Supplemental Online Content

Rosenstein MG, Chang S-C, Sakowski C, et al. Hospital quality improvement interventions, statewide policy initiatives, and rates of cesarean delivery for nulliparous, term, singleton, vertex births in California. *JAMA*. doi:10.1001/jama.2021.3816

eFigure 1. Schematic of stepped-wedge analysis and nulliparous, term, singleton, vertex (NTSV) cesarean delivery rates
eFigure 2. Nulliparous, term, singleton, vertex (NTSV) cesarean delivery rates (with 95% CI) at hospitals in California, Jan 2015 – June 2019, grouped by participation and eligibility status to join the Supporting Vaginal Birth collaborative
eTable 1. Distribution of maternal characteristics comparing women who delivered in 2015 at hospitals that participated in the collaborative, those who delivered at hospitals that declined participation, and those who delivered at hospitals that were ineligible for participation
eTable 2. Analysis of collaborative activities and statewide actions and nulliparous, term, singleton, vertex (NTSV) cesarean rates in California, Jan 2015 – June 2019

This supplemental material has been provided by the authors to give readers additional information about their work.

eFigure 1. Schematic of stepped-wedge analysis and nulliparous, term, singleton, vertex (NTSV) cesarean delivery rates

Legend: In order to account for the fact that different cohorts of the Supporting Vaginal Birth Collaborative began at different times, a modified stepped-wedge design was used to classify births as belonging to the baseline (including baseline time periods for participating hospitals and all time periods for hospitals that did not participate), intervention (time when hospitals were participating in the collaborative), or sustainment phases (the time following the collaborative participation). Deliveries were analyzed in 6-month time blocks.
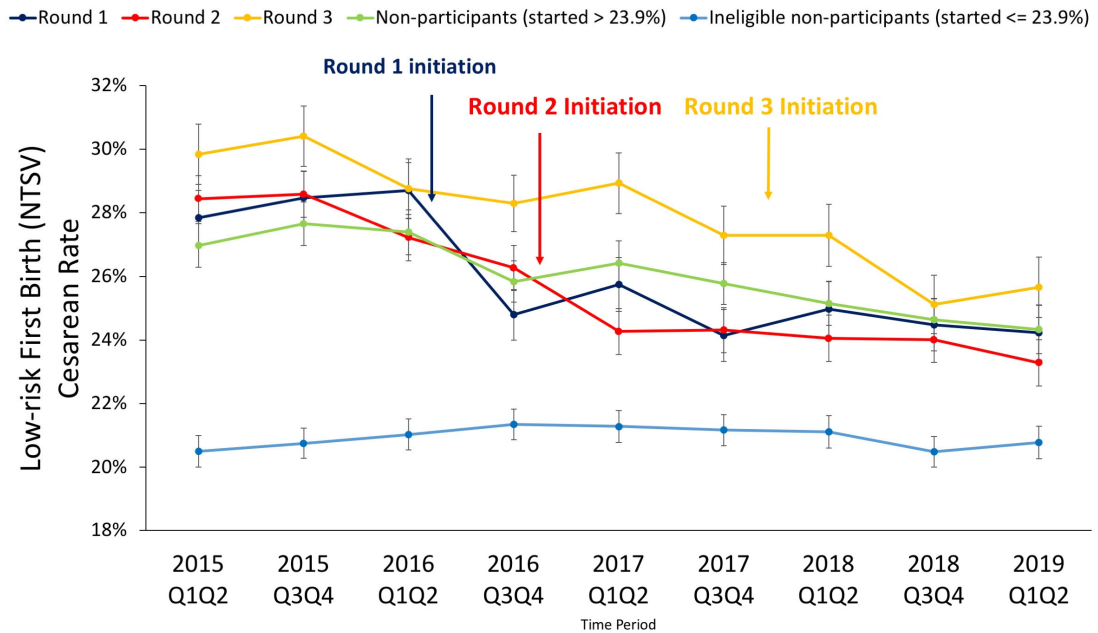
Supporting Vaginal Birth Collaborative Participation Status	Time Period								
	2015 Jan to Jun	2015 Jul to Dec	2016 Jan to Jun	2016 Jul to Dec	2017 Jan to Jun	2017 Jul to Dec	2018 Jan to Jun	2018 Jun to Dec	2019 Jan to Jun
Round 1 (N=24 hospitals)	Baseline 27.8%	Baseline 28.5%	Baseline 28.7%	Intervention 24.8%	Intervention 25.7%	Intervention 24.1%	Sustainment 25.0%	Sustainment 24.5%	Sustainment 24.2%
Round 2 (N=42 hospitals)	Baseline 28.4%	Baseline 28.6%	Baseline 27.2%	Baseline 26.3%	Intervention 24.3%	Intervention 24.3%	Intervention 24.1%	Sustainment 24.0%	Sustainment 23.3%
Round 3 (N=25 hospitals)	Baseline 29.8%	Baseline 30.4%	Baseline 28.8%	Baseline 28.3%	Baseline 28.9%	Baseline 27.3%	Intervention 27.3%	Intervention 25.1%	Intervention 25.7%
Collaborative non-participants (baseline>23.9%, N=58 hospitals)	Baseline 27.0%	Baseline 27.7%	Baseline 27.4%	Baseline 25.8%	Baseline 26.4%	Baseline 25.8%	Baseline 25.2%	Baseline 24.6%	Baseline 24.3%*
Collaborative ineligible (baseline≤23.9%, N=89 hospitals)	Baseline 20.5%	Baseline 20.8%	Baseline 21.0%	Baseline 21.3%	Baseline 21.3%	Baseline 21.2%	Baseline 21.1%	Baseline 20.5%	Baseline 20.8%†

*2019 preliminary data available for 43/58 non-participating hospitals.
†2019 preliminary data available for 78/89 Collaborative ineligible hospitals.

eFigure 2. Nulliparous, term, singleton, vertex (NTSV) cesarean delivery rates (with 95% CI) at hospitals in California, Jan 2015 – June 2019, grouped by participation and eligibility status to join the Supporting Vaginal Birth collaborative

Start dates for each collaborative cohort are noted.

eTable 1. Distribution of maternal characteristics comparing women who delivered in 2015 at hospitals that participated in the collaborative, those who delivered at hospitals that declined participation, and those who delivered at hospitals that were ineligible for participation

	Collaborative participants	Collaborative Non-participants (baseline>23.9%)	Collaborative ineligible (baseline≤23.9%)
	N=69,751	N=32,550	N=53,604
Maternal Characteristics	N (%)	N (%)	N (%)
Age at Delivery			
< 18	2,043 (2.9)	1,317 (4.0)	1,894 (3.5)
18-25	23,770 (34.1)	13,452 (41.3)	21,774 (40.6)
26-35	36,470 (52.3)	15,335 (47.1)	25,526 (47.6)
>=36	7,468 (10.7)	2,446 (7.5)	4,410 (8.2)
Race Ethnicity			
White	23,675 (34.9)	7,730 (24.3)	17,717 (33.9)
Black	3,342 (4.9)	1,131 (3.6)	3,593 (6.9)
Asian	12,958 (19.1)	6,675 (21.0)	7,983 (15.3)
Latina	27,379 (40.3)	16,083 (50.5)	22,391 (42.9)
Others	504 (0.7)	217 (0.7)	554 (1.1)
Missing	1,893	714	1,366
Pre-Pregnancy BMI			
< 18.5	2,113 (3.1)	984 (3.2)	1,330 (2.6)
18.5-25	35,484 (52.5)	15,073 (48.5)	23,351 (44.8)
25-30	17,547 (25.9)	8,425 (27.1)	15,014 (28.8)
30-35	7,597 (11.2)	3,826 (12.3)	7,157 (13.7)
35-40	3,023 (4.5)	1,732 (5.6)	3,123 (6.0)
>=40	1,886 (2.8)	1,016 (3.3)	2,143 (4.1)
Missing	2,101	1,494	1,486
Education			
Some high school or less	6,176 (9.3)	3,601 (11.6)	5,300 (10.3)
High school/GED	14,024 (21.1)	8,261 (26.7)	13,841 (27.0)
Some college	16,985 (25.6)	8,915 (28.8)	14,958 (29.2)
College grad or more	29,186 (44.0)	10,199 (32.9)	17,128 (33.4)
Missing	3,380	1,574	2,377

eTable 2. Analysis of collaborative activities and statewide actions and nulliparous, term, singleton, vertex (NTSV) cesarean rates in California, Jan 2015 – June 2019

	Model 1[a] aOR (95% CI)	Model 2[b] aOR (95% CI)
Collaborative Activities		
Intervention/Sustainment vs Baseline	0.88 (0.87, 0.90)	0.88 (0.86, 0.90)
Non-Collaborative Statewide Actions		
2016 vs. 2015	0.97 (0.96, 0.99)	0.95 (0.94, 0.97)
2017 vs. 2015	0.96 (0.94, 0.98)	0.91 (0.90, 0.93)
2018 vs. 2015	0.94 (0.92, 0.96)	0.86 (0.85, 0.88)
2019 Q1Q2 vs. 2015	0.92 (0.90, 0.95)	0.83 (0.81, 0.85)

[a]Model 1: Stepped-wedge analysis including collaborative participation (yes/no), time periods (a total of 8 binary variables representing each of the half-year time blocks), and hospital at delivery as a random intercept. Collaborative participation and time periods were coded according to the schemes shown in supplementary Figure 1.
[b]Model 2: Include all potential confounders listed in supplementary Table 1 and 2.