



Published in final edited form as:

Sex Transm Dis. 2025 July 01; 52(7): 392–394. doi:10.1097/OLQ.0000000000002127.

Trends in syphilis case rates among women of reproductive age — United States, 2013–2022

Priyanka Anand, MD¹, Laura A. S. Quilter, MD MPH¹, Emily R. Learner, PhD¹, Lindley A. Barbee, MD MPH¹, David A. Jackson, MD MPH¹

¹Division of STD Prevention, Centers for Disease Control and Prevention, Atlanta, GA, USA

Abstract

We analyzed syphilis case notifications in reproductive age women during 2013–2022. Late/unknown duration syphilis grew faster after 2020 (45.8% versus 17.9% annual growth pre-2020). Increased screening, inaccurate staging, delayed diagnosis, or increased incidence following clinical and partner services gaps during 2020 may contribute to rises in late/unknown duration cases.

Short summary:

Syphilis case rates in women of reproductive age continue to rise at an increasing pace, with a significant increase in late/unknown duration cases after 2020.

Keywords

syphilis; syphilis staging; women; women of reproductive age; surveillance

Introduction

The syphilis epidemic among women in the United States continues to expand; the rate of primary and secondary (P&S) syphilis among women of reproductive age (WRA) increased over 800% during 2013–2022, paralleling increases in congenital syphilis.¹ Public health efforts often concentrate on P&S syphilis cases; however, unknown duration or late syphilis accounts for over half of cases among WRA.¹ A recent report from King County, Washington described sharp increases in unknown duration or late syphilis rates among women.² National and regional trends in syphilis case rates by stage among WRA have not been fully described. We examined trends in national syphilis case notifications among WRA during 2013–2022, to understand trends in syphilis by region and assess differences in trends by reported syphilis stage.

Corresponding author: Priyanka Anand, MD, Division of STD Prevention (DSTDP), Centers for Disease Control and Prevention, 1600 Clifton Rd NE, MS H24-4, Atlanta, GA 30329, panand@cdc.gov.

Conflicts of interest and source of funding: None

Materials and Methods

We analyzed acquired syphilis case notifications (hereafter “syphilis cases”) for WRA (cases with a current sex of female and aged 15–44 years) submitted to CDC via the National Notifiable Diseases Surveillance System for the period of 2013–2022, from all 50 U.S. states and the District of Columbia. We calculated case rates by syphilis stage (P&S, early non-primary non-secondary [ENPNS], and unknown duration or late), and stratified rates by U.S. census region (Supplementary Figure 2). As California contributed over half of all cases in the West, we conducted a sensitivity analysis examining the effect of California on trends in the West. We conducted joinpoint regression to describe periods with statistically significant ($p < 0.05$) differences in annual percent change (APC) in case rates. Joinpoint regression was conducted in Joinpoint Regression Program, Version 5.0.2, using the weighted Bayesian Information Criterion (MIC) method, which selects a best fit model while minimizing the number of joinpoints. We pre-specified a maximum of three joinpoints, minimum of one observation between joinpoints, and minimum of two observations from final joinpoint to end of the data, to avoid overfitting*.³ All other analyses were conducted in R version 4.4.0.⁴ Case rates are reported per 100,000 persons. This study used data routinely collected by public health surveillance and was therefore not subject to institutional review board approval for human subjects’ protection. Data were collected during 2013 to 2023 and analyzed in 2024.

Results

There were 213,366 cases of syphilis reported among WRA between 2013–2022; over half (55%) were reported during 2020–2022. Median age was 25 years (interquartile range 20–35 years). The South (47%) and West (31%) accounted for most cases. Half (51.0%) of cases were unknown duration or late stage. The proportion that were reported as pregnant decreased slightly over the period (21.1% in 2013 to 19.3% in 2022).

Case rates of all stages of syphilis (total syphilis) among WRA increased from 12.5 in 2013 to 78.0 in 2022. Joinpoint regression revealed a change in trend in growth rate of total syphilis among WRA after 2020. Total syphilis case rates among WRA showed slower growth during 2013–2020 (20.6% APC, 95% confidence interval [CI] 10.6%–23.8%), followed by a period of faster growth during 2021–2022 (37.0% APC, 95% CI 26.4%–45.4%). Unknown duration or late syphilis case rates followed a similar pattern with rates increasing from 7.1 to 41.7 during 2013–2022, with initial slower growth during 2013–2020 (17.9% APC; 95% CI: 6.5%–22.1%) followed by faster growth during 2021–2022 (45.8% APC; 95% CI: 29.4%–58.4%). In contrast, joinpoint regression did not show a change in trend for P&S and ENPNS syphilis case rates during 2013–2022. P&S syphilis case rates increased steadily from 2.1 to 19.1, (29.2% APC, 95% CI 27.4%–32.2%), and ENPNS syphilis case rates increased steadily from 3.3 to 17.2 (20.8% APC, 95% CI 19.6%–22.6%). (Figure 1)

*More information on joinpoint regression is available at: Joinpoint Regression Program ([cancer.gov](https://cancer.gov/joinpoint)).

Regional trends were similar to national trends for total syphilis case rates in the Northeast, Midwest, and South, with faster growth after 2020 (supplementary Figure 1). Unknown duration or late syphilis case rates also showed faster growth after 2020 in the Northeast and South and after 2019 in the Midwest, with APCs exceeding 45% per year in these regions (supplementary Figure 1 and Table 1). In the South and Midwest, P&S syphilis case rates grew faster after 2017, preceding increases in growth rate for unknown duration or late syphilis. P&S syphilis case rates grew steadily in the Northeast during 2013–2022. ENPNS syphilis case rates in the Midwest also had faster growth after 2017, but the trend in ENPNS syphilis case rates did not meaningfully change during 2013–2022 in the Northeast and South (supplementary Figure 1 and supplementary Table 1).

In contrast, in the West, the rate of growth for total syphilis case rates declined from initial faster growth (36.4% APC) during 2013–2018 to slower growth (23.8% APC) during 2019–2022. There was no change in trend for unknown duration or late syphilis case rates in the West (30.0% APC throughout 2013–2022). Both P&S and ENPNS syphilis case rates in the West showed slower growth after 2018 (supplementary Figure 1). In a sensitivity analysis removing California cases, unknown duration or late syphilis case rates in the West grew faster after 2016, several years earlier than in other regions. All other stages of syphilis had a steady, high rate of growth throughout the period. In California, all stages of syphilis showed significantly slower growth after 2019–2020 (supplementary Table 1).

Discussion

Syphilis is expanding rapidly among WRA. Unknown duration or late syphilis case rates in WRA nationally increased sharply after 2020, in contrast to an ongoing steady rate of growth for P&S and ENPNS syphilis. Our results are consistent with previous findings from King County, Washington², and suggest that the increase in unknown duration or late syphilis is part of a broad national trend. Growth rates for unknown duration or late syphilis increased sharply in the Northeast, Midwest, and South after 2020, outpacing the rate of growth of early stages of syphilis. In Western states (excluding California) increased growth rate of unknown duration or late syphilis began in 2016, years before the other regions. In California, all stages of syphilis experienced large declines in annual growth rate after 2019–2020. Reductions in growth in syphilis in California may demonstrate the impact of prevention efforts targeting WRA. By 2018, many jurisdictions in California had adopted expanded prenatal syphilis screening; California also prioritized syphilis cases among WRA for partner services.⁵

A number of factors may explain the sharp rise in unknown duration or late syphilis rates. Increased screening may contribute to higher case rates, but screening alone is unlikely to explain the large increases seen in our data. Guidance on expanded syphilis screening is relatively new.^{6,7} Furthermore, seroprevalence studies among blood donors show increasing syphilis prevalence among women during 2020–2022, which is unlikely to be impacted by screening rates.⁸ A true increase in late stage syphilis among WRA after 2020 may stem from missed diagnosis of early syphilis services during the COVID-19 pandemic due to lack of timely case finding and treatment, reductions in partner services, and gaps in in-person STI services. Alternatively, recently acquired, transmissible cases of syphilis in women may

have been more frequently staged as unknown duration or late syphilis in recent years. WRA undergoing syphilis testing often do not have a history of syphilis testing, making it harder to differentiate recent acquisition from late stage syphilis. Clinicians may miss syphilitic lesions in women and may not be aware of how to obtain prior serologic test results or how to interpret these results.¹² Reassignment of disease intervention specialists during the COVID-19 pandemic and ongoing reductions in partner services, which play a critical role in surveillance staging, may have contributed to more inaccurate syphilis staging after 2020.¹³ Although not possible using case notification data alone, future analyses will be important to understand the factors underlying increases in unknown duration or late stage case rates.

Historically, surveillance and partner services have focused on early stages of syphilis, particularly P&S syphilis, as these cases represent higher transmission risk. However, P&S syphilis represents a minority of syphilis cases among WRA. Nationally, the rise in unknown duration or late stage syphilis cases has outpaced other syphilis stages. Public health departments can continue to support syphilis screening among WRA and their sex partners by educating providers and communities on screening recommendations, supporting testing across all healthcare settings, and offering low-barrier testing.^{14,15} To ensure newly detected syphilis cases in WRA are accurately staged to guide treatment, follow-up, and partner services interventions, providers should conduct detailed histories and thorough physical exams, including careful skin, oral, and pelvic exams for lesions.¹⁶ Given low comfort with syphilis diagnosis and management among non-STI specialists, ongoing education efforts are needed.¹² To manage rising case volumes, health departments can implement automated review of syphilis serologies to reduce case investigation time and allow staff to focus on other tasks.¹⁷ When managing limited resources, health departments may consider first prioritizing all cases of syphilis in WRA for follow-up and partner services interventions, given the importance of identifying and treating syphilis in WRA to prevent congenital syphilis.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

References:

1. CDC. Sexually Transmitted Infections Surveillance, 2023. U.S. Department of Health and Human Services. <https://www.cdc.gov/std/statistics/2022/default.htm>
2. Berzkalns A, Ramchandani MS, Cannon CA, Kerani RP, Dombrowski JC, Golden MR. The Syphilis Epidemic Among Heterosexuals Is Accelerating: Evidence From King County, Washington. *Open Forum Infect Dis*. Oct 2023;10(10):ofad481. doi:10.1093/ofid/ofad481 [PubMed: 37849505]
3. Kim HJ, Chen HS, Midthune D, et al. Data-driven choice of a model selection method in joinpoint regression. *J Appl Stat*. 2023;50(9):1992–2013. doi:10.1080/02664763.2022.2063265 [PubMed: 37378270]
4. Joinpoint Regression Program. Version 5.0. 2. National Cancer Institute; May 2023.
5. Plotzker Rosalyn E SLR, Harmon Jennifer L, Kovalski Laura. Expanded Syphilis Screening Recommendations for the Prevention of Congenital Syphilis. 2020. <https://www.cdph.ca.gov/Programs/CID/DCDC/CDPH%20Document%20Library/Expanded-Syphilis-Screening-Recommendations.pdf>

6. Congenital syphilis letter to providers and screening guidelines. Public Health Seattle and King County, Washington State Department of Health; May 12, 2022, 2022. https://doh.wa.gov/sites/default/files/2022-05/150-163_Congenital_syphilis_letter_to_providers_5.12.2022.pdf?uid=62842f309152e
7. Dear Colleague Letter: Expanded Syphilis Screening. CDPH STD Control Branch; December 8, 2020, 2020. https://www.cdph.ca.gov/Programs/CID/DCDC/CDPH%20Document%20Library/Dear-Colleague-Letter_Expanded-Syphilis-Screening_12-8-20.pdf
8. Conti G, Notari EP, Dodd RY, et al. Syphilis seroprevalence and incidence in US blood donors from 2020 to 2022. *Transfusion*. 2024;64(2):325–333. [PubMed: 38180267]
9. Jenness SM, Le Guillou A, Chandra C, et al. Projected HIV and Bacterial Sexually Transmitted Infection Incidence Following COVID-19-Related Sexual Distancing and Clinical Service Interruption. *J Infect Dis*. Mar 29 2021;223(6):1019–1028. doi:10.1093/infdis/jiab051 [PubMed: 33507308]
10. Patel SY, Mehrotra A, Huskamp HA, Uscher-Pines L, Ganguli I, Barnett ML. Trends in Outpatient Care Delivery and Telemedicine During the COVID-19 Pandemic in the US. *JAMA Intern Med*. Mar 1 2021;181(3):388–391. doi:10.1001/jamainternmed.2020.5928
11. Pinto CN, Niles JK, Kaufman HW, et al. Impact of the COVID-19 Pandemic on Chlamydia and Gonorrhea Screening in the U.S. *Am J Prev Med*. Sep 2021;61(3):386–393. doi:10.1016/j.amepre.2021.03.009 [PubMed: 34020848]
12. Bonnewell J, Magaziner S, Fava JL, et al. A survey of syphilis knowledge among medical providers and students in Rhode Island. *SAGE Open Med*. 2020;8:2050312120902591. doi:10.1177/2050312120902591
13. Wright SS, Kreisel KM, Hitt JC, Pagaoa MA, Weinstock HS, Thorpe PG. Impact of the COVID-19 Pandemic on Centers for Disease Control and Prevention–Funded Sexually Transmitted Disease Programs. *Sex Transm Dis*. 2022;49(4):e61–e63. doi:10.1097/olq.0000000000001566 [PubMed: 34654769]
14. McDonald R, O’Callaghan K, Torrone E, et al. Vital Signs: Missed Opportunities for Preventing Congenital Syphilis - United States, 2022. *MMWR Morb Mortal Wkly Rep*. Nov 17 2023;72(46):1269–1274. doi:10.15585/mmwr.mm7246e1 [PubMed: 37971936]
15. Force NSaCSSFT. Considerations for the Implementation of Point of Care Tests for Syphilis 2024. <https://www.hhs.gov/sites/default/files/nscss-considerations-for-the-implementation-of-syphilis-poc-tests.pdf>
16. Workowski KA, Bachmann LH, Chan PA, et al. Sexually Transmitted Infections Treatment Guidelines, 2021. *MMWR Recomm Rep*. Jul 23 2021;70(4)(4):1–187. doi:10.15585/mmwr.rr7004a1
17. Karki S, Peterman TA, Johnson K, et al. An Automated Syphilis Serology Record Search and Review Algorithm to Prioritize Investigations by Health Departments. *Sex Transm Dis*. Dec 1 2021;48(12):909–914. doi:10.1097/OLQ.0000000000001489 [PubMed: 34091581]

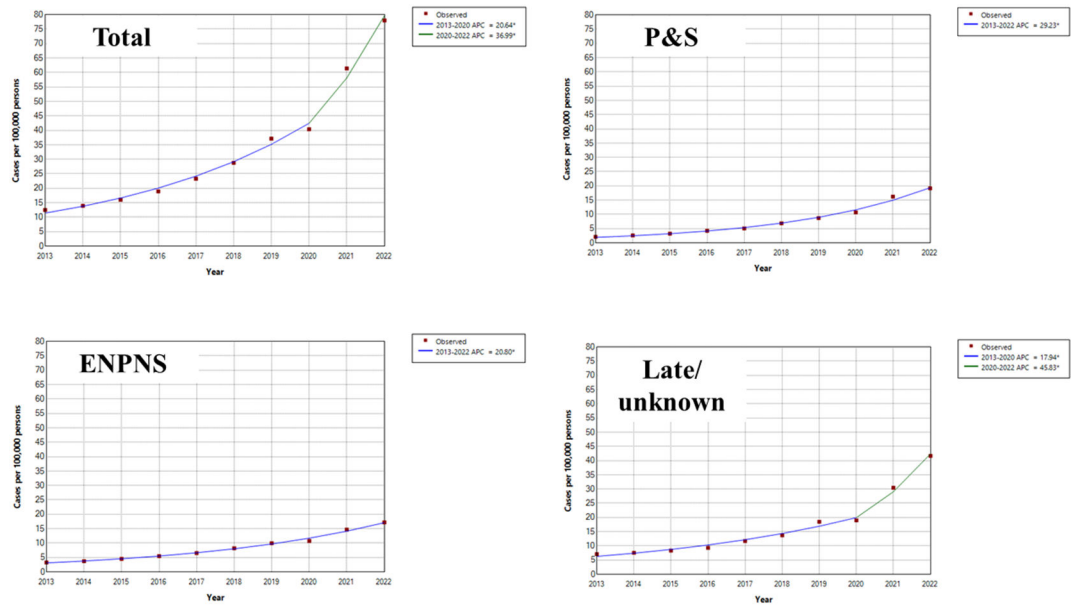


Figure 1.

Joinpoint regression for (A) total, (B) primary and secondary, (C) early non-primary non-secondary, and (D) late or unknown duration syphilis case rates, United States (50 states and District of Columbia), 2013–2022