



## Trends in Characteristics of Mothers With Confirmed or Presumed COVID-19 During Pregnancy: 14 States and District of Columbia, July 2020–June 2022

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### Abstract

**Objectives**—This report describes changes in the distribution of characteristics of mothers with and without presumed or confirmed COVID-19 during pregnancy for a 15-jurisdiction reporting area for mothers who gave birth between July 2020 and June 2022. Changes by maternal age, education level, race and Hispanic origin, and principal source of payment for the delivery are presented.

**Methods**—Data are based on supplemental reports of presumed or confirmed COVID-19 cases occurring at any time during pregnancy provided to the National Center for Health Statistics by 14 states and the District of Columbia for births occurring between July 2020 and June 2022 and linked to the U.S. Standard Certificate of Live Birth.

**Results**—Changes over the 2-year study period were observed in the distributions of mothers reported to have COVID-19 by maternal age (for example, from 61.6% to 51.1% for mothers under age 30), race and Hispanic origin (from 49.5% to 17.2% for Hispanic mothers and from 25.1% to 58.2% for White non-Hispanic [subsequently, White] mothers), education level (from 59.9% to 35.1% for mothers with a high school diploma or less), and source of payment

for the delivery (from 62.7% to 37.1% for mothers with Medicaid). Shifts in the distributions of mothers without COVID-19 were less pronounced. For example, the percentage of mothers without COVID-19 who were White declined 4% over the study period compared with a 132% increase in the percentage of mothers with COVID-19 who were White. Despite these shifts, throughout the reporting period, mothers with COVID-19 during pregnancy were younger, had lower education levels, and were more likely to be Black non-Hispanic or White (generally, starting in Quarter 2, 2021) and less likely to be Asian non-Hispanic (throughout) or Hispanic (starting in Quarter 2, 2021) compared with mothers who did not have COVID-19.

**Keywords:** age of mother • race and Hispanic origin • education level • source of payment for the delivery • National Vital Statistics System

### Introduction

The first case of COVID-19 was reported in the United States in January 2020 (1). In March 2020, the World Health Organization declared COVID-19 a pandemic and a national emergency was declared. By the end of May, the reported death toll in the United States from COVID-19 surpassed 100,000 (2).

As the pandemic progressed, reports of the virus' adverse impact on maternal and newborn health and concerns that pregnant women were at higher risk for severe outcomes than nonpregnant women of reproductive age began to emerge (1,3–8).

Information on COVID-19 is not included on the U.S. Standard Certificate of Live Birth (9); no nationally representative data set on COVID-19 during pregnancy exists, and only limited information is available from administrative data (10,11), local studies in medical systems (12), or individual states (13). Surveillance data from the Centers for Disease Control and Prevention's Surveillance for Emerging Threats to Mothers and Babies Network are available for 34 states and show COVID-19 cases among pregnant women but do not include a comparison group of pregnant women who do not have COVID-19 during pregnancy and are no longer publicly reported (14).

In April 2020, the National Center for Health Statistics (NCHS) began working with its state vital statistics partners to develop approaches for collecting data on COVID-19 during pregnancy and sharing this information with NCHS independent of the standard birth data reporting process. Between April and June 2020, 14 states and the District of Columbia (D.C.),



representing 26.7% of all U.S. live births, began reporting cases of confirmed or presumed COVID-19 during pregnancy to NCHS (15). This information was linked to the U.S. Standard Certificate of Live Birth, allowing for the analysis of several maternal and infant characteristics and pregnancy outcomes that may be associated with COVID-19 during pregnancy (15). Although the maternal COVID-19 data collected are not representative of all U.S. births and have other limitations, linkage of COVID-19 cases with birth certificate data provides unique information on COVID-19 in pregnant women. NCHS publishes descriptive statistics that are updated regularly on selected maternal and infant characteristics of birth to mothers with and without COVID-19 (15). Additionally, a previous report described maternal characteristics and selected pregnancy outcomes among mothers with and without confirmed or presumed COVID-19 during pregnancy, who gave birth in a 15-jurisdiction reporting area for the 13-month period from April 2020 through April 2021 (16).

Previous NCHS releases of these maternal COVID-19 data have presented data for only the cumulative reporting period to date (15,16). To explore how characteristics of mothers with COVID-19 have changed over the course of the pandemic, from before and after vaccines were widely available and through the Delta and Omicron waves, distributions of age, education level, race and Hispanic origin, and principal source of payment for the delivery are presented for the 15-jurisdiction reporting area for births occurring from July 2020 through June 2022.

## Methods

Analysis is based on reports of presumed or confirmed COVID-19 cases occurring at any time during pregnancy and provided to NCHS by 14 states (Alabama, Alaska, Arkansas, California, Idaho, Maine, Maryland, New Hampshire, North Dakota, Ohio, Oklahoma, Oregon, Tennessee, and West Virginia) and D.C. for births occurring

between July 1, 2020, and June 30, 2022. Supplemental information on maternal COVID-19, which is not included on the U.S. Standard Certificate of Live Birth, is sent by the jurisdictions to NCHS independent of the standard birth data reporting process and then linked to birth records by NCHS. Nearly all cases of maternal COVID-19 reported to NCHS (107,337 or 99.6%) were linked to a corresponding birth record, which contains detailed information on the mother and the newborn. Unlinked cases are those for which the standard birth record had not been received by NCHS at the time of linkage.

The 2-year analysis period begins in July 2020 because that is the first month that all 15 reporting areas provided maternal COVID-19 data to NCHS. The analysis period of July 2020 through June 2022 is divided into quarters according to the calendar year. For example, Quarter 3, (Q3) 2020, refers to July–September 2020 and Quarter 4, (Q4) 2021, to October–December 2021. Analysis is based on quarter of birth; time of COVID-19 infection during pregnancy is not available. Distributions refer to the percentage of mothers with (or without) COVID-19 during pregnancy with certain characteristics, for example, the number of mothers with COVID-19 who had a bachelor's degree or higher. The percentage is calculated by dividing the number of mothers with COVID-19 with a bachelor's degree or higher by the number of all women with COVID-19 during pregnancy. Records with missing data are excluded from the analysis for each characteristic.

Births occurring in these 15 jurisdictions represent 26.7% of all births reported to NCHS during July 2020–June 2022. Characteristics of the reporting area are a function of the participating jurisdictions and the length of time they have been reporting, and are not generalizable to the United States as a whole. For example, California accounted for 43.0% of births occurring in the 15-jurisdiction reporting area but accounted for only 11.5% of U.S. births overall. When compared by race and Hispanic origin, the 15 reporting

areas had a slightly larger percentage of Hispanic (27.3% compared with 24.9%) and Asian non-Hispanic (subsequently, Asian) (7.6% compared with 6.0%) births than the total United States and a smaller percentage of White non-Hispanic (subsequently, White) (49.1% compared with 51.3%) and Black non-Hispanic (subsequently, Black) (11.7% compared with 14.3%) births.

The reporting jurisdictions have varying approaches to capturing information on maternal COVID-19. These approaches include adding an item on maternal COVID-19 to the state birth certificate, linking information from electronic disease surveillance systems to the birth record, and collecting special reports on maternal COVID-19 status from birthing hospitals. While 10 states and D.C. capture both presumed and confirmed cases of COVID-19, 4 states (Maryland, North Dakota, Ohio, and Tennessee) capture confirmed cases only. North Dakota reports confirmed cases only at delivery. California reports cases of presumed or confirmed maternal COVID-19; however, an issue was identified in the reporting of presumed cases and only confirmed cases of maternal COVID-19 for California are included in this report. The number of maternal COVID-19 cases is likely undercounted, particularly in states for which only confirmed cases of COVID-19 are reported. For more detailed information on reporting methods by state, see reference 2.

Birth certificate data for 2020 are based on all birth records received and processed by NCHS as of May 6, 2021, (493,857) for the 15-jurisdiction reporting area for July through December 2020. Birth certificate data for 2021 are based on all birth records received and processed by NCHS as of May 5, 2022, (981,472) for the 15-jurisdiction reporting area. Birth certificate data for 2022 are based on all birth records received and processed by NCHS as of April 17, 2023, (472,334) for the 15-jurisdiction reporting area for January through June 2022. For the full study period, most births in the 15-jurisdiction reporting area are to

mothers without COVID-19 (94.5%); 5.5% of births overall were to mothers with COVID-19, ranging from 2.0% in Q3 2020 to 11.2% in Q1 2022.

Education level of the mother is the highest degree or level of school completed by the mother at the time of birth and is self-reported. The education categories shown in this report are: less than a high school diploma, high school diploma or GED, some college but no degree, associate’s degree, and bachelor’s degree or higher. Education level was missing for 3.5% of all records.

Race and Hispanic origin are reported independently on the birth certificate and are self-reported by the mother. Race of the mother was missing for 8.9% of births in the 15-jurisdiction area over the reporting period. For birth certificates with missing race of mother, race is imputed to that of the father (if known), or that of the preceding record with known race. Hispanic origin was missing for 2.3% of records. Data shown by Hispanic origin include all people of Hispanic origin of any race. Data for non-Hispanic people are shown separately for single-race groups: Asian, Black, and White. Due to small numbers, data for American Indian or Alaska Native non-Hispanic, single-race; Native Hawaiian or Other Pacific Islander non-Hispanic, single-race; and multiple-race non-Hispanic mothers are not shown separately and are combined into the category “other races, non-Hispanic” for this report.

Two principal sources of payment for the delivery are presented: a) Medicaid, which includes comparable state programs, and b) private insurance (such as BlueCross BlueShield or Aetna). Together, these two sources of payment accounted for more than 90% of births in the reporting area. The remaining sources of payment were grouped together and include self-pay, Indian Health Service, CHAMPUS or TRICARE, other government (federal, state, or local), or charity. Source of payment information was missing for 0.4% of records.

this report are statistically significant at the 0.05 level based on a two-tailed *z* test, unless noted otherwise. Trends for more than two consecutive quarters were assessed using the Cochran–Armitage test, a modified chi-squared test, at the 0.05 level.

## Results

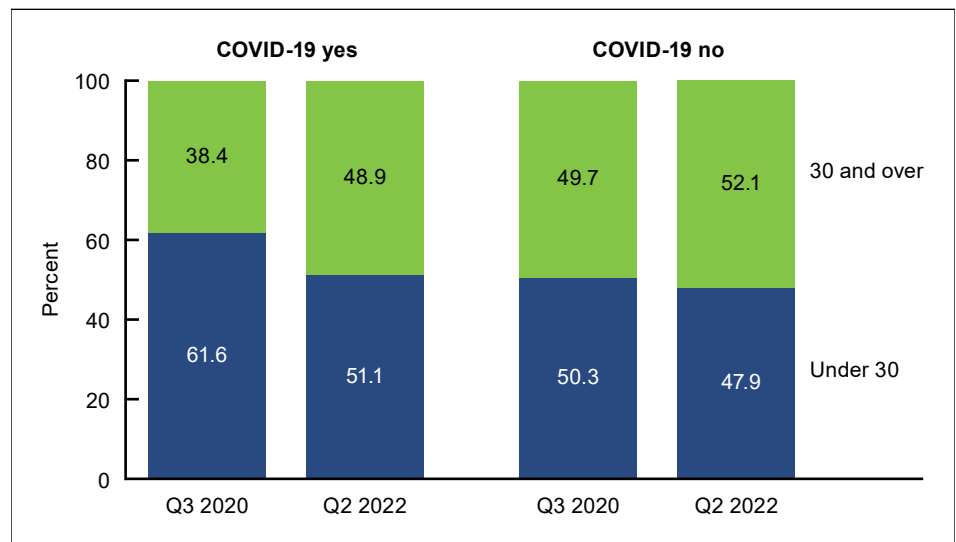
### Maternal age

The percentage of mothers with COVID-19 during pregnancy who were under age 30 decreased from 61.6% in Q3 2020 to 56.3% in Q2 2021, increased to 58.7% in Q4 2021, then decreased again to 51.1% in Q2 2022 (Table 1, Figure 1). At the same time, the percentage of mothers with COVID-19 who were aged 30 and over increased from 38.4% in Q3 2020 to 43.7% in Q2 2021, declined through Q4 2021 to 41.3%, then increased in Q1 2022 to 45.8% and Q2 2022 to 48.9%. Over the study period, the percentage of mothers under age 30 decreased 17%, with a corresponding 27% increase in the percentage of mothers aged 30 and over.

In contrast, the percentage of mothers without COVID-19 who were under age 30 decreased from 50.3% (Q3 and Q4 2020) to 47.9% (Q1 and Q2 2022). The percentage aged 30 and over increased from 49.7% (Q3 and Q4 2020) to 52.1% (Q1 and Q2 2022) (Table 1). The percentage of mothers without COVID-19 under age 30 declined 5% over the study period, with a corresponding 5% increase in the percentage of mothers aged 30 and over.

For the full 2-year study period and in each quarter, mothers with COVID-19 during pregnancy tended to be younger than mothers without COVID-19, but the differences generally diminished over time (Table 1). In Q3 2020, the first quarter of the study period, mothers with COVID-19 were 22% more likely to be under age 30 and 23% less likely to be aged 30 and over than mothers without COVID-19. In Q2 2022, the last quarter of the study period, mothers with COVID-19 were 7% more likely to be under age 30 and 6% less likely to be aged 30 and over (Figure 1).

Figure 1. Distribution of age for mothers with and without COVID-19 during pregnancy: 14 states and District of Columbia, Quarter 3, 2020, and Quarter 2, 2022



NOTES: Q3 2020 refers to July–September 2020, and Q2 2022 refers to April–June 2022. All differences between Q3 2020 and Q2 2022 and between COVID-19 yes and COVID-19 no are significant ( $p < 0.05$ ). Reporting area includes Alabama, Alaska, Arkansas, California, District of Columbia, Idaho, Maine, Maryland, New Hampshire, North Dakota, Ohio, Oklahoma, Oregon, Tennessee, and West Virginia. COVID-19 yes includes presumed or confirmed cases. SOURCE: National Center for Health Statistics, National Vital Statistics System, Natality data file.

Changes and differences presented in

## Education level

The percentage of mothers with COVID-19 who had a high school diploma or less decreased from 59.9% in Q3 2020 to 37.0% in Q2 2021, increased to 45.3% in Q4 2021, then decreased again to 35.1% in Q2 2022 (Table 2, Figure 2). At the same time, the percentage of mothers with COVID-19 with a bachelor’s degree or higher increased from 14.2% in Q3 2020 to 31.3% in Q2 2021, declined through Q4 2021 to 23.3%, then increased in Q1 2022 (26.8%) and Q2 2022 to 35.3%. The percentage of mothers with a high school diploma or less decreased 41% over the study period, with a corresponding 149% increase in the percentage of mothers with a bachelor’s degree or higher and, as a result, in Q2 2022 35.1% and 35.3% of mothers with COVID-19 had a high school diploma or less and a bachelor’s or higher, respectively.

In contrast, the percentage of mothers without COVID-19 who had a high school diploma or less fluctuated between 39.0% (Q4 2020) and 36.9% (Q2 2021). The percentage with a bachelor’s degree or higher fluctuated between 36.1% (Q2 2022) and 32.9% (Q4 2020).

For the full study period and in all but two quarters, mothers with COVID-19 during pregnancy tended to have lower education levels than mothers without COVID-19 (Table 2). The largest difference was in Q3 2020, when 59.9% of mothers with COVID-19 had a high school diploma or less compared with 38.5% of mothers without COVID-19. In Q2 2021, 37.0% and 36.9% of mothers both with and without COVID-19, respectively, had a high school diploma or less. At the end of the study period, in Q2 2022, mothers with COVID-19 were less likely than mothers without COVID-19 to have a high school diploma or less (35.1% and 37.3%, respectively) (Figure 2).

## Race and Hispanic origin

The percentage of mothers with COVID-19 who were Hispanic decreased each quarter from 49.5% in Q3 2020 to 18.5% in Q4 2021, increased in Q1 2022 to 27.4%, then decreased again to 17.2% in Q2 2022, the lowest percentage of the study period and 65% lower than in Q3 2020 (Table 3, Figure 3). At the same time, the percentage of mothers with COVID-19 who were White rose from 25.1% in Q3 2020 to 57.1% in Q2 2021,

then fluctuated by quarter, ending the study period at 58.2% in Q2 2022, the highest percentage of the study period and 132% higher than in Q3 2020.

The percentage of mothers with COVID-19 who were Black fluctuated by quarter but was lower at the end of the study period than at the beginning, decreasing from 19.5% in Q3 2020 to 13.8% in Q1 2021, increasing for Q2 (14.1%) through Q4 2021 (17.1%), then decreasing in Q1 and Q2 2022 to 14.5%, 26% lower than in Q3 2020.

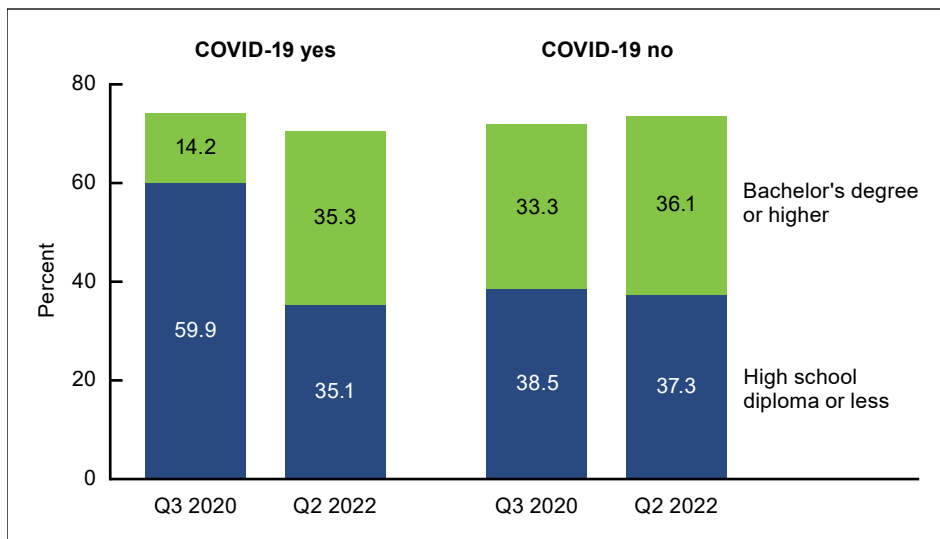
The percentage of mothers with COVID-19 who were Asian also fluctuated by quarter but was higher at the end of the study period than at the beginning, increasing from 2.6% in Q3 2020 to 3.4%–3.5% for Q4 2020 through Q2 2021, declining to 2.7% in Q4 2021, then increasing in Q1 2022 and Q2 2022 to 5.0%, nearly twice as high as in Q3 2020 (92%).

Fewer changes were observed in trends among mothers without COVID-19 across the quarters by race and Hispanic origin (Table 3, Figure 3). For example, the percentage of mothers without COVID-19 who were Hispanic ranged from 25.8% (Q1 2021) to 29.3% (Q2 2022). The percentage of mothers without COVID-19 who were White ranged from 47.5% (Q2 2022) to 50.2% (Q1 2021).

For the full study period, mothers with COVID-19 were more likely to be Black or White and less likely to be Asian compared with the distribution among mothers without COVID-19 (Table 3).

Differences in the distribution tended to shift by quarter. For example, for Q3 2020 through Q1 2021, mothers with COVID-19 were more likely to be Hispanic or Black than mothers without COVID-19 and less likely to be White. However, by Q2 2021, mothers with COVID-19 were more likely to be White than mothers without COVID-19 and less likely to be Hispanic, a pattern that persisted over the remaining quarters (see Figure 3 for Q3 2020 and Q2 2022).

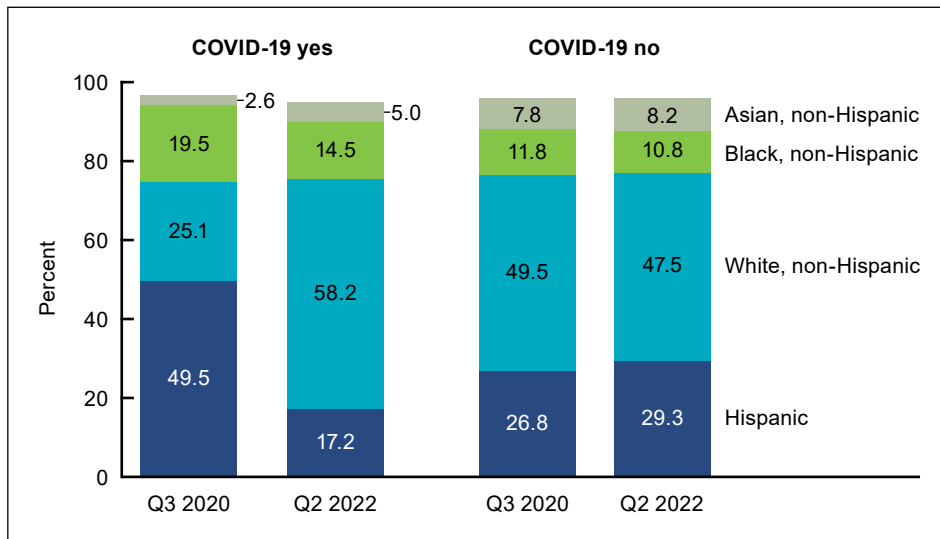
Figure 2. Distribution of education level for mothers with and without COVID-19 during pregnancy: 14 states and District of Columbia, Quarter 3, 2020, and Quarter 2, 2022



NOTES: Not all education levels are shown. Q3 2020 refers to July–September 2020, and Q2 2022 refers to April–June 2022. All differences between Q3 2020 and Q2 2022 and between COVID-19 yes and COVID-19 no are significant ( $p < 0.05$ ). Reporting area includes Alabama, Alaska, Arkansas, California, District of Columbia, Idaho, Maine, Maryland, New Hampshire, North Dakota, Ohio, Oklahoma, Oregon, Tennessee, and West Virginia. COVID-19 yes includes presumed or confirmed cases. SOURCE: National Center for Health Statistics, National Vital Statistics System, Natality data file.

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Figure 3. Distribution of race and Hispanic origin for mothers with and without COVID-19 during pregnancy: 14 states and District of Columbia, Quarter 3, 2020, and Quarter 2, 2022



NOTES: Not all racial and ethnic groups are shown. Q3 2020 refers to July–September 2020, and Q2 2022 refers to April–June 2022. All differences between Q3 2020 and Q2 2022 and between COVID-19 yes and COVID-19 no are significant ( $p < 0.05$ ). Reporting area includes Alabama, Alaska, Arkansas, California, District of Columbia, Idaho, Maine, Maryland, New Hampshire, North Dakota, Ohio, Oklahoma, Oregon, Tennessee, and West Virginia. COVID-19 yes includes presumed or confirmed cases. SOURCE: National Center for Health Statistics, National Vital Statistics System, Natality data file.

### Principal source of payment for the delivery

The percentage of mothers with COVID-19 for whom Medicaid was the principal source of payment for the delivery decreased from 62.7% in Q3 2020 to 39.2% in Q2 2021, increased in Q3 2021 to 43.2% and Q4 2021 to 48.1%, then decreased in Q1 2022 to 45.5% and Q2 2022 to 37.1% (Table 4, Figure 4). At the same time, the percentage of mothers with private insurance increased from 30.7% in Q3 2020 to 56.9% in Q2 2021, declined for Q3 and Q4 2021 to 46.9%, then increased in Q1 2022 to 48.9% and Q2 2022 to 58.2%. The percentage of mothers covered by Medicaid decreased 41% over the study period, with a corresponding 90% increase in the percentage of mothers with private insurance.

In contrast, among mothers without maternal COVID-19, the percentage of mothers covered by Medicaid ranged from 40.0% in Q2 2021 to 42.1% in Q4 2020. The percentage of mothers without COVID-19 with private insurance ranged from 50.9% in Q4 2020 to 53.2% for Q2 2021.

For the full study period and in all but two quarters, mothers with COVID-19 were more likely to be covered by Medicaid than mothers without COVID-19 (Table 4). In Q2 2022, mothers with COVID-19 were less likely than mothers without COVID-19 to be covered by Medicaid—37.1% compared with 40.4% (Figure 4).

### Discussion

This report covers the period July 2020 through June 2022 when the COVID-19 pandemic transitioned from its initial wave, through the prevaccination period (through Q1 2021), to the introduction of vaccines and the spread of the Delta variant (Q2 2021) and the Omicron variant (Q1 2022) (1). Population groups in the United States were not affected the same way by the pandemic; for example, mortality risk differed by age and race and Hispanic origin, and these differences fluctuated over the course of the pandemic (17–19). This report shows shifts during the COVID-19 pandemic period in the characteristics of mothers with COVID-19 during pregnancy by maternal age, education, race and Hispanic origin, and source of payment for the delivery for a 15-jurisdiction

reporting area. It also demonstrates that less-pronounced changes in these characteristics were observed among mothers without COVID-19.

The largest changes over the study period in the distributions of characteristics for mothers with COVID-19 during pregnancy were by maternal education level (from lower to higher education levels), maternal race and Hispanic origin (from predominately Hispanic to predominately White mothers), and source of payment for the delivery (from Medicaid to private insurance). Somewhat less-pronounced changes were observed by maternal age (higher proportion of births to mothers aged 30 and over).

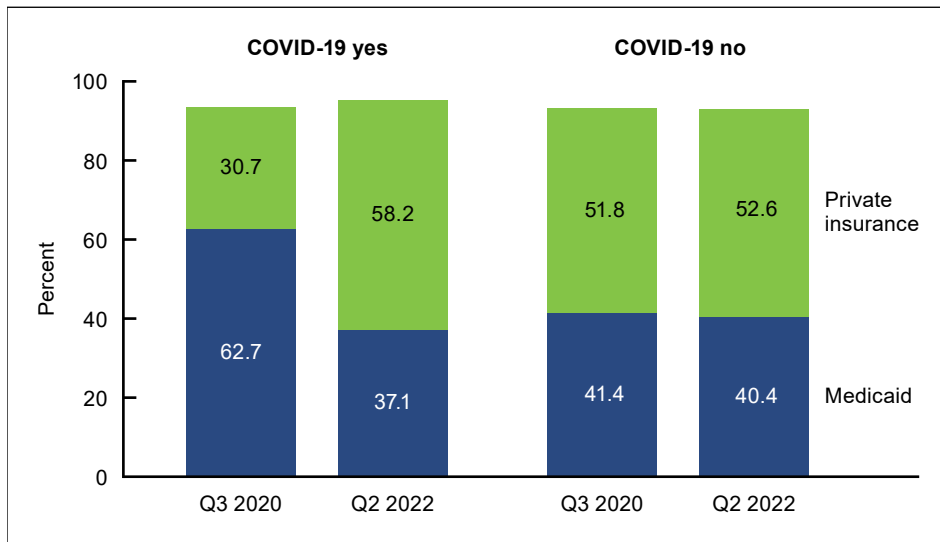
Trends in distributions across the reporting period differed by race and Hispanic origin. Large shifts in distributions of mothers with COVID-19 were observed for Hispanic and White mothers. Except for a brief spike in Q1 2022, the percentage of all mothers with COVID-19 who were of Hispanic origin fluctuated but generally declined over the study period. In contrast to the decreasing proportions for Hispanic mothers, the percentage of White mothers rose for all but two quarters (Q3 2021 and Q1 2022), more than doubling overall from one of every four (25.1%) to more than one of every two (58.2%) mothers with COVID-19.

The same patterns over the study period were not observed for mothers without COVID-19. For example, the percentage of mothers with COVID-19 with a bachelor's degree or higher more than doubled over the study period (14.2% to 35.3%) compared with an 8% increase (33.3% to 36.1%) for mothers without COVID-19.

### Limitations

The maternal COVID-19 data presented in this report have some limitations. The data are not representative of all mothers giving birth in the United States during the study period. Given that the incidence of COVID-19 varies substantially by

Figure 4. Distribution of source of payment for delivery for mothers with and without COVID-19 during pregnancy: 14 states and District of Columbia, Quarter 3, 2020, and Quarter 2, 2022



NOTES: Not all sources of payment are shown. Q3 2020 refers to July–September 2020, and Q2 2022 refers to April–June 2022. All differences between Q3 2020 and Q2 2022 and between COVID-19 yes and COVID-19 no are significant ( $p < 0.05$ ). Reporting area includes Alabama, Alaska, Arkansas, California, District of Columbia, Idaho, Maine, Maryland, New Hampshire, North Dakota, Ohio, Oklahoma, Oregon, Tennessee, and West Virginia. COVID-19 yes includes presumed or confirmed cases. SOURCE: National Center for Health Statistics, National Vital Statistics System, Natality data file.

state and by reporting period, and that the 15 reporting jurisdictions are not a random sample of states (see note on the disproportionate representation of California births in the Methods section), results may vary over time and by geography. Lack of standardization in the process for collecting COVID-19 data across and within the reporting jurisdictions may have also affected the representativeness and completeness of data for a given state. Some jurisdictions included only confirmed cases, while others reported presumed or confirmed COVID-19 cases, and less severe or asymptomatic (no symptoms) cases of COVID-19 may not have been reported. States that report only confirmed cases of maternal COVID-19 may undercount the number of mothers with COVID-19 and overcount mothers without COVID-19. Additionally, some facilities within a jurisdiction may have a universal COVID-19 screening protocol, while others may not (20–22). As a result, differences in maternal characteristics and infant outcomes between the COVID-19 and non-COVID-19 groups may be biased. The information on COVID-19 cases shown may not include all cases of maternal COVID-19 that occurred in the reporting areas during July 2020–June 2022.

Additionally, information on COVID-19 vaccination status and timing of infection is not available from this data source.

Finally, the groups combined into the other races category (for example, American Indian or Alaska Native non-Hispanic, single race) may be disproportionately impacted by COVID-19, and the lack of detailed information on these groups is a limitation of this analysis. Despite these limitations, this is the most comprehensive data set available on COVID-19 during pregnancy.

Data from the Centers for Disease Control and Prevention’s Surveillance for Emerging Threats to Mothers and Babies Network, which presented data for pregnant people with COVID-19 by month, showed distributions of maternal COVID-19 for July 2020 through June 2022 that are generally consistent with this vital statistics-based study (12). The findings in this report on the differential impact of maternal COVID-19 by race and Hispanic origin and of changes over the course of the pandemic in COVID-19 by race and Hispanic origin are also consistent with the findings of other reports based on different U.S. populations (3,12,23–25).

## Summary

Changes in the distributions of characteristics of mothers with COVID-19 by maternal age, race and Hispanic origin, education level, and principal source of payment for the delivery were observed during a 2-year study period in the 15-jurisdiction reporting area. Although differences narrowed, mothers with COVID-19 were disproportionately younger throughout the study period. Distributions by education level, however, shifted from mainly mothers with a high school diploma to mothers with a bachelor’s degree or higher, and the source of payment for the delivery shifted from mainly Medicaid to private insurance. By race and Hispanic origin, distributions shifted from predominately mothers of Hispanic origin to predominately White mothers. The percentages of Black mothers with COVID-19 generally declined from Q3 2020 through Q2 2022, while the percentage of Asian mothers increased. Only modest changes were observed among mothers without COVID-19. Mothers with COVID-19 were more likely than mothers without COVID-19 to be Black (throughout the study period) or White (generally, starting in Q2 2021) and less likely to be Asian (throughout) or Hispanic (starting in Q2 2021). NCHS continues to receive data on maternal COVID-19 cases from the 15 jurisdictions and publish bimonthly updates; the latest information is available on the NCHS website: <https://www.cdc.gov/nchs/covid19/technical-linkage.htm> (15).

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# Vital Statistics Surveillance Report

Table 1. Distribution of maternal age, by maternal COVID-19 status: 14 states and District of Columbia, July 2020–June 2022

Age of mother	Total	2020		2021				2022		Percent change Quarter 3, 2020– Quarter 2, 2022
		Quarter 3 July– September	Quarter 4 October– December	Quarter 1 January– March	Quarter 2 April– June	Quarter 3 July– September	Quarter 4 October– December	Quarter 1 January– March	Quarter 2 April– June	
Percent distribution										
COVID-19 yes										
Total <sup>1</sup> . . . . .	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	...
Under 30 <sup>2</sup> . . . . .	55.9	61.6	58.6	58.4	56.3	58.1	58.7	54.2	51.1	-17
Under 20 . . . . .	4.8	7.3	5.2	5.1	†4.2	4.8	5.7	4.8	†3.7	-49
20–24 . . . . .	20.9	24.0	22.8	22.3	20.3	21.6	22.8	20.2	18.1	-25
25–29 . . . . .	30.2	30.3	30.7	31.0	31.8	31.7	30.2	29.3	29.3	‡
30 and over <sup>2</sup> . . . . .	44.1	38.4	41.4	41.6	43.7	41.9	41.3	45.8	48.9	27
30–34 . . . . .	27.5	23.4	25.9	26.0	28.4	26.8	26.5	27.8	†30.3	29
35–39 . . . . .	13.5	12.3	12.5	12.6	12.7	12.6	11.8	14.6	15.3	24
40 and over . . . . .	3.1	2.7	3.0	3.0	2.6	2.6	3.0	3.4	3.3	22
COVID-19 no										
Total <sup>1</sup> . . . . .	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	...
Under 30 <sup>2</sup> . . . . .	49.0	50.3	50.3	49.7	48.8	48.8	48.2	47.9	47.9	-5
Under 20 . . . . .	4.0	4.3	4.3	4.1	3.9	4.0	3.9	4.0	3.8	-12
20–24 . . . . .	17.6	18.1	18.2	18.0	17.4	17.5	17.3	17.1	17.0	-6
25–29 . . . . .	27.4	27.9	27.8	27.6	27.5	27.3	27.0	26.9	27.1	-3
30 and over <sup>2</sup> . . . . .	51.0	49.7	49.7	50.3	51.2	51.2	51.8	52.1	52.1	5
30–34 . . . . .	30.1	29.5	29.4	29.9	30.4	30.3	30.3	30.2	30.6	4
35–39 . . . . .	16.9	16.4	16.4	16.5	16.8	16.9	17.2	17.5	17.3	5
40 and over . . . . .	4.0	3.8	3.9	3.9	4.0	4.0	4.3	4.4	4.3	13
Number										
COVID-19 yes										
Total <sup>1</sup> . . . . .	107,337	5,079	8,598	12,801	10,314	11,851	11,751	26,370	20,573	...
Under 30 . . . . .	60,027	3,127	5,041	7,476	5,806	6,881	6,894	14,293	10,509	...
Under 20 . . . . .	5,152	370	448	654	432	565	668	1,256	759	...
20–24 . . . . .	22,408	1,219	1,957	2,852	2,089	2,560	2,679	5,322	3,730	...
25–29 . . . . .	32,467	1,538	2,636	3,970	3,285	3,756	3,547	7,715	6,020	...
30 and over . . . . .	47,310	1,952	3,557	5,325	4,508	4,970	4,857	12,077	10,064	...
30–34 . . . . .	29,527	1,188	2,228	3,331	2,929	3,171	3,111	7,338	6,231	...
35–39 . . . . .	14,499	627	1,074	1,612	1,308	1,490	1,388	3,855	3,145	...
40 and over . . . . .	3,284	137	255	382	271	309	358	884	688	...

See footnotes at end of table.

# Vital Statistics Surveillance Report

Table 1. Distribution of maternal age, by maternal COVID-19 status: 14 states and District of Columbia, July 2020–June 2022—Con.

Age of mother	Total	2020		2021				2022		Percent change Quarter 3, 2020– Quarter 2, 2022
		Quarter 3 July– September	Quarter 4 October– December	Quarter 1 January– March	Quarter 2 April– June	Quarter 3 July– September	Quarter 4 October– December	Quarter 1 January– March	Quarter 2 April– June	
Number										
COVID-19 no										
Total <sup>1</sup>	1,840,326	252,158	228,022	214,691	231,787	250,513	237,764	209,319	216,072	...
Under 30	902,207	126,896	114,765	106,636	113,209	122,313	114,653	100,341	103,394	...
Under 20	74,478	10,820	9,882	8,904	9,074	10,071	9,266	8,283	8,178	...
20–24	323,768	45,754	41,586	38,547	40,406	43,798	41,195	35,843	36,639	...
25–29	503,961	70,322	63,297	59,185	63,729	68,444	64,192	56,215	58,577	...
30 and over	938,119	125,262	113,257	108,055	118,578	128,200	123,111	108,978	112,678	...
30–34	553,397	74,405	67,065	64,185	70,543	75,901	71,945	63,280	66,073	...
35–39	310,191	41,301	37,317	35,458	38,863	42,330	40,972	36,536	37,414	...
40 and over	74,531	9,556	8,875	8,412	9,172	9,969	10,194	9,162	9,191	...

... Category not applicable.

<sup>†</sup> Not statistically significantly different from mothers without COVID-19 in same quarter at  $p < 0.05$ .

<sup>‡</sup> Percent change not statistically significant at  $p < 0.05$ .

<sup>1</sup> May not add to 100 because of rounding.

<sup>2</sup> Subgroups may not add to total because of rounding.

NOTE: Reporting area includes Alabama, Alaska, Arkansas, California, District of Columbia, Idaho, Maine, Maryland, New Hampshire, North Dakota, Ohio, Oklahoma, Oregon, Tennessee, and West Virginia.

SOURCE: National Center for Health Statistics, National Vital Statistics System, Natality data file.

# Vital Statistics Surveillance Report

Table 2. Distribution of maternal education level, by maternal COVID-19 status: 14 states and District of Columbia, July 2020–June 2022

Education level	Total	2020		2021				2022		Percent change Quarter 3, 2020– Quarter 2, 2022
		Quarter 3 July– September	Quarter 4 October– December	Quarter 1 January– March	Quarter 2 April– June	Quarter 3 July– September	Quarter 4 October– December	Quarter 1 January– March	Quarter 2 April– June	
Percent distribution										
COVID-19 yes										
Total <sup>1</sup>	100.0	99.9	100.0	100.0	100.0	100.0	99.9	100.0	99.9	...
High school diploma or less <sup>2</sup>	42.1	59.9	47.7	42.7	†37.0	41.8	45.3	42.9	35.1	-41
Less than high school	11.7	25.5	16.7	12.7	9.1	10.0	†11.5	12.1	7.8	-69
High school diploma or GED	30.4	34.4	31.0	30.0	27.9	31.8	33.8	30.8	27.3	-21
Some college but no degree	21.5	†19.5	22.2	22.1	21.7	22.0	21.9	21.6	20.4	†
Associate's degree	9.0	6.3	†8.1	9.6	10.0	9.3	9.4	8.7	9.1	44
Bachelor's degree or higher	27.4	14.2	22.0	25.6	31.3	26.9	23.3	26.8	35.3	149
COVID-19 no										
Total <sup>1</sup>	99.9	99.9	100.0	100.1	100.0	100.1	100.1	100.0	100.0	...
High school diploma or less <sup>2</sup>	37.8	38.5	39.0	37.6	36.9	37.6	37.9	37.6	37.3	-3
Less than high school	11.2	11.5	11.7	11.3	10.9	11.0	11.2	11.1	11.2	-3
High school diploma or GED	26.6	26.9	27.3	26.4	26.0	26.6	26.8	26.5	26.2	-3
Some college but no degree	19.5	20.2	20.2	19.8	19.3	19.4	19.6	18.9	18.6	-8
Associate's degree	7.9	8.0	7.9	7.8	7.9	8.2	7.9	7.8	7.9	†
Bachelor's degree or higher	34.7	33.3	32.9	34.7	35.9	34.9	34.6	35.7	36.1	8
Number										
COVID-19 yes										
Total <sup>1,3</sup>	104,215	4,875	8,318	12,437	10,097	11,494	11,473	25,386	20,135	...
High school diploma or less	43,879	2,922	3,970	5,312	3,731	4,801	5,198	10,880	7,065	...
Less than high school	12,235	1,243	1,391	1,577	917	1,148	1,317	3,072	1,570	...
High school diploma or GED	31,644	1,679	2,579	3,735	2,814	3,653	3,881	7,808	5,495	...
Some college but no degree	22,385	951	1,843	2,750	2,195	2,530	2,518	5,482	4,116	...
Associate's degree	9,384	309	671	1,188	1,013	1,066	1,080	2,219	1,838	...
Bachelor's degree or higher	28,567	693	1,834	3,187	3,158	3,097	2,677	6,805	7,116	...

See footnotes at end of table.

# Vital Statistics Surveillance Report

Table 2. Distribution of maternal education level, by maternal COVID-19 status: 14 states and District of Columbia, July 2020–June 2022—Con.

Education level	Total	2020		2021				2022		Percent change Quarter 3, 2020– Quarter 2, 2022
		Quarter 3 July– September	Quarter 4 October– December	Quarter 1 January– March	Quarter 2 April– June	Quarter 3 July– September	Quarter 4 October– December	Quarter 1 January– March	Quarter 2 April– June	
Number										
COVID-19 no										
Total <sup>1,3</sup>	1,774,882	243,808	220,256	207,732	223,889	241,603	228,603	201,011	207,980	...
High school diploma or less	671,241	93,747	85,863	78,198	82,686	90,794	86,680	75,609	77,664	...
Less than high school	199,277	28,051	25,813	23,432	24,370	26,458	25,519	22,382	23,252	...
High school diploma or GED	471,964	65,696	60,050	54,766	58,316	64,336	61,161	53,227	54,412	...
Some college but no degree	346,565	49,274	44,540	41,234	43,276	46,769	44,760	37,931	38,781	...
Associate's degree	140,578	19,505	17,314	16,286	17,627	19,702	17,988	15,732	16,424	...
Bachelor's degree or higher	616,498	81,282	72,539	72,014	80,300	84,338	79,175	71,739	75,111	...

... Category not applicable.

† Not statistically significantly different from mothers without COVID-19 in same quarter at  $p < 0.05$ .

‡ Percent change not statistically significant at  $p < 0.05$ .

<sup>1</sup>May not add to 100 because of rounding.

<sup>2</sup>Subgroups may not add to total because of rounding.

<sup>3</sup>Total number excludes unknown education level.

NOTES: Includes women who may not have had time to complete their education by the time the birth occurred. Reporting area includes Alabama, Alaska, Arkansas, California, District of Columbia, Idaho, Maine, Maryland, New Hampshire, North Dakota, Ohio, Oklahoma, Oregon, Tennessee, and West Virginia.

SOURCE: National Center for Health Statistics, National Vital Statistics System, Natality data file.

# Vital Statistics Surveillance Report

Table 3. Distribution of maternal race and Hispanic origin, by maternal COVID-19 status: 14 states and District of Columbia, July 2020–June 2022

Race and Hispanic origin <sup>1</sup>	Total	2020		2021				2022		Percent change Quarter 3, 2020– Quarter 2, 2022
		Quarter 3 July– September	Quarter 4 October– December	Quarter 1 January– March	Quarter 2 April– June	Quarter 3 July– September	Quarter 4 October– December	Quarter 1 January– March	Quarter 2 April– June	
Percent distribution										
COVID-19 yes										
Total <sup>2</sup> . . . . .	100.0	99.9	100.1	100.0	100.0	99.9	100.0	99.8	100.0	...
White, non-Hispanic . . . . .	50.8	25.1	40.3	47.7	57.1	55.3	56.5	†47.7	58.2	132
Black, non-Hispanic . . . . .	15.3	19.5	16.2	13.8	14.1	15.4	17.1	15.2	14.5	-26
Asian, non-Hispanic . . . . .	3.8	2.6	3.4	3.5	3.5	3.0	2.7	4.3	5.0	92
Other races <sup>3</sup> , non-Hispanic . . . . .	4.7	3.2	3.8	3.7	3.9	5.1	5.2	5.3	5.1	59
Hispanic . . . . .	25.4	49.5	36.4	31.3	21.4	21.1	18.5	27.4	17.2	-65
COVID-19 no										
Total <sup>2</sup> . . . . .	99.9	100.1	100.1	99.9	100.0	99.9	100.0	99.9	99.9	...
White, non-Hispanic . . . . .	48.8	49.5	48.6	50.2	50.1	48.9	47.6	47.7	47.5	-4
Black, non-Hispanic . . . . .	11.4	11.8	12.2	11.8	11.1	11.4	11.2	11.3	10.8	-8
Asian, non-Hispanic . . . . .	7.9	7.8	7.9	7.8	7.9	7.6	8.0	8.2	8.2	5
Other races <sup>3</sup> , non-Hispanic . . . . .	4.2	4.2	4.2	4.3	4.3	4.2	4.1	4.1	4.1	-2
Hispanic . . . . .	27.6	26.8	27.2	25.8	26.6	27.8	29.1	28.6	29.3	9
Number										
COVID-19 yes										
Total <sup>1,4</sup> . . . . .	105,037	4,991	8,455	12,589	10,196	11,633	11,603	25,526	20,044	...
White, non-Hispanic . . . . .	53,342	1,253	3,410	6,009	5,822	6,438	6,560	12,185	11,665	...
Black, non-Hispanic . . . . .	16,083	973	1,367	1,739	1,434	1,795	1,988	3,881	2,906	...
Asian, non-Hispanic . . . . .	3,990	131	284	437	358	349	311	1,110	1,010	...
Other races <sup>3</sup> , non-Hispanic . . . . .	4,920	162	320	468	399	596	602	1,349	1,024	...
Hispanic . . . . .	26,702	2,472	3,074	3,936	2,183	2,455	2,142	7,001	3,439	...

See footnotes at end of table.

## Vital Statistics Surveillance Report

Table 3. Distribution of maternal race and Hispanic origin, by maternal COVID-19 status: 14 states and District of Columbia, July 2020–June 2022—Con.

Race and Hispanic origin <sup>1</sup>	Total	2020		2021				2022		Percent change Quarter 3, 2020– Quarter 2, 2022
		Quarter 3 July– September	Quarter 4 October– December	Quarter 1 January– March	Quarter 2 April– June	Quarter 3 July– September	Quarter 4 October– December	Quarter 1 January– March	Quarter 2 April– June	
		Number								
COVID-19 no										
Total <sup>1,4</sup>	1,798,448	246,940	223,250	210,514	226,848	245,066	232,863	202,995	209,972	...
White, non-Hispanic	877,214	122,112	108,443	105,764	113,632	119,753	110,842	96,857	99,811	...
Black, non-Hispanic	205,901	29,030	27,146	24,896	25,161	27,993	26,095	22,869	22,711	...
Asian, non-Hispanic	142,392	19,198	17,587	16,464	17,839	18,728	18,606	16,736	17,234	...
Other races <sup>3</sup> , non-Hispanic	75,705	10,414	9,458	8,975	9,843	10,414	9,498	8,394	8,709	...
Hispanic	497,236	66,186	60,616	54,415	60,373	68,178	67,822	58,139	61,507	...

... Category not applicable.

† Not statistically significantly different from mothers without COVID-19 in same quarter at  $p < 0.05$ .

<sup>1</sup>Race and Hispanic origin are reported separately on birth certificates; people of Hispanic origin may be of any race. In this table, non-Hispanic women are classified by race. Race categories are consistent with the 1997 Office of Management and Budget standards; see reference 1 in this report. Single race is defined as only one race reported on the birth certificate.

<sup>2</sup>May not add to 100 because of rounding.

<sup>3</sup>Includes American Indian or Alaska Native non-Hispanic, single-race; Native Hawaiian or Other Pacific Islander non-Hispanic single-race; and multiple race non-Hispanic.

<sup>4</sup>Total number excludes unknown race and Hispanic origin.

NOTE: Reporting area includes Alabama, Alaska, Arkansas, California, District of Columbia, Idaho, Maine, Maryland, New Hampshire, North Dakota, Ohio, Oklahoma, Oregon, Tennessee, and West Virginia.

SOURCE: National Center for Health Statistics, National Vital Statistics System, Natality data file.

# Vital Statistics Surveillance Report

Table 4. Distribution of principal source of payment for the delivery, by maternal COVID-19 status: 14 states and District of Columbia, July 2020–June 2022

Principal source of payment for the delivery	Total	2020		2021				2022		Percent change Quarter 3, 2020–Quarter 2, 2022
		Quarter 3 July–September	Quarter 4 October–December	Quarter 1 January–March	Quarter 2 April–June	Quarter 3 July–September	Quarter 4 October–December	Quarter 1 January–March	Quarter 2 April–June	
Percent distribution										
COVID-19 yes										
Total <sup>1</sup>	99.9	100.0	100.0	100.0	100.0	100.1	100.0	99.9	99.9	...
Medicaid	44.8	62.7	52.0	46.8	†39.2	43.2	48.1	45.5	37.1	-41
Private	50.1	30.7	42.8	47.9	56.9	†52.1	46.9	48.9	58.2	90
Other <sup>2</sup>	5.0	†6.6	5.2	5.3	3.9	4.8	5.0	5.5	4.6	-30
COVID-19 No										
Total <sup>1</sup>	100.0	100.1	100.0	100.1	100.0	100.0	100.0	100.0	100.0	...
Medicaid	40.9	41.4	42.1	41.4	40.0	40.4	40.9	40.5	40.4	-2
Private	52.2	51.8	50.9	51.9	53.2	52.8	52.3	52.2	52.6	2
Other <sup>2</sup>	6.9	6.9	7.0	6.8	6.8	6.8	6.8	7.3	7.0	1
Number										
COVID-19 yes										
Total <sup>1,3</sup>	106,973	5,063	8,578	12,748	10,271	11,815	11,726	26,276	20,496	...
Medicaid	47,958	3,174	4,464	5,970	4,031	5,102	5,643	11,965	7,609	...
Private	53,618	1,556	3,669	6,105	5,842	6,150	5,500	12,860	11,936	...
Other <sup>2</sup>	5,397	333	445	673	398	563	583	1,451	951	...
COVID-19 no										
Total <sup>1,3</sup>	1,833,537	251,277	227,320	213,826	230,936	249,704	236,937	208,359	215,178	...
Medicaid	749,434	103,913	95,636	88,483	92,373	100,925	96,796	84,282	87,026	...
Private	957,321	130,084	115,697	110,881	122,963	131,771	123,993	108,840	113,092	...
Other <sup>2</sup>	126,782	17,280	15,987	14,462	15,600	17,008	16,148	15,237	15,060	...

... Category not applicable.

† Not statistically significantly different from mothers without COVID-19 in same quarter at  $p < 0.05$ .

<sup>1</sup>May not add to 100 because of rounding.

<sup>2</sup>Includes self-pay, Indian Health Service, CHAMPUS or TRICARE, other government (federal, state, or local), or charity.

<sup>3</sup>Total number excludes unknown source of payment.

NOTE: Reporting area includes Alabama, Alaska, Arkansas, California, District of Columbia, Idaho, Maine, Maryland, New Hampshire, North Dakota, Ohio, Oklahoma, Oregon, Tennessee, and West Virginia.

SOURCE: National Center for Health Statistics, National Vital Statistics System, Natality data file.

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