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Syphilis Screening During Pregnancy in 18- to 49-Year-Old Women in Commercially Insured Claims Data, 2022

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Abstract

Background: Syphilis cases continue to climb in the United States, with a 159% increase among women between 2018 and 2022. Congenital syphilis (CS) cases continued along the same trajectory, with a 183% increase over the same time frame. Adherence to the screening guidelines may assist in reducing this trend. Our analysis aimed to determine the proportion of commercially insured women receiving syphilis screening during pregnancy.

Materials and Methods: We analyzed the 2022 Merative MarketScan Database containing commercially insured medical claims to determine syphilis screening rates among insured pregnant women aged 18 to 49 years, insured for 8 months before childbirth. Screening events were classified into 3 categories: first (1–13 weeks), second (14–27 weeks), and third (28+ weeks). Percentages and odds ratios were calculated for pregnancy categories by age category, trimester, Centers for Medicare & Medicaid Services regions, employment, and type of health insurance.

Results: Of the 170,005 pregnant women in the sample, 79.6% were screened for syphilis at least once, and 95.1% resided in a state requiring syphilis testing during pregnancy. The highest percentage of pregnant women was screened during the third trimester, and the majority of those screened received at least 2 tests during pregnancy. Women in states with laws had 14% greater odds for receiving any screening during pregnancy.

Discussion: Despite Centers for Disease Control and Prevention syphilis screening recommendations, only 79.6% received screening among this insured population. Effective communication on the importance of syphilis screening for all medical providers and their patients may increase the screening rates and decrease the incidence of CS.

Syphilis continues to cause negative health outcomes, despite the discovery of penicillin as an effective treatment more than 80 years ago.¹ One of the most concerning adverse

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health outcomes occurs when syphilis is transmitted across the placenta to the fetus during pregnancy, causing congenital syphilis (CS).^{2,3} Syphilis during pregnancy increases the risk of stillbirth, preterm birth, neonatal morbidity, and neonatal death soon after birth due to CS.⁴ In 2022, women in the United States experienced a 159% increase in reported syphilis cases since 2018, and a 183% increase in reported CS cases was observed since 2018.⁵ The urgent nature of the situation led to the development of the National Syphilis and Congenital Syphilis Syndemic Federal Task Force.⁶ The goal of the task force is to avert 5% of new CS cases by September 2024 by reducing syphilis rates, promoting health equity, and directly working within the communities that are impacted.^{6,7}

Syphilis screening is recommended by the Centers for Disease Control and Prevention (CDC) for all women who are pregnant at their initial prenatal visit or first encounter with the health care system.⁸ Rescreening is recommended early in the third trimester and at delivery for individuals with risk factors or women who live in a county with high rates of syphilis.^{8,9} Many states mandate syphilis screening during pregnancy, but there is variability in policy state-to-state.¹⁰ In 2022, 42 of the 50 states require syphilis screening during the first visit, 22 in the third trimester, and 15 at the time of delivery. Furthermore, multiple states only require screening only if the woman is at an increased risk of syphilis¹⁰ (Appendix). Prevention of CS is feasible if every pregnant woman receives screening at first prenatal visit, at birth, and administered effective treatment when diagnosed.^{8,11}

Our analysis has 2 objectives: (1) to provide a snapshot of health care access and prenatal screening for syphilis among 18- to 49-year-old pregnant women with commercial health insurance within the United States, and (2) to assess the proportion of these women who received timely syphilis screening according to CDC recommendations and state requirements.

MATERIALS AND METHODS

We analyzed the 2022 Merative MarketScan Research Commercial Database to determine the proportion of 18- to 49-year-old women receiving syphilis screening during pregnancy. In 2022, the US Census estimated that 65% of the population with health insurance were covered with private health insurance, and of those 56.6% were covered under employer-based coverage.^{12,13} Merative MarketScan (www.Merative.com) databases are U.S. health care claims data available for health care research that are de-identified to the patient-level for 273 million patients. The commercial database did not include any pregnant women enrolled in Medicaid.

We created the analysis sample by merging multiple datasets on a unique identifier capturing physician visits and hospital visits, providing an all-inclusive experience during the woman's pregnancy. Standardized medical codes, women's age, and sex assigned at birth were utilized to identify pregnancy, childbirth, and services related to the pregnancy. We included codes from the *International Classification of Diseases, Tenth Revision*, Healthcare Common Procedure Coding System (HCPCS), and Current Procedural Terminology (CPT) to identify pregnancy and services provided during pregnancy.¹⁴ The final dataset was restricted to women aged 18 to 49 years, who were enrolled in a health plan for 8 months or

more before documented pregnancy delivery, and who had at least one pregnancy claim in 2022.

Age was calculated at the time of pregnancy claim related to the pregnancy outcome, and then aggregated into specific age ranges. Age ranges 18–24, 25–34, 35–44, and 45–49 years were selected according to the US Census Bureau age categories. The location for the woman was determined by the geographic location of the primary beneficiary's residence. States were aggregated according to the Centers for Medicare & Medicaid Services (CMS) regions, 1 to 10 (Appendix).¹⁵ Employee classifications were aggregated as follows: Salary Non-union, Salary Union, Salary Other coded as Salary; Hourly Non-union, Hourly Union, Hourly Other coded as Hourly; Non-union, Union, and unknown. The types of health care insurance plans included are health maintenance organizations (HMO); preferred provider organizations (PPO); noncapitated point-of-service and capitated or partially capitated point-of-service, which were combined for a total point-of-service category (POS); consumer-driven health plan (CDHP); high-deductible, health plan (HDHP); and basic/major medical, comprehensive, and exclusive provider organization were coded as "Other."

Syphilis screening was determined with CPT and HCPCS codes (Appendix). The trimesters were identified using previously published methods for diagnosis codes identifying gestation weeks.¹⁴ The trimesters were assigned as first trimester (0–13 weeks), second trimester (≥ 14 –27 weeks), or third trimester (≥ 28 weeks). Syphilis screening categories were created according to the timing of syphilis screening (first, second, third trimester, any trimester). The counts and percentages of the pregnant women are not mutually exclusive per trimester, and a woman could have received screening during the 3 trimesters and counted for each trimester. We compared the syphilis screening categories stratified by demographics, CMS regions, and states with and without the legal requirement (statute or regulation) for syphilis screening during pregnancy in 2022 (Appendix). Descriptive statistics were used to describe demographic variables, and logistic regression models were used for odds ratios (ORs) using SAS 9.4 software (SAS Institute Inc., Cary, NC).

The regression reference categories were selected for the following reasons: 45- to 49-year-old pregnant women have higher chance of complications during a pregnancy and may be monitored closely during pregnancy¹⁶; CMS region 4 contains multiple southern states, which have historically higher rates of syphilis; salaried employees may have greater health care access; and PPO health plans typically allow for the greatest level of access.¹⁷

The analysis dataset contains pregnancy outcome claims data from 2022 and syphilis screening for those identified outcomes ending on December 31, 2022. These data involve deidentified patient claims and are considered a secondary data source; thus, no institutional review board (IRB) approval was required.

RESULTS

For the time period of January 1, 2022, through December 31, 2022, we identified 170,005 commercially insured pregnant women between the ages of 18 and 49 years. The 170,005 pregnant women were most commonly in the 25 to 34 years of age group (62.6%),

residents of CMS region 4 (30.1%), salaried employees (29.3%), and participants in a PPO health plan (47.3%). Syphilis screening rates by trimester increased from the first (52.8%), second (64.3%), to third (72.1%). Although nonsignificant, women aged 18 to 24 years were screened the least during their pregnancy (first: 49.6%, second: 62.9%, third: 70.4%) compared with other women and overall, 77.0% (Table 1). In addition, of the 135,376 women who were screened for syphilis, 83.8% (results not shown) were screened at least twice during their pregnancy; for example, a patient may have received a test in the first and third trimesters.

The percentage of pregnant women screened at least once for syphilis exceeded 75% in all 10 CMS regions, ranging from 75.7% to 85.7%. The CMS regions' screening percentages during the first trimester ranged from 46.5% (region 9) to 58.6% (region 3). Syphilis screening increased by an average of 11 percentage points during the second trimester, with region 6 having the largest increase between the first and second trimesters, from 48.2% to 64.1% (Table 1). Again, syphilis screening increased in the third trimester, ranging from 65.9% in region 8 to 81.1% in region 6.

By employee classification, although workers participating in a union received the highest screening during all trimesters, with 83.2% (data not shown, representing 1.9% of the total sample) screened at least once during pregnancy. Consumer-driven health plans had the highest percentage of pregnant people being screened at least once for syphilis at 80.6%, compared with the other health plans.

Forty-two of the 50 states require syphilis screening during pregnancy. Of the pregnant women in our sample 95.1% (144,731) resided in a state requiring syphilis screening within the first trimester or at the first available prenatal visit and 10.4% (17,749) were missing geographic location data. Of the 144,731, only 80% of those residing in states with laws were screened for syphilis during this time frame. In addition, 22 states required screening during the third trimester, and 73% of the patients in those states did not receive a screening during the third trimester (Tables 2, 3; Appendix). Overall, states with any screening laws reported 80.2% receiving screening compared with states with no laws, 77.9%. The screening laws had 14% greater odds (OR, 1.14; 95% confidence interval [CI], 1.08–1.21) at receiving a screening for syphilis compared with a jurisdiction without laws.

The odds of receiving a syphilis screening in states with state laws varied compared with the reference category. Region 4 contains multiple southern states that have historically higher rates of syphilis. Region 6's odds were greater (OR, 1.63; 95% CI, 1.56–1.71) for being screened at least once during pregnancy compared with Region 4; followed by Region 7, 36% greater odds (OR, 1.36; 95% CI, 1.27–1.45), and Region 5 displaying a slight increase, 6% greater odds (OR, 1.06; 95% CI, 1.01–1.11) compared with Region 4 (Table 3). Region 8 had 15% lower odds (OR, 0.85; 95% CI, 0.79–0.91), and Region 9 had 13% lower odds (OR, 0.87; 95% CI, 0.84–0.91) of receiving a syphilis test any time during their pregnancy compared with Region 4 (Table 3). Pregnant women who were classified as hourly worker had 11% lower odds (OR, 0.89; 95% CI, 0.86–0.92) of receiving a syphilis screening than pregnant women working in a salaried position. The type of insurance plan in which a woman was enrolled was not strongly associated with the receipt of at least one syphilis

screening during pregnancy. Women enrolled in a CDHP had higher odds (OR, 1.07; 95% CI, 1.02–1.11) of being screened for syphilis during pregnancy compared with PPO plans (reference category).

DISCUSSION

Screening for syphilis during pregnancy is recommended by many professional organizations and is required by law in most states in the United States, yet 20% of pregnant women do not have evidence of any screening for syphilis in the claims data. The highest percentage of pregnant women was screened during the third trimester, and the majority of those screened received at least 2 tests during pregnancy. However, the data show wide-spread non-adherence to the recommendations to perform syphilis screening at the first prenatal visit. Furthermore, the different types of commercial health insurance plans demonstrated minor differences in syphilis screening rates. It is noted that, even with health insurance coverage and state mandates, there are women who are not receiving the recommended syphilis screenings during their pregnancy, which points to missed opportunities to provide quality care.

The need for a better understanding of these missed opportunities and ways to overcome the potential barriers to receiving quality care during pregnancy cannot be overstated. This is highlighted by a recent study stating that 36.8% of birthing women delivering an infant with CS received no prenatal care.⁸ How prenatal care is delivered warrants attention to ensure no newborn or pregnant woman experiences negative health outcomes from missed opportunities.¹⁸ The commercially insured population has access to health care, yet there remains room for improvement to reach the optimal level of syphilis screening to help reduce cases of CS.

A study by Lanier et al.¹⁹ investigated syphilis screening in 6 southern states and demonstrated first-trimester screening percentages were higher than the third-trimester percentages, in comparison to our findings where third-trimester screening percentages were higher. The screening percentages increased from first to third trimester, with pregnant women receiving syphilis screening during the third trimester at a much higher percentage: first, 52.8%; third, 72.1%. However, the study by Lanier and colleagues was focused solely on Medicaid enrollees, and the dynamics of receiving care in this cohort is markedly different than our study cohort. The difference in percentages between the first and third trimesters may represent missed opportunities for clinical intervention, especially considering that 42 states have prenatal screening requirements.

In all CMS regions, more than 75% of the women received at least one syphilis screening during their pregnancy. In addition, states with laws requiring screening at any time during the pregnancy had higher screening percentages compared with states without any laws. The importance of syphilis screening during prenatal care continues to drive an important message that CS is preventable.

Health care access is vital for ensuring a safe pregnancy and was operationalized in our study by showing enrollment in the different types of health insurance plans. Differences

in plan types were expected because of the variances in access to providers, and managed care practices have on meeting quality metrics. Mick and colleagues²⁰ found that patients enrolled in managed care plans were less likely to receive sexually transmitted infection testing by primary care providers compared with the accountable care organization–driven plans that have incentives for primary care providers to coordinate care across their patient panels. This contrasted with our findings with nonsignificant differences between the private insurance plans. However, our analyses were not able to identify specific incentives for quality in each of the defined health plan types, such as accountable care organization affiliation.

Our analyses have main limitations that are inherent when using commercially insured medical claims data. The data are subject to coding errors, especially if the provider used ambiguous codes to identify syphilis screening.^{21–23} MarketScan databases are collected as a convenience sample from large employers that provide private insurance to employees and may not be representative of the US population.^{24,25} Furthermore, it was estimated in 2021 that 96% of pregnant women had health care coverage for their delivery, with 51.7% covered by commercial insurance, 41.0% by Medicaid, 3.4% by other coverage, and 3.9% with self-pay, possibly also uninsured at the time of delivery.²⁶ In addition, Hammerslag et al.²⁷ documented pregnant women enrolled in Medicaid had higher odds of screening at any time during pregnancy. Also, the analysis did not include the location of treatment and if effective treatment was offered and administered.

Access to quality sexually transmitted infection care is important for reducing the burden of CS. Sexually transmitted infections can be diagnosed and treated in many different venues, including emergency departments and urgent care clinics,^{28,29} and these health care access events may be the only opportunity to provide syphilis prevention and education for some pregnant women who have reduced access to care. Pregnant women also may receive prenatal care for the first time at labor and delivery because they did not access prenatal care otherwise. Therefore, the need for public health messaging (e.g., “Talk.Test.Treat.”) around syphilis knowledge and screening recommendations will require a holistic approach among medical providers, patients, and public health departments to create a team effort for ensuring healthy pregnancies.³⁰ Despite near-universal prenatal syphilis screening requirements across states, not all women are receiving recommended syphilis screening during pregnancy. Therefore, there is room for improvement that necessitates public health professionals, medical providers, and patients working together to ensure improved health outcomes during pregnancy. Adherence to recommended syphilis screening, reaching pregnant women during all health care visits, and enhanced public health messaging can help achieve the larger goal of ensuring the health of future generations.

Appendix

Centers for Medicare & Medicaid Services Regions:

- 1: Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont
- 2: New Jersey, New York

- 3: Delaware, District of Columbia, Maryland, Pennsylvania, Virginia, West Virginia
- 4: Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee
- 5: Illinois, Indiana, Michigan, Minnesota, Ohio, Wisconsin
- 6: Arkansas, Louisiana, New Mexico, Oklahoma, Texas
- 7: Iowa, Kansas, Missouri, Nebraska
- 8: Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming
- 9: Arizona, California, Hawaii, Nevada
- 10: Alaska, Idaho, Oregon, Washington.

Current Procedural Terminology and Healthcare Common Procedure Codes utilized for identifying a syphilis test.

Current Procedural Terminology codes

- 86592:** Syphilis test, non-treponemal antibody, qualitative (VDRL, RPR, ART)
- 86593:** Syphilis test, non-treponemal antibody
- 86780:** Medical procedural for qualitative or semiquantitative immunoassays, used to report and bill *Treponema pallidum* antibody tests with the BioPlex 2200 Syphilis Total & rapid plasma regain (RPR) kit
- 80055:** Obstetric panel used for the first obstetric visit
- 80081:** Obstetric panel, panel includes blood count, complete (CBC), hepatitis B surface antigen, HIV-1 antigen, HIV-1 and HIV-2 antibodies, antibody rubella, syphilis test non-treponemal antibody qualitative, antibody screen RBC each serum technique, blood typing ABO, blood typing Rh (D)
- 86781:** *T. pallidum* confirmatory test
- 0065 U:** BioPlex 2200 RPR Assay for an immunoassay for non-treponemal antibody, RPR
- 0210 U:** BioPlex 2200 RPR Assay—Quantitative test, evaluates the level of syphilis-related antibodies.

Healthcare Common Procedure Codes:

- G9228:** Chlamydia, gonorrhea, and syphilis screening results documented.

Prenatal Syphilis Screening Laws

Legal requirements for syphilis screening among pregnant women by time of test and state

First Visit

Alabama	Maryland	South Dakota
Alaska	Massachusetts	Tennessee
Arizona	Michigan	Texas
Arkansas	Missouri	Utah
California	Montana	Vermont
Colorado	Nebraska	Virginia
Connecticut	Nevada	Washington
Delaware	New Jersey	West Virginia
District of Columbia	New Mexico	Wyoming
Florida	New York	
Georgia	North Carolina	
Idaho	Ohio	
Illinois	Oklahoma	
Indiana	Oregon	
Kansas	Pennsylvania	
Kentucky	Rhode Island	
Louisiana	South Carolina	

Third Trimester

Alabama (only if at increased risk)	Indiana (only if at increased risk)
Arizona	Louisiana
Arkansas	Maryland
California	Missouri (only if at increased risk)
Connecticut	Nevada
Delaware	North Carolina
District of Columbia	Oklahoma (only if at increased risk)
Florida	Pennsylvania (only if at increased risk)
Georgia	Tennessee (only if at increased risk)
Illinois	Texas

Delivery

Alabama	Nevada (only if at increased risk)
Arizona	New Jersey
California (only if at increased risk)	North Carolina
Florida (only if at increased risk)	Oklahoma (only if at increased risk)
Georgia	Texas
Louisiana (only if at increased risk)	
Maryland (only if at increased risk)	
Michigan (only if at increased risk)	
Missouri (only if at increased risk)	

Appendix TABLE 4

2022 Legal requirements for syphilis screening among pregnant women by time of test and number of times screened during pregnancy

Screening Requirement	Total	Screening During 1st Trimester	Screening During 2nd Trimester	Screening During 3rd Trimester	1 Screening During Pregnancy	2+ Screenings During Pregnancy
No screening requirement	7,525	4,389 (58.3)	4,983 (66.2)	5,213 (69.3)	737 (9.8)	5,122 (68.1)
During 1st prenatal visit	49,654	28,491 (57.4)	32,970 (66.4)	36,082 (72.7)	5,756 (11.6)	34,322 (69.1)
During 1st prenatal and 3rd trimester	95,077	48,274 (50.77)	60,593 (63.7)	69,063 (72.6)	13,308 (14.0)	62,715 (66.0)

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TABLE 1.

Number of Pregnant Women Aged 18 to 49 Years in the Commercial Insurance Claims Dataset, Number and Percentage Screened for Syphilis by Stage of Pregnancy, by Age Group, Centers for Medicare & Medicaid Service Regions, Employer Classification, and the Type of Health Care Insurance Plan, 2022 MarketScan Data

No. Pregnant Women Aged 18–49 y	Syphilis Screening During Pregnancy				
	N (Col%)	First Trimester (1–13 wk)*, N (%)	Second Trimester (14–27 wk), †, N (%)	Third Trimester (28+ wk)‡, N (%)	Any time, N (%)
Total	170,005 (100)	89,742 (52.8)	109,357 (64.3)	122,556 (72.1)	135,376 (79.6)
Age category, y					
18–24	19,684 (11.6)	9771 (49.6)	12,376 (62.8)	13,862 (70.4)	15,155 (77.0)
25–34	106,496 (62.6)	55,936 (52.5)	68,668 (64.5)	76,765 (72.1)	85,184 (80.0)
35–44	43,211 (25.4)	23,682 (54.8)	27,901 (64.6)	31,474 (72.8)	34,542 (79.9)
45–49	614 (0.4)	353 (57.5)	412 (67.1)	455 (74.1)	495 (80.6)
Centers for Medicare & Medicaid Services regions.§					
1 (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont)	7,545 (4.4)	4,837 (64.1)	5,350 (70.9)	5,682 (75.3)	6,193 (82.1)
2 (New Jersey, New York)	11,936 (7.0)	6,591 (55.2)	7,382 (61.9)	8,528 (71.5)	9,552 (80.0)
3 (Delaware, District of Columbia, Maryland, Pennsylvania, Virginia, West Virginia)	16,048 (9.5)	9,414 (58.7)	11,298 (70.4)	11,952 (74.5)	13,148 (81.9)
4 (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee)	51,112 (30.1)	26,355 (51.6)	32,567 (63.7)	36,160 (70.8)	39,888 (78.0)
5 (Illinois, Indiana, Michigan, Minnesota, Ohio, Wisconsin)	26,858 (15.8)	14,338 (53.4)	17,102 (63.7)	18,908 (70.4)	21,047 (78.4)
6 (Arkansas, Louisiana, New Mexico, Oklahoma, Texas)	18,767 (11.1)	9,048 (48.2)	12,036 (64.1)	15,232 (81.2)	16,088 (85.7)
7 (Iowa, Kansas, Missouri, Nebraska)	7,480 (4.4)	4,351 (58.2)	5,180 (69.3)	5,561 (75.7)	6,195 (82.7)
8 (Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming)	4,637 (2.7)	2,186 (47.1)	2,859 (61.7)	3,059 (66.0)	3,508 (75.7)
9 (Arizona, California, Hawaii, Nevada)	17,787 (10.5)	8,319 (46.5)	10,594 (59.3)	12,013 (67.2)	13,659 (76.4)
10 (Alaska, Idaho, Oregon, Washington)	7,555 (4.5)	4,226 (55.9)	4,895 (64.8)	5,253 (69.5)	5,982 (79.2)
Employee classification¶					
Hourly	40,218 (44.7)	21,072 (52.4)	26,051 (64.8)	29,093 (72.3)	31,974 (79.5)
Salary	49,861 (55.4)	27,363 (54.9)	32,817 (65.8)	36,390 (73.0)	40,482 (81.2)
Type of Health care insurance plan¶¶					
HMO	19,824 (11.9)	10,108 (51.0)	12,373 (62.4)	14,001 (70.6)	15,653 (79.0)

No. Pregnant Women Aged 18–49 y	Syphilis Screening During Pregnancy				
	N (Col%)	First Trimester (1–13 wk) *, N (%)	Second Trimester (14–27 wk) †, N (%)	Third Trimester (28+ wk) ‡, N (%)	Any time, N (%)
PPO	78,720 (47.3)	41,835 (53.1)	51,030 (64.8)	56,813 (72.2)	62,665 (79.6)
POS	20,468 (12.3)	10,390 (50.8)	12,850 (62.8)	15,043 (73.5)	16,390 (80.1)
CDHP	18,110 (10.9)	9,943 (54.9)	11,950 (66.0)	13,255 (73.2)	14,602 (80.6)
HDHP	25,739 (15.5)	13,730 (53.3)	16,535 (64.2)	18,398 (71.5)	20,443 (79.4)
Other	3,737 (2.2)	1,930 (51.7)	2,388 (63.9)	2,593 (69.4)	2,927 (78.3)

* N and percent: pregnant women screened for syphilis during the first trimester. Screening is not mutually exclusive, woman could have received screening in the 3 trimesters, and counted for each trimester.

† N and percent: pregnant women screened for syphilis during the second trimester. Screening is not mutually exclusive, woman could have received screening in the 3 trimesters, and counted for each trimester.

‡ N and percent: pregnant women screened for syphilis during the third trimester. Screening is not mutually exclusive, woman could have received screening in the 3 trimesters, and counted for each trimester.

§ Centers for Medicare & Medicaid Services regions are regional offices ensure that health care providers are meeting federal requirements. Missing = 189.

¶ Employment classification of the primary beneficiary (Salary Non-union, Salary Union, Salary Other combined for Salary; Hourly Non-union, Hourly Union, Hourly Other combined for Hourly; N = 90,079).

// Type of benefit plan: HMO, PPO, POS, CDHP, HDHP. Missing = 3,407.

Col% indicates column percent; Other, other basic or major medical comprehensive exclusive provider organizations; Row%, row percent.

TABLE 2.

Number of Pregnant Women Aged 18 to 49 Years in the Commercial Insurance Claims Dataset, Number and Percentage Residing in States With Laws for Syphilis Screening by Category, 2022 MarketScan Data

No. Pregnant Women Aged 18–49 y	Residing in States With 3rd-Trimester Syphilis Screening Laws *		Residing in States With Any-Trimester Syphilis Screening Laws †	
	N (Col%)	N (Row%)	N (Row%)	N (Row%)
Total	170,005 (100)	95,077 (62.5)	144,731 (95.1)	
Age category, y [‡]				
18–24	19,684 (11.6)	11,517 (64.5)	17,032 (95.4)	
25–34	106,496 (62.6)	58,886 (62.3)	89,718 (94.8)	
35–44	43,211 (25.4)	24,337 (62.0)	37,450 (95.4)	
45–49	614 (0.4)	337 (60.7)	531 (95.7)	
Centers for Medicare & Medicaid Services regions [§]				
1 (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont)	7,545 (4.4)	2,553 (33.8)	6,623 (87.8)	
2 (New Jersey, New York)	11,936 (7.0)	0 (0.0)	11,927 (100.0)	
3 (Delaware, District of Columbia, Maryland, Pennsylvania, Virginia, West Virginia)	16,048 (9.5)	9,145 (57.0)	16,048 (100.0)	
4 (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee)	51,112 (30.1)	34,275 (84.0)	39,850 (97.7)	
5 (Illinois, Indiana, Michigan, Minnesota, Ohio, Wisconsin)	26,858 (15.8)	9,055 (46.2)	15,559 (79.3)	
6 (Arkansas, Louisiana, New Mexico, Oklahoma, Texas)	18,767 (11.1)	18,534 (98.8)	18,767 (100.0)	
7 (Iowa, Kansas, Missouri, Nebraska)	7,480 (4.4)	3,659 (48.9)	6,102 (81.6)	
8 (Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming)	4,637 (2.7)	0 (0.0)	4,444 (95.8)	
9 (Arizona, California, Hawaii, Nevada)	17,878 (10.5)	17,856 (99.9)	17,856 (99.9)	
10 (Alaska, Idaho, Oregon, Washington)	7,555 (4.4)	0 (0.0)	7,555 (100.0)	
Employee classification [¶]				
Hourly	40,218 (44.7)	24,130 (60.0)	36,088 (95.5)	
Salary	49,861 (55.4)	27,886 (55.9)	41,338 (92.2)	
Type of health care insurance plan				
HMO	19,824 (11.9)	13,763 (81.2)	16,279 (96.1)	
PPO	78,720 (47.3)	40,683 (60.5)	64,832 (96.3)	
POS	20,468 (12.3)	11,155 (55.3)	19,634 (97.4)	
CDHP	18,110 (10.9)	9,872 (59.6)	15,602 (94.3)	

No. Pregnant Women Aged 18–49 y	Residing in States With 3rd-Trimester Syphilis Screening Laws *		Residing in States With Any-Trimester Syphilis Screening Laws †	
	N (Col%)	N (Row%)	N (Row%)	N (Row%)
HDHP	25,739 (15.5)	15,474 (62.7)	22,678 (91.9)	
Other	3,737 (2.2)	1,985 (59.6)	3,006 (90.3)	

* Number and percentage of women who resided in a state with a law requiring third trimester screening. N = 152,256; Missing = 17,749.

† Number and percentage of women who resided in a state with a law requiring syphilis screening anytime during pregnancy. N = 152,256.

‡ Age groups: missing for third-trimester laws (missing = 17,749; missing by age group: 18–24 years = 1829, 25–34 years = 11,897, 35–44 years = 3964, 45–49 years = 59); missing for any-trimester laws (missing = 17,749; missing by age group: 18–24 years = 1829, 25–34 years = 11,897, 35–44 years = 3964, 45–49 years = 59).

§ Centers for Medicare & Medicaid Services regions are regional offices ensure that health care providers are meeting federal requirements. Missing = 17,749, Total = 189, Region 1 = 0, Region 2 = 9, Region 3 = 0, Region 4 = 10,311, Region 5 = 7,240, Region 6 = 0, Region 7 = 0, Region 8 = 0, Region 9 = 0, Region 10 = 0.

¶ Employment classification of the primary beneficiary (Salary Non-union, Salary Union, Salary Other combined for Salary; Hourly Non-union, Hourly Union, Hourly Other combined for Hourly; N = 82,626, Missing = 7,453, Hourly = 2,426, Salary = 5,027).

// Type of insurance benefit plan: HMO, PPO, POS, CDHP, HDHP. N = 148,953, Missing = 17,749, Total = 104, HMO = 2,881, PPO = 11,423, POS = 307, CDHP = 1,556, HDHP = 1,071.

Col% indicates column percent; Other, other basic or major medical comprehensive exclusive provider organizations; Row%, row percent.

TABLE 3.

Syphilis Screening for 18- to 49-Year-Old Pregnant Women in Commercial Insurance Claims Data With State Laws During the Third Trimester and Any Time According to Age, Centers for Medicare & Medicaid Service Region, Employee Classification, and Type of Health Care Insurance, 2022
MarketScan Data

	3rd Trimester			Any Screening During Pregnancy			
	Total	N (Col %)	N (%)	No. Screened According to Law ^f	Odds Ratio (95% CI) ^g	No. Pregnant Women Residing in State With Screening Law ^h	No. Screened According to Law ^h
Total ^h	170,005 (100)	95,077 (55.93)	69,063 (72.64)	1.02 (0.99–1.04)	144,731 (95.06)	116,101 (80.2)	1.1 (1.1–1.2)
Age category, y							
18–24	19,684 (11.58)	11,517 (64.50)	8,108 (70.40)	0.82 (0.67–0.99)	17,032 (95.39)	13,182 (77.40)	0.81 (0.65–1.00)
25–34	106,496 (62.64)	58,886 (62.25)	42,864 (72.79)	0.90 (0.74–1.09)	89,718 (94.84)	72,365 (80.66)	0.98 (0.79–1.21)
35–44	43,211 (25.42)	24,337 (62.01)	17,838 (73.30)	0.93 (0.76–1.13)	37,450 (95.42)	30,126 (80.44)	0.96 (0.78–1.19)
45–49	614 (0.36)	337 (60.72)	253 (75.07)	Reference	531 (95.68)	428 (80.60)	Reference
Centers for Medicare & Medicaid Services regions **							
1 (Connecticut, Maine, Massachusetts, 7,545 (4.44) New Hampshire, Rhode Island, Vermont)		2,553 (33.84)	1,912 (74.89)	1.19 (1.12–1.26)	6,623 (87.78)	5,464 (82.50)	1.26 (1.19–1.35)
2 (New Jersey, New York)	11,936 (7.03)	0 (0.00)	0 (0.00)	0.95 (0.90–1.00)	11,927 (99.92)	9,547 (80.05)	1.09 (1.03–1.14)
3 (Delaware, District of Columbia, Maryland, Pennsylvania, Virginia, West Virginia)	16,048 (9.45)	9,145 (56.99)	6,560 (71.73)	1.16 (1.11–1.21)	16,048 (100.00)	13,148 (81.93)	1.23 (1.17–1.28)
4 (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee)	51,112 (30.10)	34,275 (84.01)	24,074 (70.24)	Reference	39,850 (97.67)	31,372 (78.73)	Reference
5 (Illinois, Indiana, Michigan, Minnesota, Ohio, Wisconsin)	26,858 (15.82)	9,055 (46.16)	6,658 (73.53)	0.97 (0.94–1.01)	15,559 (79.31)	12,447 (80.00)	1.06 (1.01–1.11)
6 (Arkansas, Louisiana, New Mexico, Oklahoma, Texas)	18,767 (11.05)	18,534 (98.76)	15,051 (81.21)	1.80 (1.72–1.87)	18,767 (100.00)	16,088 (85.72)	1.63 (1.56–1.71)
7 (Iowa, Kansas, Missouri, Nebraska)	7,480 (4.40)	3,659 (48.92)	2,811 (76.82)	1.24 (1.17–1.31)	6,102 (81.58)	5,016 (82.20)	1.36 (1.27–1.45)
8 (Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming)	4,637 (2.73)	0 (0.00)	0 (0.00)	0.73 (0.68–0.79)	4,444 (95.84)	3,395 (76.40)	0.85 (0.79–0.91)

	3rd Trimester			Any Screening During Pregnancy		
	Total	N (%)	No. Screened According to Law [†]	Odds Ratio (95% CI) [‡]	No. Pregnant Women Residing in State With Screening Law [§]	No. Screened According to Law [¶]
9 (Arizona, California, Hawaii, Nevada, Pacific Territories)	17,878 (10.53)	17,856 (99.88)	11,997 (67.19)	0.84 (0.81–0.88)	17,856 (99.88)	13,642 (76.40)
10 (Alaska, Idaho, Oregon, Washington)	7,555 (4.45)	0 (0.00)	0 (0.00)	0.86 (0.81–0.926)	7,555 (100.00)	5,982 (79.18)
Employee classification ^{††}						
Hourly	40,218 (44.65)	24,130 (60.00)	17,481 (72.45)	0.96 (0.93–0.99)	36,088 (95.49)	28,880 (80.03)
Salary	49,861 (55.35)	27,886 (55.93)	20,518 (73.58)	Reference	41,338 (92.20)	33,830 (81.84)
Type of health care insurance plan ^{‡‡}						
HMO	19,824 (12.17)	13,763 (81.23)	9,993 (72.61)	0.96 (0.92–0.99)	16,279 (96.08)	13,000 (79.86)
PPO	78,720 (48.34)	40,683 (60.45)	29,725 (73.06)	Reference	64,832 (96.34)	15,771 (80.32)
POS	20,468 (12.57)	11,155 (55.33)	8,101 (72.62)	1.05 (1.02–1.09)	19,634 (97.39)	52,054 (80.29)
CDHP	18,110 (11.1287)	9,872 (59.64)	7,141 (72.34)	1.05 (1.01–1.09)	15,602 (94.25)	12,673 (81.23)
HDHP	25,739 (15.80)	15,474 (62.73)	11,089 (71.66)	0.96 (0.93–0.99)	22,678 (91.93)	18,081 (79.73)
Other	3,737 (2.24)	1,985 (59.61)	1,425 (71.79)	0.85 (0.79–0.92)	3,006 (90.27)	2,355 (78.34)

* Number and percentage of women who resided in a state with a law requiring third-trimester screening.

[†] Number and percentage of the pregnant women residing in a state with a law requiring third-trimester screening who were screened for syphilis.

[‡] Odds ratios were calculated with the reference categories (age: 45–49 years; CMS region: 10; salary, PPO) and regulation requiring syphilis screening during a specific gestation period.

[§] Number and percentage of women who resided in a state with a law requiring syphilis screening anytime during pregnancy. N = 152,256; Missing = 17,749.

[¶] Number and percentage of the pregnant women residing in a state with a law requiring anytime during pregnancy screening who were screened for syphilis.

^{¶¶} Odds ratios were calculated for the women residing in a state with laws versus the states without current laws on the specific screening time.

*** Centers for Medicare & Medicaid Services regions contain regional offices to ensure that health care providers are meeting federal requirements. Missing = 189.

^{†††} Employment classification of the primary beneficiary (Salary Non-union, Salary Union, Salary Other combined for Salary; Hourly Non-union, Hourly Union, Hourly Other combined for Hourly; N = 90,079).

^{‡‡‡} Type of benefit plan, HMO, PPO, POS, CDHP, HDHP, Other; third-trimester law population: N = 92,932, Missing = 21,052; population: N = 148,953, Missing = 21,052.

Col% indicates column percent; Other, other basic or major medical comprehensive exclusive provider organizations; Row%, row percent.

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