillin G, 50 000 U/kg, IM, as single daily dose for 10 days

CDC Vital Signs

Search

Syphilis in Babies Reflects Health System Failures

Tailored strategies can address missed prevention opportunities during pregnancy

View All Topics

Updated Dec. 14, 2023 | Print

10x

Over 10 times as many babies were born with syphilis in 2022 than in 2012.

9 in 10

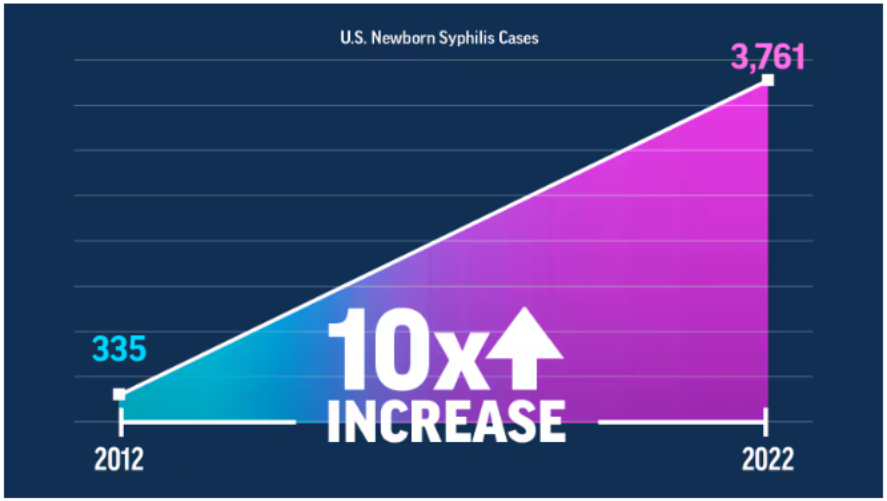
Timely testing and treatment during pregnancy might have prevented almost 9 in 10 (88%) cases in 2022.

2 in 5

Two in 5 (40%) people who had a baby with syphilis did not get prenatal care.

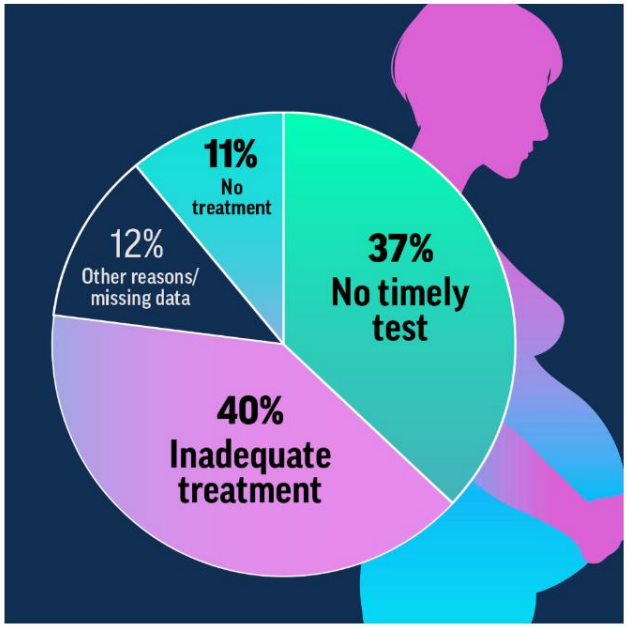
Over 10 Times as Many Babies Were Born with Syphilis in 2022 than in 2012

Increasing rates of syphilis among babies reflect a failure of the U.S. health system.



Timely Syphilis Testing and Treatment During Pregnancy Might Have Prevented Almost 90% of Cases

Newborn syphilis happens when syphilis is not identified and treated properly during pregnancy.



[Syphilis in Babies Reflects Health System Failures | VitalSigns | CDC]

Challenges

Missed opportunities during pregnancy can have tragic consequences

- **Babies are born with syphilis when people are tested too late and not treated properly during pregnancy.** Timely testing and treatment during pregnancy can help keep people healthy and might have prevented 9 out of 10 newborn syphilis cases in 2022.
- **Late testing and treatment happen for different reasons depending on individual- and system-level barriers to care.** Individual-level barriers include substance use disorder and lack of insurance. System-level barriers include systemic racism and limited healthcare access. Medication shortages now also threaten effective care. There is no one-size-fits-all solution to addressing these barriers. Knowing the data is critical for tailoring approaches.
- **People are not always getting prenatal care.** Two in 5 cases of babies born with syphilis happened in people who did not receive any prenatal care.

To Prevent Newborn Syphilis

Healthcare providers

- Understand who should get tested for syphilis, especially if your county has high rates of syphilis among those who are sexually active. Talk to patients about sexual health and test for sexually transmitted infections.
- Test—with rapid tests if necessary—everyone who is pregnant the first time you see them.
- Repeat syphilis testing during pregnancy for those living in counties with the highest rates of syphilis or those who are more likely to get syphilis during pregnancy.
- Treat syphilis immediately.

People who are sexually active

- Ask a healthcare provider about how to prevent syphilis.
- Talk to your partner(s) about sexually transmitted infections and consider what safer sex options are right for you.
- Get tested for sexually transmitted infections, especially if you or your partner are pregnant or planning to get pregnant.

Health departments

- Identify counties in your states with high rates of syphilis and notify physicians in these counties to encourage more testing and coordinated treatment.
- Collaborate with community programs to address structural barriers to syphilis care, make testing (including rapid syphilis tests) and treatment more accessible, and link people to other needed services.
- Know the pregnancy status for people with syphilis to facilitate timely treatment. Verify that people with syphilis and their partners are treated.

To Advance Health Equity

By improving access to syphilis testing and treatment for everyone, we can prevent syphilis in babies and advance health equity.

- **Consider geographic risk in addition to individual behaviors to reduce stigma and bias in syphilis screening.**
  - For many people, the most significant risk factor for syphilis is living in a community with high rates of syphilis, not individual risk factors.
    - Offering syphilis screening to sexually active people 15-44 years of age in counties with a high rate of syphilis among women of reproductive age may help identify and prevent the spread of syphilis (the Healthy People 2030 goal for reducing syphilis among women of reproductive age is 4.6 per 100,000).
  - Identifying and preventing syphilis before pregnancy can minimize illness during pregnancy and prevent newborn syphilis.
- **Make any healthcare encounter during pregnancy an opportunity to treat and prevent newborn syphilis.**
  - Meet people where they are during pregnancy with syphilis testing and treatment, including outside of usual prenatal care settings.
  - Emergency departments, jails, syringe services programs, and maternal and child health programs play a role in identifying and treating syphilis among people who do not receive adequate prenatal care.
- **Ensure all people get the treatment they need.**
  - Rapid syphilis tests (points of care tests) offer opportunities to test and treat at the same time.
    - This is especially needed for people who might not see a healthcare provider regularly during pregnancy and who may face barriers to coming back for treatment.
  - Local disease intervention specialists, who are public health professionals trained to prevent and contain infectious diseases, also play a vital role in reaching out in communities and ensuring people are diagnosed and treated.

Syphilis in Babies Reflects Health System Failures | VitalSigns | CDC

Sexually Transmitted Infections

Summary of CDC Treatment Guidelines—2021

PRISMA HEALTH Children's Hospital

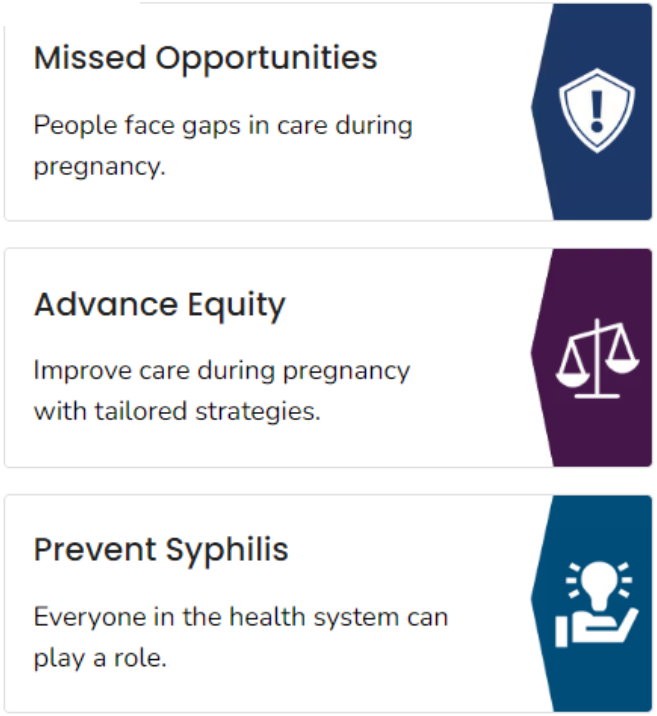
https://www.cdc.gov/std/treatment-guidelines/pocket-guide.pdf

Recommended IHS Screening best practices for 2023-2024:

1. **Universal screening for syphilis** for patients aged 13-64 should continue through 2024
    a. **Primary Care**
    b. **Emergency Department/Urgent Care Clinic**
    c. **Field outreach programs**

Fall 2023 IHS STI Treatment Guidance

National STD Curriculum (uw.edu)



Sexually Transmitted Infections

National Strategic Plan

for the United States | **2021–2025**

- **Partner with pharmacies and clinics** to increase easy local access to STD testing and treatment.
- **Establish express clinics** where people can access walk-in testing and treatment without full exams.
- **Harness the potential of telehealth/telemedicine** as a convenient method of testing and consultation for people across the country, including in rural areas. (If you live in such an area, are uncomfortable talking with your doctor, or just can't find the time to go get tested, an increasingly popular option is to take an at-home STD test.)

[Sexually Transmitted Infections (STI) National Strategic Plan: 2021-2025 (hhs.gov)]

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Holistic, Coordinated Care Is Critical for Addressing These Overlapping Epidemics

A "no-wrong-door" approach – providing or connecting a person to all the services that meet their needs wherever they seek care – is crucial.

The first step in implementing this approach is **increasing access to quality healthcare settings.** STD clinics are important spaces for people who are uninsured, need flexible appointments, need low- or no-cost services, or are looking for expert and confidential services.

We must reduce the effect of social and economic conditions that can influence health outcomes - called social determinants of health - which have been documented as key contributors to negative health outcomes, including STI transmission. Strategies to reduce these conditions can include:

- ☑ **Promoting prevention and care in related systems,** including housing, education, and the justice system.
- ☑ **Providing patients with resources,** including housing, food, transportation, and employment.
- ☑ **Integrating existing programs,** such as syringe services, substance use disorder treatment programs, and HIV testing and pre-exposure prophylaxis programs in STD clinics.
- ☑ **Identifying "outside-the-box" opportunities for collaboration and integration.** New solutions could include developing partnerships with pharmacies and retail health clinics or modernizing and streamlining data systems.

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NATIONAL CONDOM WEEK TIMELINE

3000 B.C.

Earliest Known Condoms

Condoms are used in ancient Egyptian civilization.

1400 A.D.

Condoms Made From Animals

Condoms are made from animal intestines.

1848

Rubber Condoms are Born

Vulcanization of rubber gives birth to rubber condoms.

1990s

National Condom Week

National Condom Week is created to raise awareness of the importance of using condoms to prevent S.T.D.s and unwanted pregnancies.

References and Readings

- Stafford IA, Workowski KA, Bachmann LH. Syphilis complicating pregnancy and congenital syphilis. Ingelfinger JR, Lee C, eds. *N Engl J Med*. 2024;390(3):242-253.
- American Academy of Pediatrics Red Book: 2024–2027 Report of the Committee on Infectious Diseases (33rd Edition). Syphilis.
- Committee on Prevention and Control of Sexually Transmitted Infections in the United States, Board on Population Health and Public Health Practice, Health and Medicine Division, National Academies of Sciences, Engineering, and Medicine. *Sexually Transmitted Infections: Adopting a Sexual Health Paradigm*. (Vermund SH, Geller AB, Crowley JS, eds.). National Academies Press; 2021.
- Centers for Disease Control and Prevention. National overview of STDs, 2021.
- Centers for Disease Control and Prevention. The national plan to eliminate syphilis from the United States. https://www.cdc.gov/stopsyphilis/plan.pdf
- Breedlove B. “Living people who breathe and feel and suffer and love.” *Emerg Infect Dis*. 2023;29(10):2184-2185.

PrismaHealth.org