

## State Variation in Birth Rates and Payments Among Women Ages 18-44 With Commercial Insurance

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### Highlights

- For commercially insured women, the national overall (combined vaginal and cesarean) birth rate was 37.9 per 1,000. Correspondingly, the vaginal birth rate was 25.2 and the cesarean birth rate was 12.8.
- North Dakota and Utah were among the states with the highest birth rates. In contrast, the District of Columbia and Florida were among the states with the lowest rates for both overall births and vaginal births.
- Louisiana and Nebraska were among the states with the highest rates of cesarean births while Montana and Vermont were among the states with the lowest rates.
- Montana and Idaho had higher vaginal birth rates and lower cesarean birth rates than the national mean.
- The mean national payments for overall births, vaginal births, and cesarean births were \$10,570, \$9,170, and \$13,310, respectively.
- The highest mean payment for a cesarean birth was in New Jersey at \$18,130. The state with the lowest mean cesarean birth payment (\$11,760) was North Dakota.
- New Jersey and North Carolina had the highest mean payments for both vaginal and cesarean births, while Arkansas and North Dakota had the lowest mean payments.

### Introduction

Each year in the United States, an estimated 4 million women give birth, with roughly half of these deliveries covered by commercial insurers.<sup>i</sup> This statistical brief uses data from AHRQ's Synthetic Healthcare Database for Research (SyH-DR)<sup>ii</sup> files to examine the volume of and payments for hospital-based deliveries in the United States.

<sup>i</sup> Osterman MJK, Hamilton BE, Martin JA, Driscoll AK, Valenzuela CP. Births: final data for 2021. Natl Vital Stat Rep. 2023;72 (1). Hyattsville, MD: National Center for Health Statistics. <https://www.cdc.gov/nchs//data/nvsr/nvsr72/nvsr72-01.pdf>. Accessed October 17, 2023.

<sup>ii</sup> SyH-DR was created using 2016 data.

SyH-DR contains all-payer data on demographic and eligibility information, inpatient stays, outpatient visits, and prescription drugs for a nationally representative sample of people in the United States who have health insurance. SyH-DR offers several advantages over other data sources for examining deliveries and payments in the United States. It includes a very large sample size and allows state- and national-level analysis. In addition, SyH-DR has a unique enrollee identifier assigned to each sampled individual that allows linking of records across different settings of care and can support longitudinal analysis.

This statistical brief focuses on the in-hospital age-adjusted overall (combined vaginal and cesarean), vaginal, and cesarean birth rates per 1,000 commercially insured women ages 18-44. It also includes mean payments for hospitals and physicians employed by hospitals. In addition, this brief analyzes state variations in birth rates and payments for the commercially insured population. All differences highlighted in the brief meet or exceed the 0.05 significance level.

## Findings

### Birth Rates per 1,000 Women

Birth rates were calculated with the following formula:

$$\frac{\text{Number of commercially insured women ages 18 – 44 who gave birth}}{\text{Total number of commercially insured women ages 18 – 44}}$$

To account for differences in birth rates due to age, age-adjusted birth rates per 1,000 women are presented. These age-adjusted rates are useful for comparisons across groups after accounting for the age distribution of the population.

Figures 1-3 display the birth rates in all 50 states and the District of Columbia, divided into four groups:

- State rate is significantly higher than overall U.S. rate.
- State rate is higher than overall U.S. rate but the difference is not statistically significant.
- State rate is lower than overall U.S. rate but the difference is not statistically significant.
- State rate is significantly lower than overall U.S. rate.

The standard errors and 95% confidence intervals (the upper and lower bounds of the estimate) are also presented to show estimate precision. Figure 1 shows overall birth rates, and the results reveal considerable variation across states.

The U.S. birth rate was 37.9, with rates ranging from 26.3 in the District of Columbia to 52.2 in North Dakota. Thirteen states (Idaho, Illinois, Iowa, Kansas, Michigan, Minnesota, Nebraska, New York, North Dakota, South Dakota, Texas, Utah, Wisconsin) had rates higher than the national rate.

In contrast, nine states (California, District of Columbia,<sup>iii</sup> Florida, Georgia, Mississippi, New Jersey, North Carolina, Rhode Island, Vermont) had rates lower than the national rate. The remaining states had rates that did not significantly differ from the national rate.

Figure 2 shows that the U.S. vaginal birth rate was 25.2, with rates ranging from 16.5 in Florida to 39.4 in Utah. About a third of states (Arizona, Colorado, Idaho, Illinois, Iowa, Kansas, Michigan, Minnesota, Montana, Nebraska, North Dakota, Ohio, South Dakota, Utah, Washington, Wisconsin) had rates higher than the national rate.

In contrast, 10 states (California, District of Columbia, Florida, Georgia, Maryland, Mississippi, New Jersey, North Carolina, South Carolina, West Virginia) had rates lower than the national rate.

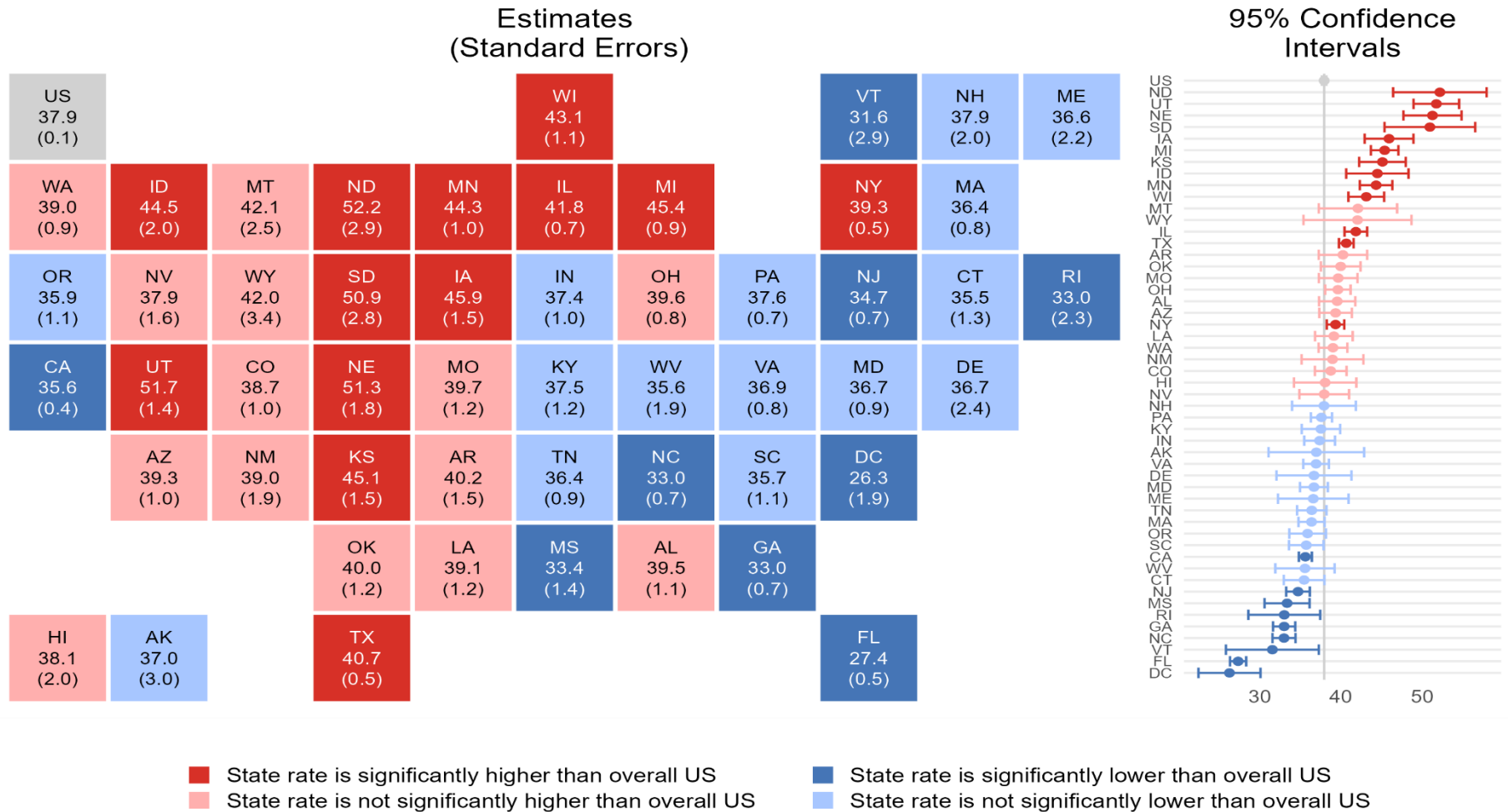
Figure 3 shows substantial variation in cesarean birth rates across states. The differences in cesarean rates ranged from 7.5 in Vermont to 16.3 in Nebraska.

Six states (Arkansas, Illinois, Louisiana, Michigan, Nebraska, Texas) had rates higher than the national rate. Eight states (District of Columbia, Florida, Hawaii, Idaho, Montana, North Carolina, Vermont, Washington) had rates lower than the national rate.

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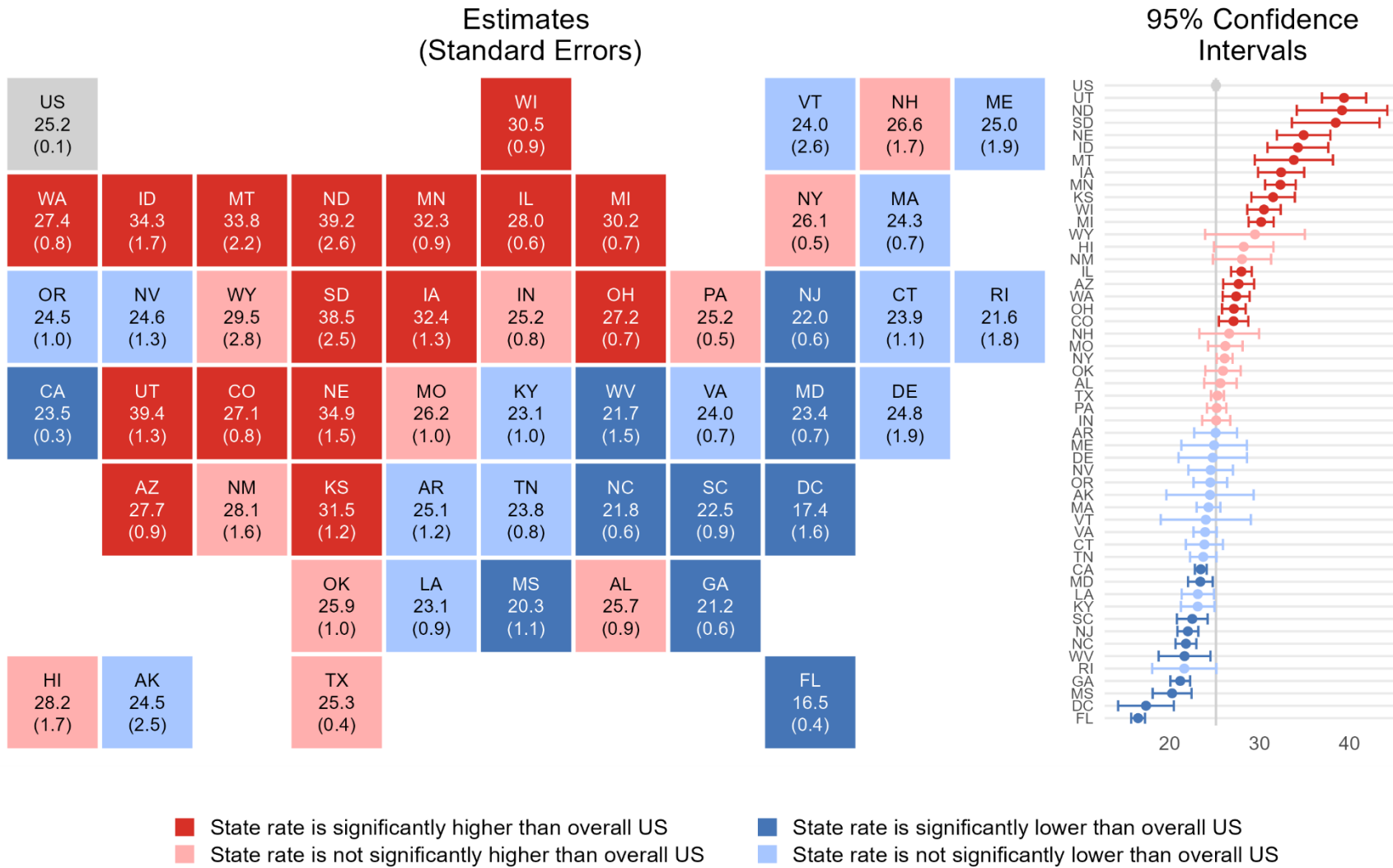
<sup>iii</sup> For purposes of this analysis, the District of Columbia is treated as a state.

**Figure 1. Age-adjusted overall birth rate per 1,000 women ages 18-44 with commercial insurance**



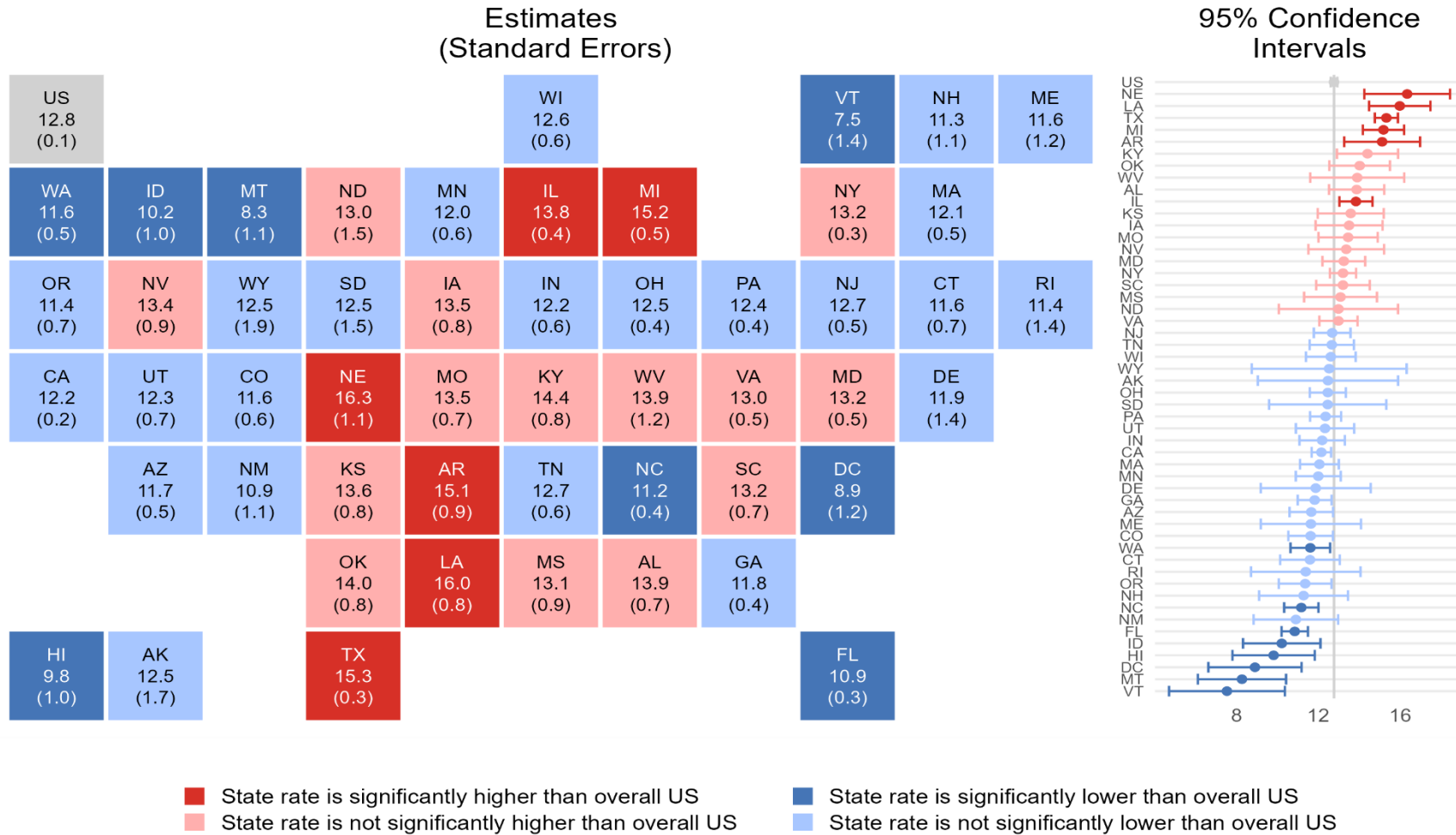
**Source:** Agency for Healthcare Research and Quality, Synthetic Healthcare Database for Research (SyH-DR), 2016.

**Figure 2. Age-adjusted vaginal birth rate per 1,000 women ages 18-44 with commercial insurance**



**Source:** Agency for Healthcare Research and Quality, Synthetic Healthcare Database for Research (SyH-DR), 2016.

**Figure 3. Age-adjusted cesarean birth rate per 1,000 women ages 18-44 with commercial insurance**



**Source:** Agency for Healthcare Research and Quality, Synthetic Healthcare Database for Research (SyH-DR), 2016.

## Mean Commercial Insurance Payments

Figures 4-6 display age-adjusted payments for overall, vaginal, and cesarean births for each state and nationwide. Figure 4 presents variation in the mean commercial insurance payment for all births. The mean payment for overall births in the United States was \$10,570, ranging from \$9,330 in North Dakota to \$13,790 in New Jersey.

Nine states (District of Columbia, Florida, Hawaii, Illinois, Massachusetts, New Jersey, North Carolina, Oklahoma, Texas) had payments higher than the national mean. Almost half of the states (Alabama, Arizona, Arkansas, Idaho, Indiana, Iowa, Kansas, Maryland, Michigan, Minnesota, Mississippi, Nebraska, North Dakota, Ohio, Pennsylvania, South Dakota, Tennessee, Utah, Virginia, Washington, Wisconsin) had payments lower than the national mean.

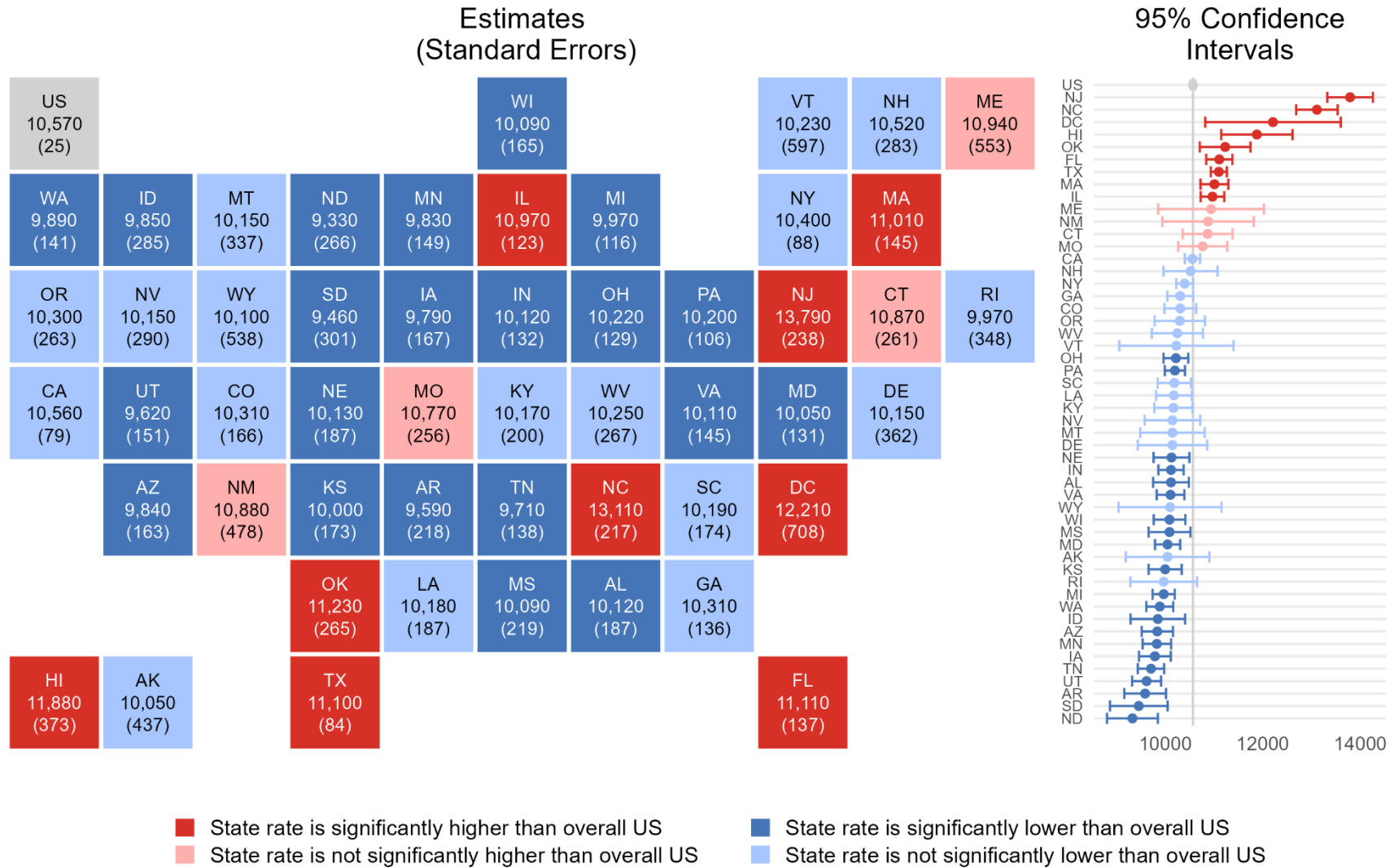
Figure 5 shows the mean commercial insurance payment for vaginal births nationally and across states. The data show that the lowest average payment was \$8,280 in Arkansas, and the state with the highest average payment was North Carolina at \$11,380, a difference of \$3,100.

Eight states had payments that exceeded the national mean of \$9,170, including the District of Columbia, Florida, Hawaii, Illinois, Massachusetts, New Jersey, North Carolina, and Texas. Conversely, about a quarter of the states (Arizona, Arkansas, Georgia, Louisiana, Maryland, Michigan, Mississippi, North Dakota, Pennsylvania, Tennessee, Utah, Virginia, Washington) had payments lower than the national mean.

Figure 6 presents the mean commercial insurance payment for cesarean births nationally and across states. The national mean payment for a cesarean birth was \$13,310, ranging from \$11,760 in North Dakota to \$18,130 in New Jersey.

Hawaii, New Jersey, and North Carolina had payments higher than the national mean. Fifteen states (Alabama, Arkansas, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maryland, Michigan, Minnesota, Mississippi, North Dakota, Tennessee, South Carolina, West Virginia) had payments lower than the national mean.

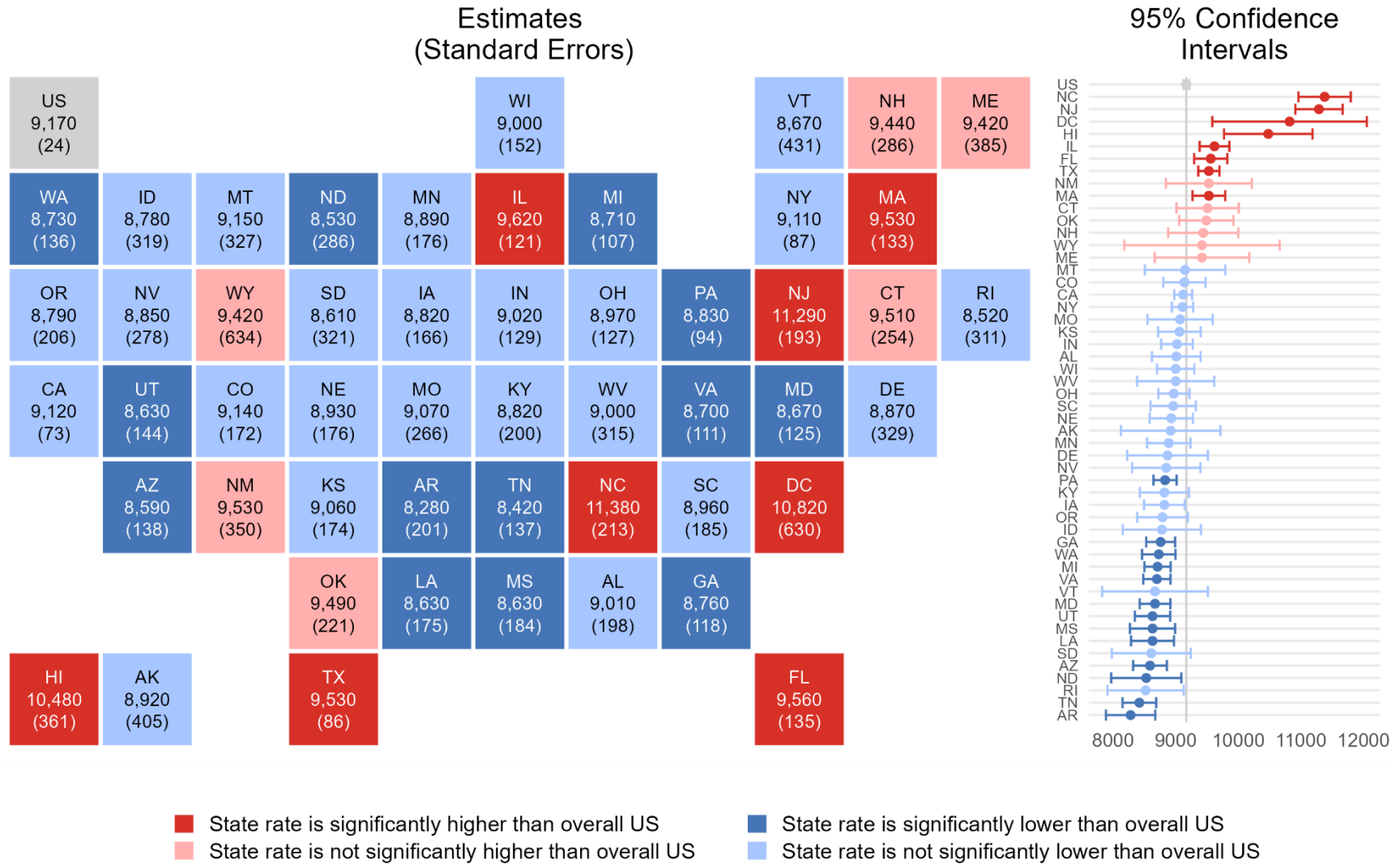
**Figure 4. Age-adjusted mean overall birth payments (in U.S. dollars) among women ages 18-44 with commercial insurance**



**Source:** Agency for Healthcare Research and Quality, Synthetic Healthcare Database for Research (SyH-DR), 2016.



**Figure 5. Age-adjusted mean vaginal birth payments (in U.S. dollars) among women ages 18-44 with commercial insurance**



**Source:** Agency for Healthcare Research and Quality, Synthetic Healthcare Database for Research (SyH-DR), 2016.



## Data Source

The data in this statistical brief are derived from the SyH-DR 2016 intramural files. The intramural files include claims from the commercially insured population, covering those who had commercial health insurance such as Affordable Care Act market exchange, employer-based, direct-purchase, and federal employee coverage.

SyH-DR intramural files include a small set of diagnosis codes that reveal certain events (e.g., birth) that are not available in the public use files because of privacy and confidentiality concerns. This analysis was limited to deliveries that occurred in a hospital setting.

## Definitions

### Case Definition

This study used International Classification of Diseases (ICD)-10 Clinical Modification/Procedure Coding System (CM/PCS) codes to identify vaginal and cesarean deliveries. Codes appear in Table 1. All listed diagnoses and procedures were used in identifying births. Births were excluded if they had any code indicating an abortive outcome.

The diagnosis codes in SyH-DR are partially synthesized, where the first three characters were retained from the original values. Similarly, procedure codes were partially synthesized with synthetic codes replacing those in the source files if they belonged to the same procedure category.

Procedure categorization was performed using the AHRQ Clinical Classifications Software (CCS) for ICD-10-PCS. All delivery procedures used in this study exactly match the codes included in the cesarean section CCS category.

**Table 1. Codes defining deliveries**

<b>ICD-10-CM/PCS Code</b>	<b>Code Description</b>
<i>Vaginal Deliveries</i>	
Z37	Outcome of delivery
O80	Encounter for full-term uncomplicated delivery
<i>Cesarean Deliveries</i>	
O82	Encounter for cesarean delivery without indication
10D00Z0, 10D00Z1, 10D00Z2	Extraction of products of conception,* open approach
<b>ICD-10-CM/PCS Code</b>	<b>Code Description</b>
<i>Abortive Outcomes</i>	
O00	Ectopic pregnancy
O01	Hydatidiform mole
O02	Other abnormal products of conception
O03	Spontaneous abortion

ICD-10-CM/PCS Code	Code Description
O04	Complications following (induced) termination of pregnancy
O07	Failed attempted termination of pregnancy
O08	Complications following ectopic and molar pregnancy

**Key:** CM: Clinical Modification; PCS: Procedure Coding System.

\* For coding purposes, a cesarean delivery is referred to as “extraction of products of conception.”

**Age-Adjusted Rates**

The age-adjusted birth rate (per 1,000 standard population) is a useful measure for comparing birth rates across different populations with varying age distributions. This rate represents the proportion of women who delivered in the hospital, standardized using the direct method and the age distribution of a standard population.

We age adjusted the rates by first multiplying the age-specific rates by the standard population age-specific weights. In this study, the standard population weights used are the proportion of overall commercially insured females ages 18-44, using SyH-DR data. We then aggregated the weighted rates across the age groups to give the age-adjusted rate.

By applying the observed age-specific rates to the same standard population, the age-adjusted rates provide an estimate of the expected birth rates for the population of interest, independent of age distribution. Rates shown are rounded to the nearest tenth.

**Age-Adjusted Payments**

Payment is the total amount in the record that corresponds to the amount paid by the payer. We included payments associated with the hospital delivery stay, any emergency department visit if the discharge date and the hospital admission date are the same, and any prescription payments that have claim dates overlapping with the hospital stay.

Payments from physicians who bill separately from hospitals are excluded in the analysis. We age adjusted the payments using the direct method and SyH-DR data for commercially insured females ages 18-44. Payments shown are rounded to the nearest ten.

## About SyH-DR

SyH-DR is an all-payer, nationally representative claims database. The database consists of a sample of inpatient, outpatient, and prescription drug claims, including utilization, payment, and enrollment data, for people insured by Medicare, Medicaid, or commercial health insurance in 2016. AHRQ created SyH-DR, in part, as a resource to facilitate improvements to price and quality transparency in healthcare.

SyH-DR is a synthetic database that preserves the structure and statistical properties of the original claims data while protecting privacy and confidentiality of people and institutions. Synthetic data are created by statistically modeling or changing original data so that new values or data elements are generated while maintaining the original data's statistical properties. Additional steps, such as masking, are taken to reduce the risk of identifying people and institutions so that the data may be made publicly available to a broad community of researchers.

SyH-DR is a robust and nationally representative dataset that can be used to conduct research at various levels of granularity, including sex, age group, and insurance source at the national or state level. For more information about SyH-DR, visit the SyH-DR web page at <https://www.ahrq.gov/data/innovations/syh-dr.html>.

## About AHRQ Data Innovations

AHRQ is engaged in several data development activities that have become known as "AHRQ Data Innovations." These activities include identifying data needs and data gaps. In addition, AHRQ is creating new research databases that complement existing databases to address emerging questions in U.S. healthcare delivery. These include the Physician and Physician Practice Research Database (3P-RD), Social Determinants of Health (SDOH) database, and Synthetic Healthcare Data for Research (SyH-DR).

### Suggested Citation

Limcangco R, Rohde R, Yildirim M. State Variation in Birth Rates and Payments Among Women Ages 18-44 With Commercial Insurance. Data Innovations Statistical Brief #1. Rockville, MD: Agency for Healthcare Research and Quality; October 2023.

*AHRQ welcomes questions and comments from readers of this publication who are interested in obtaining more information about access, cost, use, financing, and quality of healthcare in the United States. We also invite you to tell us how you are using this statistical brief and other Data Innovations products and to share suggestions on how Data Innovations products might be enhanced to further meet your needs. Please email us at [DataInnovations@ahrq.hhs.gov](mailto:DataInnovations@ahrq.hhs.gov) or send a letter to the address below:*

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