Racial/Ethnic Differences in the Likelihood of Cesarean Delivery, California

ABSTRACT

Objectives. The purpose of this study was to determine whether women's sociodemographic characteristics are independently associated with cesarean delivery.

Methods. A retrospective review was conducted of hospital discharge data for singleton first births in California in 1991.

Results. After insurance and personal, community, medical, and hospital characteristics had been controlled, Blacks were 24% more likely to undergo cesarean delivery than Whites; only among low-birthweight and county hospital births were Blacks not at a significantly elevated risk. Among women who resided in substantially non-English-speaking communities, who delivered high-birthweight babies, or who gave birth at for-profit hospitals, cesarean delivery appeared to be more likely among non-Whites and was over 40% more likely among Blacks than among Whites.

Conclusions. The findings cannot establish causation, but the significant racial/ethnic disparities in delivery mode, despite adjustment for social, economic, medical, and hospital factors, suggest inappropriate influences on clinical decision making that would not be addressed by changes in reimbursement. If practice variations among providers are involved, de facto racial differences in access to optimal care may be indicated. The role of provider and patient attitudes and expectations in the observed racial/ethnic differentials should also be explored. (*Am J Public Health.* 1995;85:625–630)

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Introduction

Rates of cesarean deliveries increased dramatically in the United States from 4.5% of all births during 1965[1] to 24.1% during 1986,[2] leveling off thereafter.[3] Concern about unnecessary cesarean sections has prompted examination of nonclinical factors that might influence decision making about delivery mode. Apart from age,[1–7] parity,[4–7] and insurance,[1–3,6,8–14] the literature provides limited or contradictory information on women's sociodemographic characteristics as independent predictors of delivery mode. We used birth certificate and census data to examine differences in the likelihood of cesarean deliveries for first live births according to sociodemographic characteristics, taking into account insurance, medical indications, and hospital factors.

Several studies have documented differences in cesarean rates by insurance status, with rates generally lowest for uninsured women, intermediate for women with Medicaid coverage, and highest for women with private insurance,[1–3,6,8–14] especially fee for service.[8,12,13] However, these studies have not adjusted for maternal education or nativity, and some have not described income or hospital characteristics. Gould et al. found more cesarean sections in higher income census tracts, but information was unavailable on insurance, education, nativity, or hospital characteristics.[5] Stafford, after controlling for insurance, found no significant association between repeat cesarean delivery and median family income of residence zip code; however, family size was not considered in studying income, and information was unavailable on education, marital status, nativity, or prenatal care.[8]

With varying degrees of control for other factors, some studies have found higher rates of cesarean delivery among Whites,[5,12–15] while others have found higher rates among Blacks[4,8,16] or among non-White women in general.[8,17] The studies that observed elevated cesarean rates among Blacks[4,8,16] did not examine education, marital status, or use of prenatal care; two of these studies[4,16] also lacked information on insurance.

Several studies have described variations in cesarean rates by delivery site. Haynes de Regt et al. found that private practice patients were more likely than subsidized clinic patients to have a cesarean delivery; insurance was not studied.[18] Differences have been observed by geographic region[1,14] and hospital volume[2–4,8,14]; higher rates have been observed at for-profit[1–4,8,14] and nonteaching institutions.[4,8] Some authors have focused on individual provider differences in decision making about delivery mode.[19,20] Others have hypothesized a role for provider attitudes toward patients of different social classes.[5,6] Cesarean rates have been associated with physician-perceived malpractice risk and actual claims.[6,21] Provider convenience may play a role.[22,23]

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TABLE 1—Likelihood of Cesarean vs Vaginal Delivery among Singleton First Births to California Resident Women, by Sample Characteristics: 1991

	No. of Deliveries	Cesarean Deliveries, %	Adjusted[a] Odds Ratio (95% Confidence Interval)
Sociodemographic characteristics			
Insurance			
Uninsured	9 604	23.0	0.74 (0.69, 0.79)
Medi-Cal	93 180	21.2	0.88 (0.85, 0.92)
Private fee for service	54 898	30.7	1.00 ...
Private prepaid	59 779	23.8	0.74 (0.71, 0.76)
Maternal race/ethnicity			
Black	15 529	25.4	1.24 (1.18, 1.31)
Foreign-born Asian	19 142	24.3	0.94 (0.89, 0.98)
Foreign-born Latina	62 303	21.4	0.97 (0.93, 1.01)
US-born Latina	26 802	23.4	1.07 (1.03, 1.12)
White	93 685	26.5	1.00 ...
Maternal age, y			
≤19	50 058	15.8	0.27 (0.26, 0.29)
20–34	154 688	25.6	0.46 (0.43, 0.48)
≥35	12 715	42.9	1.00 ...
Maternal education			
≤9th grade	40 707	19.7	0.92 (0.88, 0.97)
10th–11th grade	28 579	19.0	0.94 (0.89, 0.98)
High school degree	64 319	24.7	1.01 (0.98, 1.04)
Some college	83 856	28.2	1.00 ...
Marital status			
Unmarried	83 351	21.9	1.01 (0.98, 1.05)
Married	134 110	25.9	1.00 ...
Prenatal care initiation			
1st or 2nd trimester	206 193	24.7	1.00 ...
3rd trimester or no care	11 268	18.6	0.91 (0.85, 0.97)
Persons in poverty in zip code, %			
<25	187 529	24.7	1.00 ...
≥25 (high poverty)	26 250	21.9	1.07 (1.03, 1.12)
Missing data	3 682	24.8	
Non–English speakers in zip code, %			
<25	187 455	24.6	1.00 ...
≥25 (high non–English speaking)	26 321	22.6	1.02 (0.98, 1.07)
Missing data	3 685	24.9	
Medical risk factors			
Birthweight, g			
<2500	11 596	30.3	1.61 (1.53, 1.70)
2500–4000	185 977	21.9	1.00 ...
>4000	19 888	43.8	2.37 (2.28, 2.47)
Mechanical factors			
Noted	28 907	83.8	32.2 (31.1, 33.4)
Not noted	188 554	15.3	1.00 ...
Fetal stress			
Noted	21 910	50.3	4.80 (4.64, 4.97)
Not noted	195 551	21.5	1.00 ...
Miscellaneous complications			
Noted	23 625	42.9	2.29 (2.21, 2.38)
Not noted	193 836	22.1	1.00 ...

(Continued)

Methods

Data Source and Sample

Public use data from certificates of live births to California residents during 1991 were linked by maternal residence zip code with data from the 1990 census. Because indications for cesarean delivery may be different for multiple births and repeat cesareans, we limited the sample to singleton first live births (n = 217 461 after exclusions for missing data); 99.4% of cesarean deliveries in the sample were coded as primary cesareans.

Variables

Delivery mode was categorized as vaginal vs cesarean. Reporting appeared comparable in birth certificate and hospital discharge data.

Maternal sociodemographic characteristics. Using birth certificate information on principal delivery payer, we categorized insurance status as uninsured, Medi-Cal (Medicaid), private fee for service, or private prepaid. Because of small numbers, we excluded 10 399 births without insurance information or in other coverage groups.

Mutually exclusive race or ethnic (including nativity) groups were as follows: (1) Blacks (Black race regardless of Hispanic origin or birthplace, given that there were few Hispanic or foreign-born Black women in the sample); (2) foreign-born Asian American/Pacific Islanders (non-US birthplace and race recorded as any Asian/Pacific Island national origin, regardless of Hispanic origin), subsequently referred to as Asian Americans; (3) Whites, both US and foreign born (all those of White race and not of Hispanic origin; there were too few foreign-born Whites for separate analysis); (4) foreign-born Latinas (Hispanic origin and non-US birthplace; race recorded as White or other, missing, refused, or unknown); and (5) US-born Latinas (US birthplace and race recorded as White or other, missing, refused, or unknown). Because of small numbers, we excluded 3413 births to US-born Asian Americans (who were not combined with foreign-born Asian Americans so as to allow study of Asian immigrants), 1033 Native American births, and 588 non-Hispanic origin births with race recorded as other, missing, refused, or unknown.

We defined three categories of maternal age in years (excluding 56 records with unknown age): 19 and younger, 20 through 34, and 35 and older. Preliminary analyses showed no differences in delivery mode between girls 17 years of age and younger and women 18 or 19 years old. Maternal education in years of completed schooling was grouped as follows: 9 or less, 10 or 11, 12 (high school graduate), and 13 or more (some college). We used marital status as imputed in California vital statistics. Analyses of prenatal care initiation compared women who began care during the first or second trimester of pregnancy with those who had third trimester initiation or no care.

TABLE 1—*Continued*

	No. of Deliveries	Cesarean Deliveries, %	Adjusted[a] Odds Ratio (95% Confidence Interval)
Hospital characteristics			
Delivery volume			
≤2500 deliveries per year	93 620	25.6	0.93 (0.90, 0.95)
>2500 deliveries per year	123 841	23.4	1.00 ...
Teaching status			
Teaching	48 953	20.1	0.73 (0.70, 0.75)
Nonteaching	168 508	25.6	1.00 ...
Ownership			
County	25 071	16.9	0.53 (0.50, 0.56)
Private nonprofit	156 400	25.2	0.71 (0.68, 0.73)
Private proprietary	35 990	25.9	1.00 ...
Region			
Los Angeles County	75 970	26.3	1.52 (1.48, 1.56)
Other county	141 491	23.3	1.00 ...
Total	217 461	24.4	

Note. Births associated with the following factors were excluded: unknown mode of delivery; other or unknown insurance coverage; unknown maternal age or education; US-born Asian, Native American, or other/unknown race or ethnic group; unknown month of initiation of prenatal care; birthweight less than 500 g or unknown; and/or nonhospital delivery or delivery at hospital with federal or other/unknown ownership.

[a]Data were derived from 1991 California birth certificates and 1990 census data (n = 213 761 singleton first live births).

Markers of community poverty and language were percentage in poverty, the percentage of all zip code residents living below the federal poverty level in 1990 (grouped as high poverty [25% or more below poverty] and other), and percentage English speaking, the percentage of zip code residents 5 to 64 years of age who spoke English poorly or not at all (grouped as high non–English speaking [25% or more with poor or no English] and other).

Medical indications. Birthweight was defined as low (less than 2500 g), normal (2500 to 4000 g), or high (greater than 4000 g). We also defined three broad, non-mutually exclusive groupings of indications for cesarean delivery based on complications coded in birth certificates: mechanical factors (cephalopelvic/fetopelvic disproportion, shoulder dystocia, breech or other abnormal presentation, and/or prolonged or other dysfunctional labor), fetal stress (moderate or heavy meconium, cord prolapse, and/or fetal distress), and miscellaneous complications (preeclampsia, eclampsia, or seizures during labor; chronic hypertension; renal, cardiac, or lung disease; diabetes; poly- or oligohydramnios; abruptio placenta, placenta previa, or excessive bleeding; premature rupture of membranes; amnionitis/sepsis or fever; and/or genital herpes).

Hospital characteristics. Hospitals were grouped by 1991 volume as having 2500 or fewer or more than 2500 deliveries. Teaching hospitals had an accredited residency in obstetrics and gynecology.[24] Ownership (based on state data) was defined as county, "private" nonprofit (including University of California and other nonprofit, non-county-owned hospitals), or private proprietary (for profit). Region was defined as hospital location in Los Angeles County vs elsewhere.

Statistical Analysis

Unadjusted analyses examined the proportion of cesarean deliveries overall and how cesarean rates varied by maternal sociodemographic, medical, and hospital characteristics. We examined the likelihood of cesarean delivery associated with maternal sociodemographic characteristics after controlling for the other factors; we used multiple logistic regression models (SAS LOGIST)[25] to determine adjusted odds ratios (ORs) and 95% confidence intervals (CIs).

Limitations

There were several limitations of this study. For example, although education is a widely accepted proxy for socioeconomic status, birth certificates do not include information on individuals' income. Also, census data on income by zip code area are limited by socioeconomic heterogeneity within such areas. Finally, medical complications are likely to be underreported on birth certificates (H. Jamison, unpublished data, 1982).[26,27]

Results

Unadjusted Data

Table 1 describes sample characteristics and corresponding cesarean rates; overall, 52 992 (24.4%) singleton first live births involved cesarean deliveries. Unadjusted cesarean rates by insurance were lowest with Medi-Cal and highest with private fee-for-service coverage; rates by race or ethnic group were lowest among foreign-born Latinas and highest among Whites. Unadjusted rates increased with age and with years of schooling and were higher for married women, women who began prenatal care before the third trimester, and those in zip code areas not classified as high poverty or high non–English speaking. Unadjusted cesarean rates were higher among births with each of the medical complications; at hospitals classified as low volume, nonteaching, or for profit; and at hospitals located in Los Angeles County (where 34.9% of the sample deliveries occurred).

Multivariate Analyses

As shown in Table 1, insurance, age, education, prenatal care initiation, medical indications, and hospital teaching status, ownership, and region remained significant predictors of cesarean delivery after the other factors had been controlled; the relationships of these variables were similar in direction to those revealed in the unadjusted results. For example, cesarean delivery was less likely among women with Medi-Cal (OR = 0.88, 95% CI = 0.85, 0.92), no coverage (OR = 0.74, 95% CI = 0.69, 0.79), or private prepaid coverage (OR = 0.74, 95% CI = 0.71, 0.76) than among those with private fee-for-service insurance; also, such deliveries were less likely at teaching hospitals (OR = 0.73, 95% CI = 0.70, 0.75) than at nonteaching institutions and less likely at county-owned (OR = 0.53, 95% CI = 0.50, 0.56) than at proprietary institutions.

In the case of certain variables, however, adjustment for other factors altered the findings with respect to cesarean delivery. In multivariate results, marital status was not predictive, and women without high school degrees appeared only modestly less likely to undergo

TABLE 2—Racial/Ethnic Differences in Likelihood of Cesarean vs Vaginal Delivery among Groups Defined by Percentage of Non-English-Speaking Persons in Zip Code Area

Maternal Race/Ethnicity	Less than 25% Non–English Speakers in Zip Code (n = 187 440)		25% or More Non–English Speakers in Zip Code (n = 26 321)	
	Odds Ratio	95% Confidence Interval	Odds Ratio	95% Confidence Interval
Black	1.22	1.15, 1.28	1.51	1.20, 1.89
Foreign-born Asian	0.92	0.88, 0.97	1.20	0.98, 1.47
Foreign-born Latina	0.94	0.90, 0.98	1.22	1.03, 1.44
US-born Latina	1.08	1.03, 1.13	1.16	0.96, 1.39
White	1.00	. . .	1.00	. . .

TABLE 3—Racial/Ethnic Differences in Likelihood of Cesarean vs Vaginal Delivery among Groups Defined by Birthweight

Maternal Race/Ethnicity	Birthweight, g					
	<2500 (n = 11 402)		2500–4000 (n = 182 805)		>4000 (n = 19 554)	
	Odds Ratio	95% Confidence Interval	Odds Ratio	95% Confidence Interval	Odds Ratio	95% Confidence Interval
Black	0.89	0.75, 1.05	1.26	1.19, 1.34	1.42	1.21, 1.67
Foreign-born Asian	0.72	0.61, 0.85	0.92	0.88, 0.97	1.36	1.16, 1.59
Foreign-born Latina	0.88	0.75, 1.03	0.93	0.89, 0.97	1.32	1.18, 1.47
US-born Latina	0.93	0.79, 1.10	1.04	1.00, 1.10	1.19	1.07, 1.34
White	1.00	. . .	1.00	. . .	1.00	. . .

TABLE 4—Racial/Ethnic Differences in Likelihood of Cesarean vs Vaginal Delivery among Groups Defined by Hospital Ownership Type

Maternal Race/Ethnicity	Hospital Ownership Type					
	County (n = 24 642)		Private Nonprofit (n = 153 770)		Private Proprietary (n = 35 349)	
	Odds Ratio	95% Confidence Interval	Odds Ratio	95% Confidence Interval	Odds Ratio	95% Confidence Interval
Black	1.16	0.96, 1.40	1.23	1.16, 1.30	1.42	1.20, 1.68
Foreign-born Asian	0.49	0.39, 0.62	0.94	0.90, 1.00	1.06	0.95, 1.19
Foreign-born Latina	0.72	0.63, 0.82	0.98	0.94, 1.03	1.11	1.01, 1.22
US-born Latina	0.98	0.83, 1.16	1.07	1.01, 1.12	1.14	1.03, 1.26
White	1.00	. . .	1.00	. . .	1.00	. . .

cesarean deliveries than women with some college. In contrast with unadjusted data, the adjusted results indicated a slightly higher likelihood of cesarean deliveries among residents of high-poverty zip code areas than among residents of other zip code areas and no difference according to a zip code's proportion of non–English speakers. Multivariate results showed cesarean delivery to be markedly elevated at hospitals in Los Angeles in comparison with hospitals in other counties (OR = 1.52, 95% CI = 1.48, 1.56) and markedly decreased at private nonprofit hospitals in comparison with for-profit institutions (OR = 0.71, 95% CI = 0.68, 0.73); the extent of these differences was greater than that revealed in unadjusted data.

Differences between unadjusted and adjusted results were particularly striking for Blacks, who appeared to be at lower risk than Whites according to the unadjusted data. In multivariate results, Black women were 24% more likely to undergo cesarean deliveries than were Whites. This pattern persisted when we excluded 18 149 births at the eight hospitals with 100 or more births to Blacks and overall unadjusted cesarean rates of 30% or greater (data not shown; available on request). US-born Latinas, who, like Blacks, appeared to be at a reduced risk according to the unadjusted data, also were at an elevated risk relative to Whites when the other factors were taken into account, although to a modest extent (OR = 1.07, 95% CI = 1.03, 1.12).

The associations between race/ethnicity and delivery mode in multivariate analyses were generally consistent across subgroups defined by insurance, age, education, marital status, prenatal care initiation, community poverty, community language, and each of the medical complications and hospital characteristics represented in our model (data not shown; available on request); notable exceptions are displayed in Tables 2 through 4. Differences between Black and White women were especially marked among residents of high non-English-speaking zip code areas (OR = 1.51, 95% CI = 1.20, 1.89), among high-birthweight deliveries (OR = 1.42, 95% CI = 1.21, 1.67), and among deliveries at for-profit hospitals (OR = 1.42, 95% CI = 1.20, 1.68) (Tables 2 through 4). Only among low-birthweight deliveries (Table 3) and at county hospitals (Table 4) were Blacks not significantly more likely than Whites to undergo cesarean delivery. Although foreign-born Asian Americans and foreign-born Latinas were at a slightly reduced risk overall (Table 1), both foreign-born groups as well as US-born Latinas appeared at elevated risk (albeit not always significantly) when they resided in high non-English-speaking communities (Table 2), had high-birthweight deliveries (Table 3), and delivered at for-profit hospitals (Table 4).

Discussion

Expected reimbursement, maternal age, and hospital characteristics shown to be important in other studies without adjustment for the other factors examined

here were confirmed to be significant independent predictors of cesarean delivery. This study also provides new evidence that women's race or ethnic group can be a significant independent predictor of delivery mode and that the effect of racial or ethnic differences appears to vary by community, medical, and hospital characteristics. In particular, Black race was strongly associated with a higher likelihood of cesarean delivery overall and in most subgroups. Lower maternal educational attainment and higher community poverty had statistically significant but relatively weak effects after the other factors had been taken into account.

It seems unlikely that the higher likelihood of cesarean delivery among Black women can be explained by socioeconomic status or biological differences. Together, adjustment for community poverty and language; for individual insurance, education, age, marital status, and prenatal care initiation; and for hospital ownership should have accounted for considerable socioeconomic variation. Late or no prenatal care was included as a marker of prior care and of possible behavioral risks such as substance abuse; this variable may correlate with stage of labor on admission or severity of complications. Women with late or no prenatal care had a lower likelihood of cesarean delivery. This finding may be explained by a diminished or absent likelihood of scheduled cesarean deliveries among the late/no care group; it is consistent with the results of another study showing that attending fewer prenatal care classes was associated with fewer cesarean sections.[28] Medical factors are unlikely to have confounded the results, given the control for age, late or no care, and complications including cephalopelvic disproportion, low or high birthweight, fetal stress, and hypertensive disorders.

Including insurance and hospital ownership, teaching status, volume, and region in the models, along with a number of patient and community characteristics that could reflect provider differences, should have accounted not only for many important provider characteristics associated with practice variations but also for potential reporting biases. The general consistency of the findings on Blacks in analyses of several separate subgroups defined by complications other than low birthweight provides further evidence that the results are unlikely to reflect either confounding by medical risks or biased reporting of complications. It seems unlikely that the elevated risk for Blacks was concentrated in just a few sites, given the persistence of the findings when we excluded the hospitals with generally high cesarean rates and more than 100 births to Black women.

As indicated in Tables 2 through 4, the patterns or degree of the associations of race or ethnic group with delivery mode appeared to vary across particular subgroups. The disparities in risks for foreign-born women in comparison with Whites varied markedly by sociodemographic, medical, and hospital factors, making the findings on these groups particularly difficult to interpret. The greatest elevations in risk of cesarean delivery associated with being Black (increases of 40% to 50% relative to Whites), as well as apparent elevations in risk among all non-White women, were observed for births to residents of high non-English-speaking zip code areas, high-birthweight deliveries, and deliveries at for-profit hospitals.

Examining subgroups defined by community language, we found that foreign-born Asian Americans and Latinas appeared to be at an elevated risk relative to Whites when they lived in high non-English-speaking zip code areas but at a slightly lower risk when they lived in zip code areas with a lower proportion of non–English speakers (Table 2). If community language is interpreted as a marker of a woman's language or acculturation, the findings could suggest that poor provider–patient communication due to language or cultural barriers may lead to avoidable cesarean sections among foreign-born women. However, given the markedly increased risk among Black women (among whom very few in California are foreign born), and the apparently increased risk among US-born Latinas (also English speaking), residing in high non-English-speaking zip code areas, providers serving communities where immigrants (and potentially women of color in general) are concentrated may tend to perform more cesarean sections overall.

Racial/ethnic differences in likelihood of cesarean delivery also varied by birthweight. Among women delivering low-birthweight babies, non-White women appeared less likely than Whites to undergo cesarean delivery. However, for normal-birthweight deliveries, Blacks and US-born Latinas appeared more likely than Whites to have cesarean deliveries; for deliveries of babies weighing more than 4000 g, all non-White women were significantly more likely than Whites to have cesarean deliveries. Different patterns of racial/ethnic disparities by birthweight may reflect variations in patient or provider responses under different clinical circumstances. While birthweight differences may reflect maternal weight differences that could alter the likelihood of cesarean delivery, racial/ethnic disparities within separate birthweight groups cannot easily be explained by maternal weight differences, especially given control for mechanical factors, fetal stress, and miscellaneous complications.

Private proprietary hospitals constituted the only hospital ownership group in which the relative likelihood of cesarean delivery for all of the non-White subgroups appeared elevated in comparison with that of Whites. In contrast, at county hospitals neither Blacks nor US-born Latinas were at a risk level significantly different from that of Whites (although risks for Blacks appeared elevated), and both foreign-born groups were at markedly lower risk. At private nonprofit sites, risks were not significantly different for either foreign-born group and were only marginally different for US-born Latinas relative to Whites. These differences according to hospital ownership were seen after other hospital characteristics, as well as insurance and other socioeconomic characteristics of patients and communities, had been controlled. This suggests the potential importance of factors characterizing settings or the providers practicing in different settings; these factors could be associated with differences in how providers view women in particular racial/ethnic subgroups. Variations in provider practices according to women's race or ethnic group may consist of unconscious differences in how options are presented to different women under discretionary circumstances, based on different assumptions about liability or about patients' underlying risk, expectations, or likelihood of cooperation. At county hospitals in California, for example, staff are often given special training in serving multicultural, multilingual populations. The possibility of different reactions, expectations, or preferences (or different abilities to express reactions, expectations, or preferences) among women in different settings should also be considered. A potential role for social support (which may vary across racial/ethnic subgroups) is suggested by a recent study showing that the presence of a supportive companion throughout labor and delivery reduced cesarean section rates.[29]

We were unable to describe such factors in individual women or to describe

individual provider characteristics, and statistical power precluded studying individual hospitals separately. Although it is possible that maternal racial/ethnic differences in delivery mode reflect practice variations among providers serving different groups of women, much of that variation should have been accounted for by the multiple maternal, community, and hospital characteristics we studied. Furthermore, if women in certain racial/ethnic groups were substantially more likely to be cared for by providers with cesarean rates higher than explained by medical factors, this could indicate de facto racial/ethnic discrimination in the form of differential access to optimal care.

Accumulating evidence reveals racial/ethnic differences in medical care, with complex explanations.[30-38] Recent studies have found that Black women are less likely to receive advice from their prenatal care providers regarding behavioral risk reduction during pregnancy,[30] and more likely to undergo hysterectomy,[31] than White women. Another study showed differences by patients' ethnicity in physicians' prescribing of analgesia in treating long-bone fractures.[37]

The pattern of findings revealed here cannot establish causal factors but suggests that differences in providers' perceptions of or attitudes toward women; in patient–provider communication; in women's attitudes, expectations, and knowledge; or in the practices of providers relied on by women in different groups may influence mode of delivery. Such factors could account for many unnecessary cesarean sections and would not be influenced by reform measures focused on reimbursement alone. Although data limitations make this study primarily hypothesis generating, the findings warrant further research that more directly examines how nonclinical characteristics of patients—particularly race/ethnicity—may inappropriately influence clinical decision making. □

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