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Trends in provider-initiated versus spontaneous preterm deliveries, 2004–2013

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Abstract

Objectives—1) To estimate the proportion of preterm deliveries at a tertiary perinatal center that were provider-initiated vs. spontaneous before and after a 2009 policy to reduce elective early-term deliveries. 2) To evaluate if shifts in type of preterm delivery varied by race/ethnicity.

Methods—We performed a retrospective cohort study of preterm deliveries over a 10-year period, 2004–2013, including detailed review of 929 of 5,566 preterm deliveries to designate each delivery as provider-initiated or spontaneous. We dichotomized the time period into *early* (2004–2009) and *late* (2010–2013). We used log-binomial regression to calculate adjusted risk ratios.

Results—Of the 46,981 deliveries, 5,566 (11.8%) were preterm, with a significant reduction in the overall incidence of preterm delivery from 12.3% to 11.2% ($P=0.0003$). Among the 929 preterm deliveries analyzed, there was a reduction in the proportion of provider-initiated deliveries from 48.3% to 41.8% that was not statistically significant. The proportion of provider-initiated preterm deliveries among black, but not white, women declined from 50.8% to 39.7% (adjusted RR: 0.66; 95% CI: 0.45–0.97). This coincided with a larger reduction in overall preterm deliveries among black women (16.2% to 12.8%) vs. white women (12.3% to 11.2%) ($P_{\text{interaction}}=0.038$). By 2013, the incidence of preterm deliveries had decreased for both black (12.1%) and white women (11.4%) and the difference was no longer statistically significant ($P=0.7$).

Conclusion—We found a reduction in preterm deliveries after a policy targeted at reducing elective early-term deliveries in 2009 that coincided with reductions in the proportion of provider-initiated preterm deliveries, especially among black women.

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Keywords

elective early-term delivery; indicated preterm; preterm birth; provider-initiated preterm; public health; racial disparities; spontaneous preterm

Introduction

Approximately 10% of infants in the United States are born preterm (<37 weeks of gestation), leading to over 15,000 infant deaths annually.^{1,2} Those who survive are at risk for life-long morbidities, including lung disease and neurodevelopmental disabilities.³ National data demonstrate that preterm birth rates have decreased from 10.4 % in 2007 to 9.6% in 2014.¹ Hamilton and colleagues postulate in the report that “reductions in late-preterm and early-term deliveries from 2007 to 2014 may be related to heightened understanding of the increased neonatal risk at these gestational ages compared with at full term, and with subsequent recommendations and efforts to reduce non-medically indicated deliveries before 39 weeks.”¹ While preterm birth rates have been declining among all births, racial disparities in preterm birth persist and remain poorly understood. Over 13% of non-Hispanic black infants are born preterm compared to just 9% of non-Hispanic white infants.¹

In the last decade, policy makers and obstetric providers have made concerted efforts to lengthen gestations even among infants traditionally considered term (37 weeks or more). These efforts arose from evidence that early-term infants (37 – <39 weeks) have increased risks of mortality and morbidities, such as respiratory distress syndrome, transient tachypnea of the newborn, ventilator use, and pneumonia, compared with infants born full term (39 – <41 weeks of gestation).⁵ The March of Dimes Foundation launched a national campaign in 2007 called “Healthy Babies are Worth the Wait” to educate the public on the importance of preventing non-medically indicated inductions and cesarean delivery.^{6,7} The American Congress of Obstetricians and Gynecologists (ACOG) also discourages deliveries prior to 39 weeks without a clear medical reason that delivery will benefit the fetus, woman, or both.^{5,8} In 2009, our institution’s Department of Obstetrics and Gynecology implemented a policy to eliminate elective early-term deliveries. Elective early-term deliveries were defined as scheduled cesarean deliveries or inductions prior to 39 weeks of gestation without an approved medical indication.⁹ Our institution’s policy requires providers to state an indication for scheduled deliveries. If the indication is not on the list of approved indications, the provider must obtain approval from the medical director of Labor and Delivery.

Our hypothesis was that policies to reduce elective early-*term* deliveries also would lead to a reduction in *preterm* deliveries due to increased awareness of the importance of longer gestations for all infants. We also hypothesized that fewer provider-initiated (iatrogenic) preterm deliveries contributed to the reduction in preterm deliveries. Given that public health interventions often disproportionately benefit non-minority groups,^{10,11} we were concerned that even if we observed a reduction in preterm birth at our institution, racial disparities would be unchanged, or even widen. We conceptualized race not as a biologic variable but as a social construct that can lead to differential experiences of health and healthcare.

Materials and Methods

We performed a retrospective cohort study at a tertiary urban perinatal center with approximately 5,000 births per year. The Institutional Review Board approved the study and granted a waiver of informed consent given that it was only involved medical record review. We identified all preterm deliveries from 2004 through 2013 to encompass years before and after the 2009 local policy to eliminate early elective deliveries in our institution. We then reviewed charts in reverse-chronological order with respect to year. After reviewing the first 87 deliveries in 2013, we recognized that the detailed, manual chart review necessary to categorize preterm deliveries as either provider-initiated or spontaneous would require more resources than we had. We then changed our protocol to randomly sample a subset and manually reviewed 1 in 8 preterm deliveries from 2004–2013. We additionally reviewed every 10th delivery among black women (69 additional records) to oversample black women due to a limited number of black women in the original sample (121/860; 14%). Our final dataset included the 87 records from 2013, the randomly sampled subset, and the additional 69 records from black women. We structured our data such that the unit of analysis was the woman, thus counting deliveries and not births. In other words, twin births were counted as one delivery.

We manually abstracted maternal and infant demographic and medical data from hospital records. We collected information on potential confounding variables, including gestational age, maternal age, race/ethnicity, insurance status, parity, and number of fetuses. Gestational age was ascertained based on the best obstetric estimate documented by the obstetric providers in the chart. Race and ethnicity were self-reported by the patients upon registration at the hospital. We then derived mutually exclusive categories: Non-Hispanic black, non-Hispanic white, Hispanic, Asian and other. Other included multiple races/ethnicities or unknown race/ethnicity. We designated each preterm delivery as either provider-initiated or spontaneous. We defined a delivery as provider-initiated if it were due to preeclampsia, poor fetal growth, hypertension, or other concern for fetal/maternal well-being. In such cases, the pregnancy would have continued without provider intervention. We defined a delivery as spontaneous if the woman presented with preterm labor, preterm premature rupture of membranes or preterm cervical dilation. These criteria were consistently applied to vaginal, cesarean, and augmented deliveries. Of note, there were no elective, provider-initiated deliveries that lacked a medical indication in the medical record. Other reasons for delivery (i.e. maternal infection, gestational diabetes, breech presentation) were noted, but the primary designation for each delivery was either provider-initiated or spontaneous preterm delivery.

Two reviewers independently reviewed a random sample of records for concordance of provider-initiated and spontaneous preterm birth typing. After realizing 100% concordance, the first reviewer (MA) consulted the neonatologist (HB) when the medical record included more than one reason for preterm delivery (44 records). The neonatologist independently reviewed the chart; if the reviewers disagreed, the neonatologist's determination was selected as the final reason. If any uncertainty existed, the maternal-fetal medicine specialist (SS) was consulted for a final determination (2 records).

We dichotomized the time period into *early* (2004–2009) and *late* (2010–2013) to coincide with our institution's adoption of a policy in 2009 to eliminate elective early-term deliveries in line with ACOG's recommendations. We performed two primary analyses. First, to understand variables associated with type of preterm delivery, we compared the risk of provider-initiated and spontaneous preterm delivery according to maternal characteristics and time period. Second, we used repeated measures log-binomial regression¹² to calculate adjusted risk ratios for provider-initiated preterm delivery in the late period compared with the early period and to account for multiple deliveries by the same woman. We used multivariable models to adjust for potential confounding variables, such as gestational age at delivery, maternal age, race/ethnicity, insurance status, parity, and singleton vs. multiple births. We also performed stratified analyses to compare proportions of provider-initiated preterm delivery between singleton and multiple gestations, as well as black and white women. We tested for interaction using multiplicative terms in the models restricted to black and white women. To address oversampling of deliveries among black women and deliveries from 2013, we applied inverse-probability weights in our unadjusted and adjusted models. We also performed a secondary analysis to understand differences in the risk of various reasons for preterm deliveries between the early and late periods using repeated measures, log-binomial regression models. We performed all analyses using SAS 9.3 (SAS Institute, Cary, NC).

Results

During the 10-year study period, there were 46,981 deliveries at our institution, 28,575 (60.8%) in the early period and 18,376 (39.1%) in the late period. There were 5,566 (11.8%) preterm deliveries, of which we reviewed 971 (17.4%). We excluded 31 that had an incorrect gestational age and were not preterm or had no gestational age listed. We excluded another 11 because we were unable to determine whether the preterm delivery was provider-initiated or spontaneous. Our final dataset included 929 confirmed preterm deliveries that were either provider-initiated or spontaneous. Of the 929 sampled preterm deliveries, 534 (57.5%) occurred in the early period and 395 (42%) occurred in the late period, reflecting the proportions of total deliveries in the early (60.8%) and late (39.2%) periods.

From the early to the late period the proportion of preterm infants born at 30 – <32 weeks decreased from 10.9% to 6.3% ($P=0.01$), and the proportion of late preterm (34 – <37 weeks) infants increased from 53.9% to 62.3% ($P=0.02$) (Table 1). As intended by the policy, the proportion of early term deliveries decreased from 28.3% to 23.1% ($P<0.0001$). There was an increase in the proportion of Asian women from 6.4% to 10.9% ($P=0.03$). There was a decrease in the proportion of nulliparous women from 58.9% to 53.2% ($P=0.03$), and a decrease in multiples from 46.1% to 37.7% ($P=0.03$). There was no change in the distributions of maternal age, other races/ethnicities, or insurance status.

Of the 929 preterm deliveries we sampled, 423 (45.5%) were provider-initiated (Table 2). All of these provider-initiated deliveries had medical indications for delivery. Bivariate comparisons revealed that provider-initiated preterm deliveries were less common than spontaneous preterm deliveries among infants born <30 weeks of gestation compared with infants 34 – <37 weeks of gestation (Table 2). Women ≥ 35 years old were more likely to

have provider-initiated preterm deliveries than women 25 – <35. Asian women were less likely than white women to have provider-initiated preterm deliveries. Insurance status, parity, and multiple gestations were not associated with the proportion of preterm births that were provider-initiated.

We observed a non-significant reduction in the proportion of provider-initiated preterm deliveries from the early (48.3%) to the late (41.8%) period (RR of provider-initiated in late vs. early period: 0.88; 95% CI: 0.75–1.02). Adjustment for gestational age at delivery, maternal race/ethnicity, and singleton vs. multiple gestations did not materially change the effect estimate (adjusted RR: 0.86; 95% CI: 0.74–1.01) (Table 3). Further adjustment for maternal age, parity or insurance status did not change these estimates and were not included in the final model for parsimony.

Among singletons, there was a significant reduction in the proportion of provider-initiated preterm births between the early (52.1%) and late (39.8%) periods (adjusted RR of provider-initiated in late vs. early period: 0.80; 95% CI: 0.65–0.97) (Table 3). In contrast, there was no change in provider-initiated preterm delivery among multiples from the early (43.9%) to the late (45.0%) period. The difference in reduction in the proportion of provider-initiated preterm delivery between singletons and multiples was significant (P for interaction=0.047).

For the 190 preterm deliveries among black women in our cohort, we observed a significant reduction in the proportion of preterm deliveries that were provider-initiated from the early (50.8%) to the late (39.7%) period (adjusted RR of provider-initiated in late vs. early period: 0.66; 95% CI: 0.45–0.97) (Table 3). Among preterm deliveries for white women, we observed a smaller, non-significant reduction in provider-initiated preterm deliveries from the early (50.0%) to the late (46.9%) period (adjusted RR 0.89; 95% CI: 0.75–1.07). While it appeared black women had more of a reduction in the proportion of provider-initiated preterm birth in the late vs. early periods, a test for interaction did not meet statistical significance ($P=0.08$).

When we compared the reasons for preterm delivery in the early and late periods, there were no significant differences in the proportion of preterm deliveries attributable to preterm cervical dilation, preterm labor, poor fetal growth, preeclampsia, or hypertension (Supplementary Table 1). There was, however, a significant rise in the proportion of preterm deliveries preceded by preterm premature rupture of membranes from the early to the late period from 26.0% to 32.7% (RR in late vs. early period: 1.24; 95% CI: 1.002–1.53). Additionally, there was a significant and substantial decrease in cesarean delivery from 76.7% to 59.2% (RR in late vs. early period: 0.81; 95% CI: 0.74–0.89).

There was a significant reduction in the overall incidence of preterm delivery at our institution from 12.3% in the early period to 11.2% in the late period ($P=0.0003$). Among black women, the incidence of preterm deliveries declined over time from 16.2% to 12.8% ($P=0.001$). Among white women the incidence of preterm deliveries was similar in the early (12.4%) and late (11.7%) periods ($P=0.13$). The decline in preterm deliveries was significantly larger among black vs. white women (P for interaction=0.038) (Figure 1). By

2013, the gap between black and white women had narrowed with an incidence of 12.1% for black women and 11.4% for white women ($P=0.7$).

Discussion

At our institution, we observed a reduction in preterm delivery from 2004 to 2013, coinciding with a lower proportion of provider-initiated preterm deliveries. The reduction in preterm deliveries was most evident among singletons and black women. These findings coincided with a narrowing of the black-white disparity in preterm delivery at our institution.

From 1981 to 2006, the preterm birth rate steadily increased in the US from 9.4% to 12.8%.¹³ This increase was largely due to an increase in pregnancies among women of advanced maternal age and to twins and higher-order multiples resulting from artificial reproductive technology¹⁴ and provider-initiated preterm birth (inductions and cesarean deliveries) for conditions that are detectable with more sensitive technology, such as high resolution ultrasonography, as well as the rise in obesity putting women at higher risk of preeclampsia, intrauterine growth restriction and uteroplacental insufficiency.^{15–18} While provider-initiated preterm births occur when there is a condition that will be improved by delivery of the fetus (e.g., severe growth restriction, eclampsia, placenta accreta)¹⁹ it is possible that some preterm deliveries might be safely avoided by instituting a standardized decision-making process for planned deliveries.²⁰

No studies have addressed the question as to whether the incidence of preterm delivery has declined due to restrictions and reductions in non-medically indicated early-term (37–39 weeks), or “elective early-term” deliveries. Further, few studies have addressed the question as to whether preterm delivery rates have been dropping specifically due to reductions in provider-initiated preterm birth. Trilla et al studied 145 women with singleton late preterm births from 2009–2010 in Barcelona, Spain, and reported that older women have a higher risk of provider-initiated late preterm birth,²¹ which is consistent with our data, but would not explain lower rates of overall preterm birth in the setting of increasing maternal age at delivery.¹³ In Nova Scotia, Joseph and colleagues studied the effect of socioeconomic position and clinical risk factors on spontaneous and provider-initiated preterm births among 132,714 singleton deliveries from 1988–2003.²² Like Trilla, maternal age was a significant predictor for provider-initiated preterm birth. In contrast to our study, Joseph and colleagues found a significant increase in iatrogenic preterm birth over time. Also in contrast to our study, Hui et al performed a descriptive analysis of 6,722 preterm births in Hong Kong from 1995–2011 and categorized preterm births as ‘spontaneous’, ‘iatrogenic’, and ‘following PPROM’,²³ which differs from our binary classification of spontaneous and provider-initiated preterm delivery. They reported a decrease in spontaneous preterm birth, no change in iatrogenic preterm birth, and an increase in preterm birth following PPROM, which was included in both the provider-initiated and the spontaneous groups. If they had analyzed PPROM with spontaneous preterm births, there would have been little change in their rates of either spontaneous or provider-initiated preterm births; spontaneous preterm without PPROM declined from 4.5% to 3.8% of all births and preterm birth after PPROM increased from 0.7% to 1.7%.²³ Taken together the rate of spontaneous preterm birth including

PPROM would have gone from 5.2% to 5.5%. Nonetheless, the increase in the incidence of PPRM in their study and the proportion of PPRM in our study may deserve further investigation.

Our data suggest that reduction in provider-initiated preterm deliveries may have contributed to narrowing racial differences in the incidence of preterm birth at our institution. From 2004–2013, among black women we observed a 20.8% decrease in preterm deliveries, compared to a 4.9% decrease among white women. In Massachusetts during the same 10 years, black women experienced a 10.6% decrease, while white women experienced a 5.8% decrease.²⁴ Statewide, the reduction was approximately 50% of the decline we observed at our institution. The 2006 Massachusetts Health Care Reform Law's individual mandate may have played a significant role in black women's utilization and access of prenatal care, leading to lower preterm birth rates. On the state level, the preterm birth rate for black women largely decreased from 12.9% in 2006 to 11.1% in 2007.²⁴ As a tertiary perinatal center, our institution may have adopted an effective policy that decreased preterm deliveries by increasing health care providers' awareness of the importance of longer gestations. Our study suggests that implementing a policy to reduce elective early-term deliveries at other institutions might further reduce racial gaps in preterm birth statewide.

A strength of our study, compared to studies using population datasets, is manual abstraction of data from individual medical records. Data that we collected, such as the clinical events preceding preterm birth, are usually unreliable from birth certificates, unavailable at the state level and are difficult to obtain using automated techniques.²⁵ Another strength of our study is our use of two separate reviewers to analyze a subset of records to ensure valid phenotyping of preterm deliveries. We also oversampled preterm deliveries from black women in order to evaluate differences by race, but still may have been underpowered to detect interactions by race. While our observed difference in the reduction of provider-initiated preterm delivery between black and white women was notable, it did not reach statistical significance.

A limitation of this study is that it was retrospective. Unmeasured factors may be responsible for the changes in preterm birth rate, resulting in residual confounding. We also combined race and ethnicity into a single, mutually exclusive variable that combines two distinct constructs due to small numbers of black and Hispanic women. We did not have access to maternal body-mass index (BMI) and thus were unable to adjust for it in our analysis. However, we speculate that increases in maternal BMI over time that have occurred at the population level²⁶ would have led to a higher proportion of provider-initiated preterm delivery in the late period, and thus adjustment for BMI would have only strengthened our findings. We found that Asian women were less likely to have a provider-initiated preterm delivery compared with white women. This finding may be due to chance, but may warrant future work to determine factors that could lead to lower prevalence of conditions prompting provider-initiated preterm delivery, especially given the lower risk of preterm birth overall among Asian women compared with other minority groups.¹ Additionally, stratified analyses should be interpreted with caution as the distribution of covariates often differs among strata.

Our single center study may not generalize to the broader population; however, the reduction in preterm birth at our institution over the last 10 years is consistent with state and national data. In Massachusetts, the preterm birth rate decreased from 9.2% in 2004 to 8.8% in 2013,²⁴ while in the United States, there was a decrease from 12.5% in 2004 to 11.4% in 2013.¹³ We were unable to differentiate between potential secular trends in morbidities that could have led to reductions in provider-initiated preterm deliveries (either by induction or cesarean delivery). Additionally, we did not measure changes in providers' thresholds to deliver. We speculate that changes in provider behaviors likely explain our findings given recent increases in maternal morbidities associated with iatrogenic early deliveries including gestational diabetes and obesity.^{26,27} Furthermore, the significant reduction in cesarean deliveries, despite increases in obesity at the population level, suggests that active provider decision-making is at least partially responsible for the reduction in provider-initiated preterm delivery. Further work to understand if there was a simultaneous reduction in neonatal admissions or length of stay or any increase of intrauterine fetal demise is warranted.

In conclusion, we found a reduction in the incidence of preterm deliveries over a 10-year period that coincided with national and local efforts to reduce non-medically indicated elective early-term (37 – <39 week) deliveries. We also discovered that this reduction was associated with a decrease in proportion of preterm deliveries that were provider-initiated. The decrease in provider-initiated preterm delivery was most evident among singletons and black women. We observed a concurrent decrease in the overall incidence of preterm delivery among black women resulting in a near elimination of the racial disparity in preterm birth which was much more substantial than what has been observed at the state and national levels. Our study suggests that our local guideline to prevent elective early-term deliveries may result in reductions in provider-initiated preterm deliveries while narrowing racial disparities in preterm birth, a historically intractable public health problem.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Figure 1. Reduction in preterm deliveries for black and white women, 2004–2013

In the early period, the incidence of preterm delivery was 16.2% among black and 12.4% among white women ($P<0.0001$). In the late period, the incidence of preterm deliveries was 12.8% among black and 11.7% among white women ($P=0.17$).

Table 1

Characteristics of 929 sampled preterm deliveries in two time periods.

	2004–2009	2010–2013	
Characteristics	n (column %)	n (column %)	P [*]
Gestational age (weeks)			
<30	83 (15.5)	55 (13.9)	0.90
30 – <32	58 (10.9)	25 (6.3)	0.01
32 – <34	105 (19.7)	69 (17.5)	0.43
34 – <37	288 (53.9)	246 (62.3)	0.02
Maternal age (years)			
<25	58 (10.9)	31 (7.9)	0.17
25 – <35	284 (53.2)	217 (54.9)	0.49
35	192 (36.0)	147 (37.2)	0.98
Race/ethnicity			
Asian	34 (6.4)	43 (10.9)	0.03
Black	122 (22.9)	68 (17.2)	0.40
Hispanic	26 (4.9)	28 (7.1)	0.24
White	316 (59.2)	228 (57.7)	0.14
Other/unknown	36 (6.7)	28 (7.1)	0.73
Insurance status			
Private	179 (33.5)	144 (36.5)	0.51
HMO	215 (40.3)	136 (34.4)	0.06
Medicaid	130 (24.3)	109 (27.6)	0.08
Self-pay/other	10 (1.9)	6 (1.5)	0.66
Parity [†]			0.03
1	219 (41.1)	185 (46.8)	
0	314 (58.9)	210 (53.2)	
Number of gestations			0.03
Singleton	288 (53.9)	246 (62.3)	
Multiple	149 (46.1)	149 (37.7)	

* *P* value from unadjusted log-binomial regression comparing two time periods. Each variable is compared to the rest of the variables in the category as a group between the two time periods.

[†] 1 woman missing parity

Table 2

Characteristics of provider-initiated and spontaneous preterm deliveries, 2004–2013.

Characteristics	Provider-initiated n=423 (45.5%)	Spontaneous n=506 (54.5%)	Provider-initiated vs. spontaneous	
	n (row %)	n (row %)	Unadjusted RR (95% CI)	P[*]
Gestational age at delivery (weeks)				
<30	44 (31.9)	94 (68.1)	0.62 (0.47–0.82)	0.0007
30 – <32	36 (43.4)	47 (56.6)	0.83 (0.63–1.11)	0.21
32 – <34	82 (47.1)	92 (52.9)	0.98 (0.81–1.17)	0.79
34 – <37	261 (48.9)	273 (51.1)	reference	
Maternal age at delivery (years)				
<25	34 (38.2)	55 (61.8)	0.86 (0.63–1.19)	0.37
25 – <35	207 (41.3)	294 (58.7)	reference	
35	182 (53.7)	157 (46.3)	1.25 (1.08–1.46)	0.003
Race/ethnicity				
Asian	23 (29.9)	54 (70.1)	0.66 (0.47–0.93)	0.019
Black	89 (46.8)	101 (53.2)	0.92 (0.77–1.11)	0.40
Hispanic	20 (37.0)	34 (63.0)	0.74 (0.51–1.08)	0.12
White	265 (48.7)	279 (51.3)	reference	
Other/unknown	26 (40.6)	38 (59.4)	0.85 (0.63–1.17)	0.32
Insurance status				
Private	146 (45.2)	177 (54.8)	reference	
HMO	164 (46.7)	187 (53.3)	1.04 (0.88–1.23)	0.65
Medicaid	107 (44.8)	132 (55.2)	0.94 (0.76–1.15)	0.52
Self-pay/other	6 (37.5)	10 (62.5)	0.85 (0.42–1.68)	0.63
Parity[†]				
1	182 (45.0)	222 (55.0)	0.99 (0.85–1.15)	0.91
0	241 (46.0)	283 (54.0)	reference	
Number of gestations				
Singleton	248 (46.4)	286 (53.6)	1.06 (0.91–1.23)	0.45
Multiple	175 (44.3)	220 (55.7)	reference	

* P value from unadjusted log-binomial regression.

[†] 1 woman missing parity.

Table 3

Proportion of provider-initiated preterm deliveries in 2010–2013 vs. 2004–2009.

	<u>Early Period (2004– 2009) n=534</u>	<u>Late Period (2010– 2013) n=395</u>	<u>Late vs. Early</u>
	<u>Provider-initiated preterm %</u>		<u>Adjusted* RR (95% CI)</u>
All sampled preterm deliveries (n=929)	48.3	41.8	0.86 (0.74–1.01)
<u>Stratified analyses</u>			<u>P for interaction</u>
Gestations[†]			0.047
Singletons (n=534)	52.1	39.8	0.80 (0.65–0.97)
Multiples (n=395)	43.9	45.0	0.97 (0.77–1.21)
Race[‡]			0.08
White (n=544)	50.0	46.9	0.89 (0.75–1.07)
Black (n=190)	50.8	39.7	0.66 (0.45–0.97)

* Adjusted for gestational age, race/ethnicity, singleton vs. multiple

[†] Adjusted for gestational age, race/ethnicity[‡] Adjusted for gestational age, singleton vs. multiple