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Changes and geographic variation in rates of preterm birth and stillbirth during the prepandemic period and COVID-19 pandemic, according to health insurance claims in the United States, April–June 2019 and April–June 2020

OBJECTIVE: Studies from Europe[1] reported a reduction in the preterm birth rates early in the COVID-19 pandemic, but data from other world regions offered conflicting evidence.[2] In the United States, evidence on preterm birth and stillbirth rates during the pandemic is also mixed.[3,4] Existing studies were often limited to specific US hospitals or states or had missing information on stillbirths. We examined the temporal changes in US preterm birth and stillbirth rates by comparing the prepandemic rates with those during a period of reduced population movement (lockdown) and we investigated the geographic variation in the changes by census regions.

STUDY DESIGN: We used IQVIA's PharMetrics Plus database (IQVIA, Durham, NC) a large convenience sample of claims data that included about one-fifth of US births covered by commercial health insurance, to compare rates between the lockdown period (April–June 2020) and a comparison prepandemic period (April–June 2019). We identified singleton delivery hospitalizations at ≥20 weeks' gestation using International Classification of Diseases, Tenth Revision, and Current Procedural Terminology codes. We extracted information about the weeks of gestation and birth outcomes (live birth or stillbirth) for each delivery. Preterm birth rates (birth at <37 weeks' gestation), late preterm birth rates (birth at 34 to 36 weeks' gestation), and early preterm birth rates (birth at <34 weeks' gestation) were examined. Stillbirth rates were also examined. We used a logistic regression to compare the birth outcome rates between the 2 time periods, adjusting for census region and maternal age. Although race and ethnicity data were available through data linkages for 12% of the sample, the missing or unknown category in the linked data was still more than 30%, limiting our ability to adjust for or stratify by this variable. We reported the adjusted rate measured in percentage point (%), adjusted rate difference (ARD), and adjusted rate ratio using predictive margins from each regression model. To examine geographic variation, we used interaction terms between the indicator variables for the time period and census region.

RESULTS: Among 165,433 privately-insured women with singleton deliveries at ≥20 weeks' gestation during the study periods, 0.2% were stillbirths, and 99.8% were live births; and of the live births, approximately 7% were preterm in both the time periods (Table 1). The adjusted rate of preterm birth during the 2020 lockdown was lower than the adjusted rate during the same months in 2019 (7.0% vs 7.4%; ARD=−0.4%; 95% CI, −0.6 to −0.1). There was no change in the adjusted rate of stillbirth (ARD=−0.02%; 95% CI, −0.07 to 0.02). The reduction in preterm birth was driven by the decrease in late preterm birth (ARD=−0.3%; 95% CI, −0.6 to −0.1) (Table 2). The largest reduction in preterm birth was in the Northeast (ARD=−1.1; 95% CI, −1.8 to −0.5) (Table 2).

CONCLUSION: This study reported a decrease in the US preterm birth rate by 0.4 percentage points during the COVID-19 lockdown period than in a similar period in the previous year using a sample of delivery hospitalizations

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TABLE 1
Characteristics of all deliveries and preterm deliveries—IQVIA PharMetrics Plus, United States, April to June 2019 and April to June 2020

	All deliveries		All live births		All preterm births(<37 wk)	
Characteristic, %	April–June 2019 n=88,240	April–June 2020 n=77,193	April–June 2019 n=88,060	April–June 2020 n=77,054	April–June 2019 n=6,594	April–June 2020 n=5,497
Age group, y						
15–19	0.8	0.7	0.8	0.7	1.2	0.8
20–24	9.3	9.0	9.3	9.0	11.0	9.2
25–29	26.1	25.7	26.1	25.7	24.5	24.3
30–34	38.0	38.1	38.0	38.1	34.2	35.3
35–-39	21.1	21.7	21.1	21.7	22.1	23.1
40–44	4.3	4.6	4.3	4.6	6.3	6.6
45–49	0.3	0.3	0.3	0.3	0.7	0.6
Delivery outcomes						
Live birth	99.8	99.8	100	100	100	100
Stillbirth	0.2	0.2	—	—	—	—
Preterm (<37 wk) delivery outcome						
Preterm live birth	—	—	7.4	7.1	100.0	100.0
Late preterm (34–36 wk) live birth	—	—	5.7	5.3	76.5	75.7
Early preterm (20–33 wk) live birth	—	—	1.7	1.7	23.5	24.3
Census region						
Northeast	14.3	13.7	14.3	13.7	14.1	11.9
Midwest	27.9	29.2	28.0	29.2	26.0	28.7
South	43.6	44.5	43.6	44.5	46.4	47.6
West	14.1	12.6	14.1	12.6	13.5	11.8

Data were obtained from the 2019 and 2020 IQVIA PharMetrics Plus database (native format; version, Q4 2020 release).

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covered by private health insurance. Decreases were greatest in the Northeast region. No changes were observed in the stillbirth rates. The reduction was notable because the overall US preterm birth rate increased annually from 2014 to 2019.[5] The regional differences may be because of the variation in COVID-19 transmission rates and implementation of mitigation efforts, primarily lockdown measures. The changes in birth outcomes might also be inherently heterogeneous across regions because of preexisting geographic variations and state demographics that influence both preterm and stillbirth rates. For example, previous research has demonstrated that, over a similar time period, Tennessee saw a decrease in the odds of preterm births by 14%, whereas the California study reported no change in preterm birth rates[3-4]. This study has limitations. Other than age, our results did not adjust for other maternal characteristics owing to data limitations, such as parity, race or ethnicity, previous preterm birth, and previous stillbirth. The source database comprised a convenience sample of privately-insured individuals, which may impact representativeness. Understanding patterns of adverse birth outcomes before and after the pandemic could help to identify opportunities for prevention.

TABLE 2
Changes in preterm birth rates and stillbirth rates[a] and geographic variation in preterm birth rates comparing April to June 2019 and April to June 2020—IQVIA PharMetrics Plus, United States

Birth outcomes, %	Adjusted rate April–June 2019	Adjusted rate April–June 2020	Adjusted rate difference (2020 vs 2019)	Adjusted rate ratio(2020/2019)
Panel A: changes in preterm birth rates and stillbirth rates				
Preterm birth	7.4	7.0	−0.4	95.0
(n=165,114)	(7.2–7.6)	(6.9–7.2)	(−0.6 to −0.1)	(91.8–98.3)
Late preterm birth	5.7	5.3	−0.3	94.1
	(5.5–5.8)	(5.2–5.5)	(−0.6 to −0.1)	(90.3–97.8)
Early preterm birth	1.7	1.7	−0.03	98.3
	(1.7–1.8)	(1.6–1.8)	(−0.2 to 0.1)	(91.1–105.5)
Any stillbirth	0.2	0.2	−0.02	88.4
(n=165,433)	(0.2–0.2)	(0.2–0.2)	(−0.07 to 0.02)	(68.8–107.9)
Panel B: geographic variation in changes in preterm birth rates (n=165,114)				
Northeast	7.3	6.1	−1.1	84.6
	(6.8–7.7)	(5.7–6.6)	(−1.8 to −0.5)	(76.4–92.8)
Midwest	6.9	6.9	0.02	100.3
	(6.6–7.2)	(6.6–7.2)	(−0.4 to 0.5)	(93.7–107.0)
South	7.9	7.5	−0.4	95.6
	(7.6–8.2)	(7.3–7.8)	(−0.7 to 0.0)	(90.7–100.4)
West	7.1	6.6	−0.5	93.4
	(6.6–7.5)	(6.1–7.1)	(−1.1 to 0.2)	(84.2–102.6)

In panel A, each row shows the predicted rates, the rate difference, and rate ratio using predictive margins from the same logistic regression with the dependent variables (preterm birth, late preterm birth, early preterm birth, and any stillbirth) shown in the first column. In panel B, all predicted rates, rate differences, and rate ratios were obtained from the same logistic regression, and the dependent variable is preterm birth rate. The 95% confidence intervals are shown in parentheses. All regressions adjusted for indicators for year (2019 and 2020), age group in years (15–19, 20–24, 25–29, 30–34, 35–39, 40–44, or 45–49), and region of residence (Northeast, Midwest, South, or West).

[a] Sample restricted to live birth deliveries when the dependent variables are preterm birth, late preterm birth, and early preterm birth; sample includes all deliveries when the dependent variable is stillbirth.

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