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Variations in Low-Risk Cesarean Delivery Rates in the United States Using the Society for Maternal-Fetal Medicine Definition

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Abstract

OBJECTIVE: To assess variations in low-risk cesarean delivery rates in the United States using the Society for Maternal-Fetal Medicine (SMFM) definition of low-risk for cesarean delivery and to identify factors associated with low-risk cesarean deliveries.

METHODS: From hospital discharge data in the 2018 National Inpatient Sample and State Inpatient Databases, we identified deliveries that were low-risk for cesarean delivery using the SMFM definition based on the International Classification of Diseases, Tenth Revision, Clinical Modification codes. We estimated national low-risk cesarean delivery rates overall and by patient characteristics, clinically relevant conditions not included in the SMFM definition, and hospital characteristics based on the nationally representative sample of hospital discharges in the National Inpatient Sample. Multivariate logistic regressions were estimated for the national sample to identify factors associated with low-risk cesarean delivery. We reported low-risk cesarean delivery rates for 27 states and the District of Columbia based on the annual state data that represented the universe of hospital discharges from participating states in the State Inpatient Databases.

RESULTS: Of an estimated 3,634,724 deliveries in the 2018 National Inpatient Sample, 2,484,874 low-risk deliveries met inclusion criteria. The national low-risk cesarean delivery rate in 2018 was 14.6% (95% CI 14.4–14.8%). The rates varied widely by state (range 8.9–18.6%). Nationally, maternal age older than 40 years, non-Hispanic Black or Asian race, private insurance as primary payer, admission on weekday, obesity, diabetes, or hypertension, large metropolitan residence, and hospitals of the South census region were associated with low-risk cesarean delivery.

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CONCLUSION: Approximately one in seven low-risk deliveries was by cesarean in 2018 in the United States using the SMFM definition and the low-risk cesarean delivery rates varied widely by state.

Cesarean delivery is a life-saving surgery for specific complications during pregnancy and child-birth. However, it is associated with increased risk of maternal morbidity and mortality and adverse outcomes in subsequent pregnancy and may also have negative effects on infant and child health.[1] The United States has one of the highest cesarean delivery rates in the world[2] and efforts have been made to reduce low-risk cesarean deliveries. The American College of Obstetricians and Gynecologists and the Society for Maternal-Fetal Medicine (SMFM) jointly issued Obstetric Care Consensus on safe prevention of primary cesarean delivery.[3] The nulliparous term singleton vertex cesarean delivery rate is commonly evaluated using birth certificate data.[4] Reducing the nulliparous term singleton vertex cesarean delivery rate is one of the Healthy People 2030 goals, a focus area of the Centers for Medicare & Medicaid Services' Maternal and Infant Health Initiative, and a National Quality Forum perinatal care measure.[5–7]

The nulliparous term singleton vertex cesarean delivery definition does not account for clinical indications for cesarean delivery. In 2015 the SMFM developed an alternative low-risk for cesarean delivery definition based on International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) diagnosis codes. The SMFM definition sought to refine low risk for cesarean delivery using clinical guidance or clinical expertise if no practice guideline was available.[8] In 2017, the SMFM definition was updated using the International Classification of Diseases, Tenth Revision, Clinical Modification (ICD-10-CM) codes, which provided important enhancements to the specificity of clinical coding.[8] The SMFM definition includes all term, singleton, vertex, live birth deliveries and excludes women with prior cesarean deliveries. It excludes high-risk diagnoses for cesarean delivery that are absolute or relative contradictions to vaginal birth, such as placenta previa while retaining discretionary risk factors for cesarean delivery, such as labor disorders (Appendix 1, available online at http://links.lww.com/AOG/C542). The SMFM definition can be applied to administrative claims data; thus, it can potentially support surveillance, quality measurement, and research using such data.

The purpose of this study was to assess the SMFM low-risk cesarean delivery rates nationally and by state in the United States. We also estimated the associations between low-risk cesarean delivery and patient characteristics, clinically relevant conditions not included in the SMFM definition, and hospital characteristics.

METHODS

We used the 2018 National Inpatient Sample and State Inpatient Databases from the Healthcare Cost and Utilization Project.[9,10] The National Inpatient Sample contains a 20% nationally representative sample of all-payer hospital discharges among community, non-rehabilitation hospitals. The 2018 National Inpatient Sample sampling frame includes data from 47 States plus the District of Columbia, covering more than 97% of the U.S. population and including almost 96% of discharges from U.S. community hospitals as defined by the

American Hospital Association. The National Inpatient Sample is sampled from the State Inpatient Databases, which contain the universe of the annual inpatient discharges from participating states in the Healthcare Cost and Utilization Project.[10] The State Inpatient Databases use a uniform format to facilitate multistate comparisons. We used the 2018 State Inpatient Databases available at Centers for Disease Control and Prevention to describe state variations in low-risk cesarean delivery rates, which included a total of 27 states and the District of Columbia.

We identified delivery hospitalizations and cesarean deliveries based on a validated method[11] and identified low-risk deliveries based on the SMFM definition.[8] The SMFM low-risk cesarean delivery rate was calculated as the proportion of cesarean deliveries among low-risk deliveries.

Multiple patient and hospital characteristics were assessed (Table 1). We included race and ethnicity in our study because disparities in cesarean delivery rate by race and ethnicity have been noted in the literature.[12,13] We used the definitions of these variables provided by the Healthcare Cost and Utilization Project,[14] except the following: for primary payer, we combined categories other than Medicare, Medicaid, private insurance, self-pay, or missing into one category—"other." This category included no charge, Worker's Compensation, CHAMPUS, CHAMPVA, Title V, or other government programs. For patient residence, we combined large central metropolitan and large fringe metropolitan into large metropolitan area.

Maternal obesity, diabetes, and hypertensive disorders were strongly associated with increased cesarean delivery rates, yet they were not included in the SMFM definition.[15–20] We included these conditions as clinically relevant conditions. We converted the diagnosis codes based on the ICD-9-CM codes in a previous study[21] to ICD-10-CM codes using general equivalence mappings by the Centers for Medicare & Medicaid Services.[22] The diagnosis codes used to identify maternal obesity, diabetes, and hypertensive disorders are listed in Appendix 2, available online at http://links.lww.com/AOG/C542.

For both national and state analysis, deliveries were excluded from the analysis if they were transferred from a different acute care hospital to avoid duplication. Deliveries were also excluded if age at delivery was less than 12 years or greater than 55 years or missing. For national analysis, we included missing categories for race and ethnicity, primary payer, median household income, or patient residence to use potentially valuable information contained in the nonmissing data of the observations with these missing values. Multivariable logistic regression was estimated to identify patient characteristics, clinically relevant conditions, hospital characteristics that were associated with low-risk cesarean deliveries using the national sample. The adjusted odds ratios and 95% CIs were based on survey procedures in SAS 9.4 that account for the complex survey design of the National Inpatient Sample data.

This study does not require Institutional Review Board review given analyses of deidentified data are considered research not involving human subjects.

RESULTS

Among the weighted 3,634,724 delivery hospitalizations in the 2018 National Inpatient Sample, we identified 2,494,994 deliveries that were low risk for cesarean delivery based on the SMFM definition. We excluded 9,965 delivery hospitalizations (0.40%) that transferred in from a different acute care hospital or age less than 12 years or greater than 55 years, and another 155 deliveries with missing age. The final national analytic sample consisted of 2,484,874 low-risk deliveries, among which 363,590 were cesarean deliveries (Fig. 1). For state analysis, a total of 1,008,487 deliveries were low risk for cesarean delivery and we excluded 4,734 delivery hospitalizations (0.47%) that transferred and 28 deliveries with age at delivery less than 12 years or greater than 55 years or missing. The final state analysis was based on 1,003,725 deliveries that were low risk for cesarean delivery.

In 2018, the national low-risk cesarean delivery rate was 14.6% (95% CI 14.4–14.8%) (Table 1). The highest low-risk cesarean delivery rates were seen in those who were 40–55 years old, were non-Hispanic Black, were primarily insured by Medicare, and who were admitted on weekdays. Those with documented obesity, diabetes or hypertension also had higher low-risk cesarean delivery rates.

In adjusted models, compared with non-Hispanic White women, non-Hispanic Black women, Asian and Pacific Islander women, and Other race and ethnicity had higher odds of low-risk cesarean delivery (Table 2). Those who were 40–55 years old had higher odds of low-risk cesarean delivery compared with those were 20–29 years old. Compared with deliveries with Medicaid as primary payer, deliveries with private insurance as primary payer had higher odds of low-risk cesarean delivery. Deliveries with Medicare as primary payer also had higher odds of low-risk cesarean delivery. Compared with admission on weekend, admission on weekdays had higher odds of low-risk cesarean delivery (Table 2). Women with obesity, diabetes, or hypertension had higher odds of low-risk cesarean delivery compared with those without these conditions.

Geographic variation in low-risk cesarean delivery were observed. Compared with hospitals in the South, lower odds of low-risk cesarean delivery were observed in hospitals of the Midwest and the West (Table 2). Compared with residence in large metropolitan areas, patients who resided in less urban areas had slightly lower odds of low-risk cesarean delivery (Table 2). Using 2018 State Inpatient Databases, notable variations by state exist, with low-risk cesarean delivery rates ranging from 8.9% in South Dakota to 18.6% in Florida (Table 3).

DISCUSSION

This study demonstrated significant differences in SMFM low-risk cesarean delivery rates by patient age, race and ethnicity, primary payer, admission on weekend, urbanicity, and hospital census region. The SMFM low-risk cesarean delivery rates also varied by state. Even after accounting for clinical indications for cesarean delivery by SMFM definition, we found that diagnoses of diabetes, obesity, or hypertension were significantly associated with higher odds of low-risk cesarean delivery.

Our study provided a recent estimate of low-risk cesarean delivery rates at the national and state level using an updated SMFM definition based on ICD-10-CM codes. Previous study reported median hospital-level SMFM low-risk cesarean delivery rate of 16.5% in 2013.[21] Our national SMFM low-risk cesarean rate of 14.6% in 2018 was lower than the 2018 national nulliparous term singleton vertex cesarean delivery rate of 25.9% based on birth certificate data from the National Center for Health Statistics.[4] This was expected because the SMFM definition excluded more high-risk deliveries based on clinical indications. This difference was also noted in another study that showed the average nulliparous term singleton vertex and SMFM low-risk cesarean birth rates were 25.6% and 13.0%, respectively, based on 275 hospitals from six states for the nulliparous term singleton vertex definition and 81 hospitals from four states for the SMFM ICD-9-CM codes definition in 2015.[23]

Our results that non-Hispanic Black mothers had higher odds of low-risk cesarean delivery than non-Hispanic White mothers were consistent with previous studies.[12,13,24–27] Racial disparities persist even after accounting for medical indications, education, income, insurance type, and regional practice differences.[12,24,28] Potential reasons for this disparity include health care professional practices, facility level practices, communication between patient and health care professional, patient preferences, and racial or ethnic discrimination. Additional research to identify reasons for the observed race and ethnic disparities and strategies to reduce them are needed to inform equitable maternal care.

Private insured deliveries had a higher odds of low-risk cesarean delivery as compared with Medicaid insured deliveries even after adjusting for patient and hospital characteristics. The findings were consistent with a previous study showing that births covered by Medicaid had lower odds of cesarean delivery compared with privately insured births using National Inpatient Sample data from 2002 to 2009.[29] State Medicaid program may use strategies to reduce non–medically indicated cesarean delivery including payment tools, quality measurement and stakeholder engagement.[30] The higher rate of low-risk cesarean delivery among individuals with Medicare insurance may reflect the patient characteristics of reproductive-aged adults covered by Medicare, such as disability-related eligibility for chronic conditions.[31] Individuals with Medicare insurance may have a higher prevalence of both physical and mental health conditions that may be discretionary risk factors for cesarean delivery but did not meet the criteria of clinically relevant risk factors that are absolute or relative contraindications to vaginal delivery by the SMFM definition.[8]

Our results demonstrated variations in low-risk cesarean delivery rates by state, similar to other studies.[29,32,33] These variations may indicate opportunities for quality-improvement initiatives to reduce the rate of low-risk cesarean delivery.[34] States may use data sources available to them to assess low-risk cesarean delivery in their quality-improvement efforts, such as birth certificate, hospital discharge data, linked birth certificate and hospital discharge data, or Medicaid claims data, which provide a fuller set of factors for evaluation. Choice of data sources may be influenced by factors such as timeliness of data and ability to evaluate practices that are implemented to drive change. Of note, the distribution of patient characteristics such as maternal age, race and ethnicity, and comorbidities may influence

state to state comparisons. Comparison by facility may unfairly disadvantage practices or centers that manage high-risk cases with diagnoses excluded by the SMFM definition.[8]

Additional clinical factors beyond those included in the SMFM definition, such as diabetes, obesity, and hypertension, were associated with higher odds of low-risk cesarean delivery. This was consistent with similar findings among nulliparous term singleton vertex deliveries.[18,35] Recent clinical guidance by the American College of Obstetricians and Gynecologists in 2019 and 2020 for the care of women with hypertensive disorders in pregnancy indicates the potential need for early delivery, which may occur by cesarean delivery.[20,36,37] Diabetes is associated with macrosomia resulting in increased rate of cesarean delivery.[38] Although obesity is not an independent indication for cesarean delivery, research has shown obesity is associated with pregnancy complications and increased rates of cesarean delivery.[39,40] Weight-related stigma can influence the quality of care.[41] Similar to our findings, previous research found that cesarean delivery was more common on weekdays than weekends, which might reflect prescheduling of cesarean delivery and inductions of labor.[42,43] Recent research indicated a lower rate of cesarean delivery associated with induction compared with expectant management.[43] These findings highlight the need of collaborative approaches to reduce low-risk cesarean delivery, including equitable implementation of clinical guidance to support the management and treatment of chronic and pregnancy-induced conditions, supportive delivery care for women, and health system incentives to enhance quality of care in an equitable way.[34] In addition, improvements to maternal health broadly, including in the preconception and interconception period, is an important strategy to reduce low-risk cesarean delivery.[44,45]

This study had several limitations. First, The SMFM definition relies on the accuracy of coding and coding practices may vary by state and facility. Second, we did not distinguish between nulliparous and multiparous deliveries to refine low-risk deliveries except for the fact that the SMFM definition excluded women with prior cesarean deliveries. Third, the SMFM definition does not include all clinical information that inform decision for cesarean delivery, such as fetal weight at the time of delivery.[46] Finally, the data source does not have information on specific geographic location at the county, ZIP code, or census tract level or other potential factors associated with low-risk cesarean delivery, such as health care professional type (eg, midwife, physician), labor support and management (eg, doulas), and patient preferences.[34] Despite these limitations, this study presented national and state estimates of the U.S. SMFM low-risk cesarean delivery rates. The strengths include a nationally representative sample of hospital delivery discharges and state inpatient data that represented the universe of hospital delivery discharges from participating states. The SMFM definition includes additional clinical indications for cesarean delivery beyond the nulliparous term singleton vertex measure. Furthermore, we assessed simultaneously the associations of patient characteristics, hospital characteristics, and select clinically relevant conditions with low-risk cesarean delivery.

In summary, approximately one in seven low-risk deliveries was by cesarean delivery in 2018 in the United States using the SMFM definition. Nationally, maternal age older than 40 years, non-Hispanic Black or Asian race, private insurance as primary payer, admission on weekday, clinically relevant conditions including obesity, diabetes, or hypertension, large

metropolitan residence and hospital census region of the South were associated with low-risk cesarean delivery. The low-risk cesarean delivery rates varied widely by state. Factors associated with low-risk cesarean deliveries can potentially inform quality-improvement efforts to reduce low-risk cesarean delivery and to improve equitable care.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Acknowledgments

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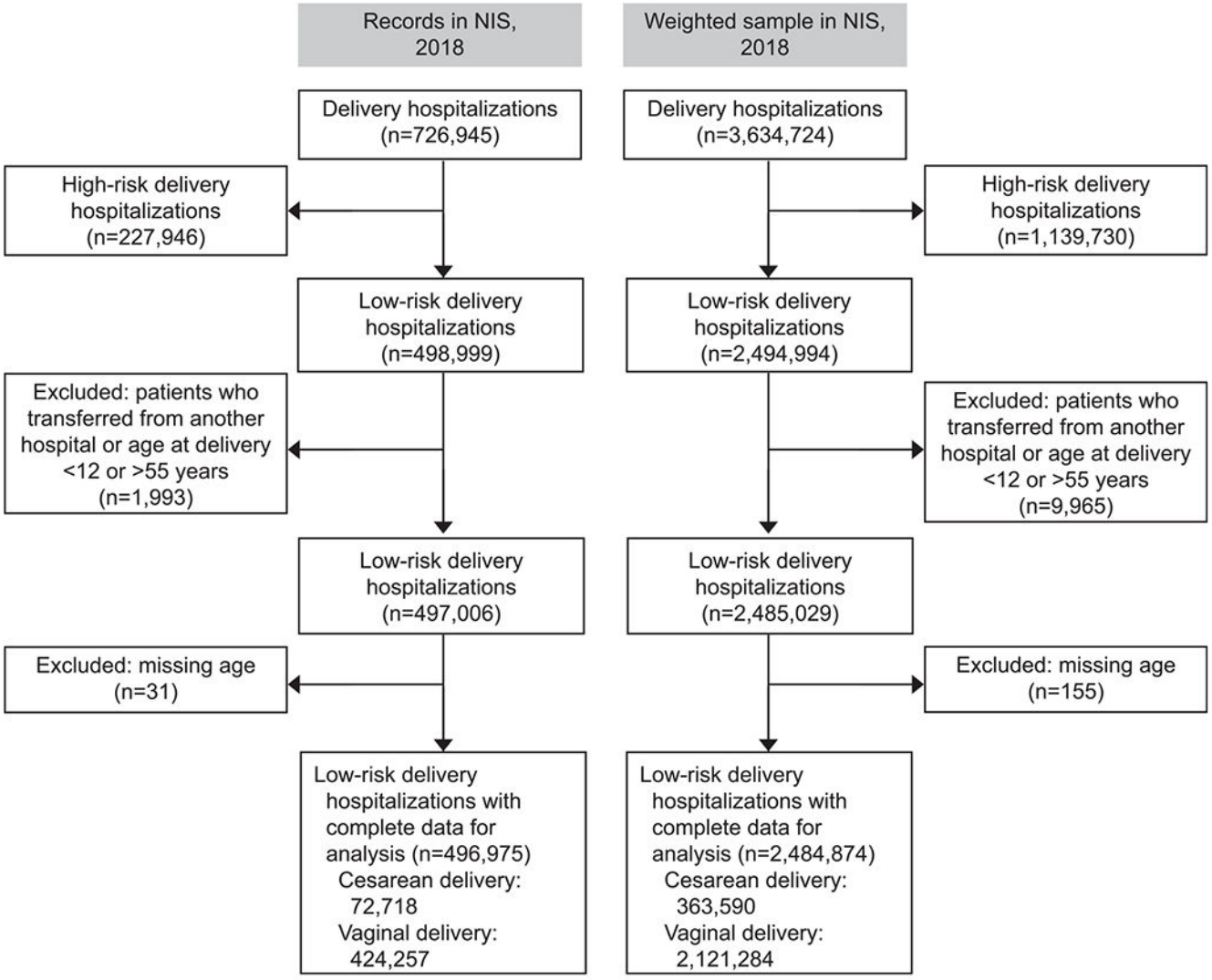

Fig. 1.

Study sample of low-risk delivery hospitalizations in the National Inpatient Sample (NIS), 2018.

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Table 1.

Low-Risk Cesarean Delivery Rates Overall and by Patient, Clinical, and Hospital Characteristics, National Inpatient Sample, 2018

Patient, Clinical, and Hospital Characteristics	Low-Risk Cesarean Deliveries	Total Low-Risk Deliveries	Low-Risk Cesarean Delivery Rate
Total	363,590(100.0)	2,484,874 (100.0)	14.6 (14.4–14.8)
Age (y)			
12–19	19,920 (5.5)	144,240 (5.8)	13.8 (13.4–14.2)
20–29	176,405 (48.5)	1,266,459 (51.0)	13.9 (13.7–14.1)
30–39	152,270 (41.9)	1,009,975 (40.6)	15.1 (14.8–15.3)
40–55	14,995 (4.1)	64,200 (2.6)	23.4 (22.5–24.2)
Race and ethnicity			
Hispanic	68,420 (18.8)	499,060 (20.1)	13.7 (13.2–14.2)
Missing	11,240 (3.1)	82,370 (3.3)	13.6 (13.0–14.3)
Non-Hispanic American Indian and Alaska Native	2,100 (0.6)	16,525 (0.7)	12.7 (11.3–14.2)
Non-Hispanic Asian and Pacific Islander	23,425 (6.4)	152,605 (6.1)	15.4 (14.8–15.9)
Non-Hispanic Black	57,885 (15.9)	332,055 (13.4)	17.4 (17.0–17.8)
Non-Hispanic White	182,760 (50.3)	1,287,854 (51.8)	14.2 (14.0–14.4)
Other	17,760 (4.9)	114,405 (4.6)	15.5 (15.0–16.1)
Primary payer*			
Medicare	2,885 (0.8)	15,510 (0.6)	18.6 (16.9–20.3)
Medicaid	134,820 (37.1)	1,032,110 (41.5)	13.1 (12.8–13.3)
Private	208,375 (57.3)	1,303,369 (52.5)	16.0 (15.7–16.2)
Self-pay	8,265 (2.3)	64,265 (2.6)	12.9 (12.2–13.6)
Other	8,775 (2.4)	66,570 (2.7)	13.2 (12.6–13.8)
Missing	470 (0.1)	3,050 (0.1)	15.4 (12.4–18.4)
Median household income ($)			
45,999 or less	96,995 (26.7)	657,730 (26.5)	14.7 (14.4–15.0)
46,000–58,999	93,535 (25.7)	643,695 (25.9)	14.5 (14.2–14.8)
59,000–78,999	88,645 (24.4)	613,285 (24.7)	14.5 (14.2–14.7)
79,000 or more	81,020 (22.3)	548,115 (22.1)	14.8 (14.4–15.1)
Missing	3,395 (0.9)	22,050 (0.9)	15.4 (14.1–16.7)
Patient residence (NCHS urban–rural code)†			

Patient, Clinical, and Hospital Characteristics	Low-Risk Cesarean Deliveries	Total Low-Risk Deliveries	Low-Risk Cesarean Delivery Rate
Large metropolitan	214,435 (59.0)	1,418,585(57.1)	15.1 (14.8–15.4)
Medium metropolitan	72,605 (20.0)	512,560 (20.6)	14.2 (13.8–14.5)
Small metropolitan	28,855 (7.9)	216,455 (8.7)	13.3 (12.9–13.8)
Micropolitan	28,000 (7.7)	198,745 (8.0)	14.1 (13.7–14.5)
Not metropolitan or micropolitan	18,640 (5.1)	131,979 (5.3)	14.1 (13.6–14.6)
Missing	1,055 (0.3)	6,550 (0.3)	16.1 (13.1–19.1)
Hospital census region			
Northeast	62,130 (17.1)	397,064 (16.0)	15.6 (15.2–16.1)
Midwest	68,975 (19.0)	530,600 (21.4)	13.0 (12.7–13.3)
South	155,455 (42.8)	954,291 (38.4)	16.3 (15.9–16.6)
West	77,030 (21.2)	602,918 (24.3)	12.8 (12.5–13.1)
Hospital size by bed count			
Small	71,790 (19.7)	501,949 (20.2)	14.3 (13.9–14.7)
Medium	111,785 (30.7)	756,275 (30.4)	14.8 (14.4–15.2)
Large	180,015 (49.5)	1,226,651 (49.4)	14.7 (14.4–14.9)
Hospital location and teaching status			
Rural	32,455 (8.9)	234,914 (9.5)	13.8 (13.4–14.2)
Urban nonteaching	71,425 (19.6)	495,256 (19.9)	14.4 (14.1–14.8)
Urban teaching	259,710 (71.4)	1,7654,704 (70.6)	14.8 (14.6–15.0)
Admission on weekend (Saturday–Sunday)			
Yes	67,140 (18.5)	542,450 (21.8)	12.4 (12.1–12.6)
No	296,450 (81.5)	1,942,424 (78.2)	15.3 (15.1–15.5)
Obesity			
Yes	66,545 (18.3)	255,490 (10.3)	26.0 (25.4–26.7)
No	297,045 (81.7)	2,229,384 (89.7)	13.3 (13.1–13.5)
Diabetes			
Yes	23,530 (6.5)	94,825 (3.8)	24.8 (24.1–25.5)
No	340,060 (93.5)	2,390,049 (96.2)	14.2 (14.0–14.4)
Hypertension			
Yes	76,825 (21.1)	301,140 (12.1)	25.5 (25.1–25.9)
No	286,765 (78.9)	2,183,734 (87.9)	13.1 (12.9–13.3)

NCHS, National Center for Health Statistics.

Data are weighted n (%) or % (95% CI).

*For primary payer, we combined categories other than Medicare, Medicaid, private insurance, or self-pay into one category, “other,” which included no charge, missing, and Worker’s Compensation, CHAMPUS, CHAMPVA, Title V, or other government programs.

†For patient residence, we combined large central metropolitan and large fringe metropolitan into large metropolitan area.

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Table 2.

Unadjusted and Adjusted Odds Ratios and 95% CIs for Associations Between Patient, Clinical, and Hospital Characteristics and Cesarean Delivery Among Low-Risk Hospital Deliveries, National Inpatient Sample, 2018

Patient, Clinical, and Hospital Characteristics	Unadjusted OR (95% CI)	Adjusted OR (95% CI)*
Age (y)		
12–19	0.99 (0.95–1.03)	1.07 (1.03–1.11)
20–29	1.0 (ref)	1.0 (ref)
30–39	1.10 (1.08–1.12)	1.03 (1.01–1.05)
40–55	1.88 (1.80–1.97)	1.64 (1.56–1.72)
Race and ethnicity		
Hispanic	0.96 (0.92–1.00)	1.03 (0.99–1.08)
Non-Hispanic American Indian and Alaska Native	0.88 (0.77–1.00)	0.95 (0.84–1.08)
Non-Hispanic Asian and Pacific Islander	1.10 (1.05–1.14)	1.19 (1.14–1.24)
Non-Hispanic Black	1.28 (1.24–1.32)	1.23 (1.19–1.27)
Non-Hispanic White	1.0 (ref)	1.0 (ref)
Other	1.11 (1.06–1.16)	1.15 (1.09–1.20)
Primary payer†		
Medicare	1.52 (1.36–1.70)	1.37 (1.23–1.54)
Medicaid	1.0 (ref)	1.0 (ref)
Private	1.27 (1.24–1.29)	1.36 (1.33–1.39)
Self-pay	0.98 (0.92–1.05)	1.04 (0.97–1.11)
Other	1.01 (0.96–1.07)	1.10 (1.05–1.17)
Patient residence (NCHS urban-rural code)‡		
Large metropolitan	1.0 (ref)	1.0 (ref)
Medium metropolitan	0.93 (0.89–0.96)	0.93 (0.90–0.97)
Small metropolitan	0.86 (0.83–0.90)	0.90 (0.86–0.94)
Micropolitan	0.92 (0.88–0.96)	0.95 (0.90–1.00)
Not metropolitan or micropolitan	0.92 (0.88–0.97)	0.94 (0.89–0.99)
Hospital census region		
Northeast	0.95 (0.91–1.00)	0.96 (0.91–1.00)
Midwest	0.77 (0.74–0.80)	0.76 (0.74–0.79)

Patient, Clinical, and Hospital Characteristics	Unadjusted OR (95% CI)	Adjusted OR (95% CI)*
South	1.0 (ref)	1.0 (ref)
West	0.75 (0.72–0.78)	0.76 (0.72–0.79)
Admission on Monday–Friday (vs Saturday–Sunday)	1.28 (1.25–1.30)	1.23 (1.20–1.25)
Obesity	2.29 (2.22–2.37)	2.01 (1.95–2.08)
Diabetes	1.99 (1.92–2.06)	1.64 (1.58–1.71)
Hypertension	2.27 (2.22–2.32)	1.95 (1.90–1.99)

OR, odds ratio;ref, reference;NCHS, National Center for Health Statistics.

*Multivariate logistic regression adjusted for all variables listed in Table 1. Median household income based on ZIP code, hospital size, and location and teaching status of hospital were not significant and not reported. Missing categories were not reported.

†For primary payer, we combined categories other than Medicare, Medicaid, private insurance, or self-pay into one category, “other,” which included no charge, missing, and Worker’s Compensation, CHAMPUS, CHAMPVA, Title V, or other government programs.

‡For patient residence, we combined large central metropolitan and large fringe metropolitan into large metropolitan area.

Table 3.

Low-Risk Cesarean Delivery Rates by State, State Inpatient Databases, 2018*

State	Low-Risk Cesarean Deliveries (n)	Total Low-Risk Deliveries (n)	Low-Risk Cesarean Delivery Rate (%)
Alaska	547	5,681	9.6
Arizona	6,406	54,608	11.7
Arkansas	3,961	23,778	16.7
Colorado	5,119	42,334	12.1
Delaware	865	6,081	14.2
District of Columbia	1,604	9,092	17.6
Florida	26,525	142,469	18.6
Georgia	13,436	81,418	16.5
Iowa	3,030	25,495	11.9
Kentucky	5,354	33,179	16.1
Maine	1,152	8,228	14.0
Maryland	6,954	43,894	15.8
Michigan	10,689	72,572	14.7
Minnesota	5,315	45,100	11.8
Mississippi	4,000	22,171	18.0
Nebraska	1,892	16,383	11.5
Nevada	3,878	23,222	16.7
New Jersey	9,888	64,700	15.3
New Mexico	1,597	14,776	10.8
North Carolina	10,316	76,650	13.5
Oregon	3,866	28,814	13.4
Rhode Island	1,166	7,442	15.7
South Carolina	5,575	34,878	16.0
South Dakota	736	8,238	8.9
Vermont	424	3,736	11.3
Washington	7,038	54,610	12.9
West Virginia	1,902	12,127	15.7
Wisconsin	4,748	42,049	11.3

* Deliveries transferred in from another acute care hospital (n=4,734, 0.47%) and age at delivery younger than 12 or older than 55 years or missing (n=28) were excluded.