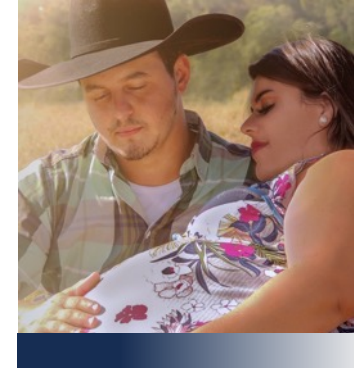
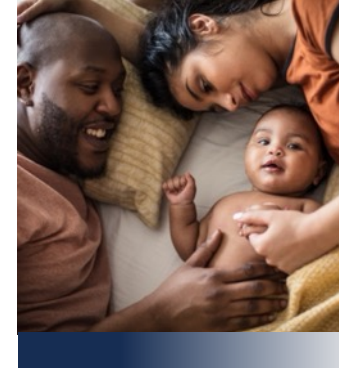
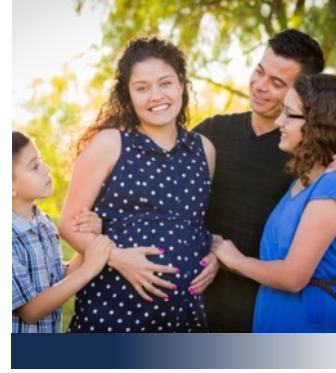
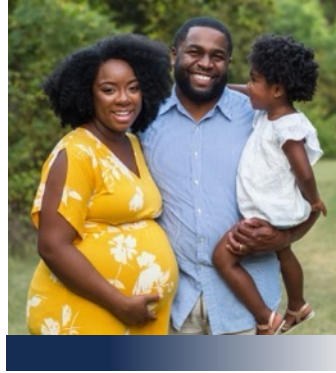
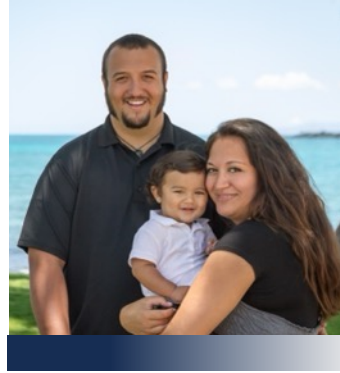
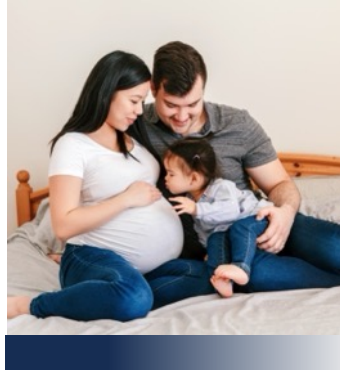
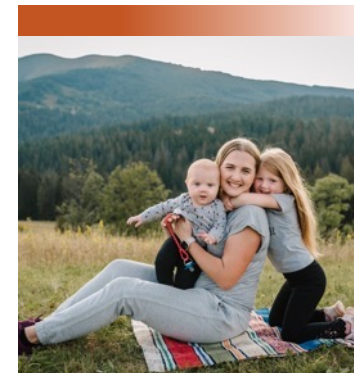
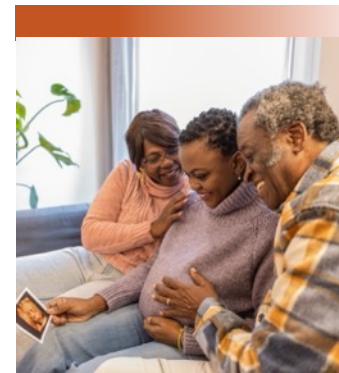
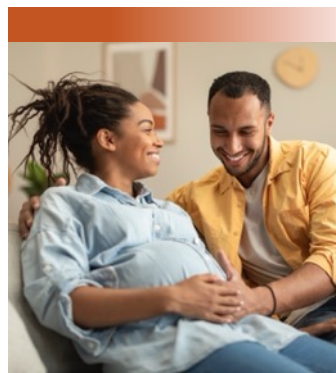
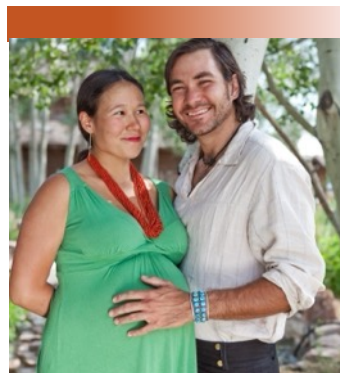
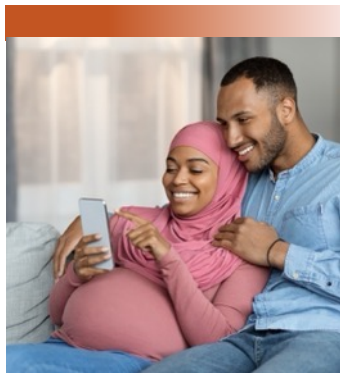




Update on Birthing Services Closure Project

Funding: HRSA State Maternal Health Innovation Program, 6 U7AMC50517-01-02

May 2026





Project Team

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*Funding: HRSA State Maternal Health
Innovation Program, 6 U7AMC50517-01-02*





Develop a systematic approach to predicting the potential impact of an obstetric Birthing Service Closure on the perinatal outcomes and needs of its community.

Project Goal

*Funding: HRSA State Maternal Health
Innovation Program, 6 U7AMC50517-01-02*





California MHI Birthing Service Closure Model Overview

Birthing Service Closure Model

Analysis of 49 closures

Service Area Impact *f* Role & Alternative Access & Relative Alternative Quality

Service Area: Zip codes that provided a minimum **of** 90% of hospital deliveries in the last two years **before the closure year.**

- <20 zip codes: Community
- >20 zip codes: Following

Role:

- Number of deliveries/year
- Market Share of All and of Medi-Cal

Birth Service Closure Model (Con't.)

Alternatives: Co-Service area

- Sites that care for 95% of service area deliveries

Access: Driving time at 4:30 **p.m.** to AAP NICU level I, II, III, IV birthing facilities

Alternative Quality: Comparison of care and outcomes ...

- Closed vs. Co-Service

Quantitative Assessments: Linked Birth Certificate/Discharge summary file

Birthing Service Closure Model Products

1. **Technical Manual:** How to actualize the components of the California MHI model
2. **Presentation Template:** A structured text and tables presentation template to facilitate the assessment of a threatened Service's role, alternative access, and relative quality compared to alternatives.

Birthing Service Closure Model Products (Con't.)

- 3. Categorizing Approach:** An approach to partitioning heterogeneity into:
- Rural with service community
 - Urban with service community
 - Urban with service following
 - And within each of these three major categories, further partitioning into four subcategories on the basis of:
 - Ease of access to alternative sites
 - Relative quality of the closed site as compared that of alternatives

Birthing Service Closure Model Products (Con't.)

4. **Outcomes Analysis:** An analysis of the extent to which post-closure maternal and neonatal outcomes differ across the 12 service closure categories, with the hope of developing an outcomes prediction tool based on a threatened services category.
5. **Community Interview Guide:** A guide for performing community interviews to assess the impact of service closures, the interventions developed to fill the care gaps, and their effectiveness.

Rationale for Categorizing Approach

Heterogeneity makes it difficult to assess the published impact of closures when taken as a group

- Categorize the birthing service based on access and relative quality of alternative sites
- Forecast the impact on the community's maternal and neonatal outcomes
 - Based on similar birthing site closures
- Forecast what needs emerged and how were they addressed?
 - Based on similar site Key Informant interviews



Using the California MHI Birthing Service Closure Model

Determining the Geographic Service Area & Market Share

Determining the Geographic Service Area: Zip codes with at least 90% of hospital deliveries in the last two years before closure

AND

Determining the Market Share (Role): % of all the service area's deliveries conducted in threatened site

Example: Service Area & Market Share

Deliveries in Rural Hospital X: 2014-2015 by Residential Zip Code

ZIP of Residence	N_delivery	N_all	pct	cum_pct
zip13	31	110	28.18	28.2
zip28	23	110	20.91	49.1
zip56	19	110	17.27	66.4
zip01	10	110	9.09	75.5
zip09	7	110	6.36	81.8
zip06	4	110	3.64	85.5
zip054	4	110	3.64	89.1
zip40	3	110	2.73	91.8
zip17	2	110	1.82	93.6

In the two years prior to closure Rural Hospital X had 110 deliveries.

A total of 91.8% (101) of these deliveries were to the residents of 8 zip codes.

Hospital X's Service area consists of 8 zip codes.
Residents of these zip codes had a 2-year total of 213 deliveries of which 101 were delivered in Hospital X.

Service share = 47.4%

Example: Major Co-Delivery Sites

2 years before the closure year (2014-2015)			
Hospital_Short_Name	N Birth in the community	% Community Birth among all community birth (Col L/sum of Col L)	Cum % of Col N
closing Hospital	101	47.4	47.4
Hospital s	94	44.1	91.5
Hospital x	9	4.2	95.8
Hospital t	4	1.9	97.7
Hospital m	1	0.5	98.1

Rank order all hospitals that record a delivery with a zip code in the service area's zip codes.

Sites that perform $\geq 95\%$ of service area deliveries are the area's **Major Co-Delivery Sites**.

Example:

- The service area consists of 3 zip codes.
- The area had 213 deliveries.
- Prior to closure 95.8% of these deliveries were in 3 birthing sites.



Example: Site Access Assessment

Nearest Level I	Level	Miles	Driving Time
W	I	15	0:30
Nearest Level II	Level	Miles	Driving Time
Q	II	14	0:26
A	II	33	0:41
X	II	39	0:46
Nearest Level III or IV	Level	Miles	Driving Time
B	III	1	0:05
G	III	7	0:11
J	III	27	0:33
S	IV	50	0:50

High+	At least one III/IV hospital <15 min away
High	At least one hospital <15 min away
Moderate	At least one hospital <30 min away
Low	No hospitals <30 min away

SERVICE SHIFT	2 Years Pre-Closure		2 Years Post-Closure	
	N	%	N	%
Total service area births	3,729		3,701	
In-Hospital Birth	3,711	99.52	3,675	99.30
Birth at the Closed Hospital E	476	12.76	0	0.0
Birth at Major Co-service area hospitals	3,074	82.43	3,544	95.76
Home Birth	14	0.38	20	0.54
Birth at a birthing center	0	0.00	2	0.05
Emergency Department (ED) Birth				
ED Birth at the Closed Hospital E	0	0.00	2	0.05
ED Birth at Major Co-service Hospitals	4	0.11	2	0.05

Potential Impact on Perinatal Outcomes

All Births: 2020-2021

	Distribution among all hospitals			Closed hospital			Co-service hospitals			Total
Number of Deliveries				1800			7860			9660
Maternal demographic factors and comorbidities	Q1	Median	Q3	N	(%)	Quartile	N	(%)	Quartile	P-Value ^{*a}
Payment for delivery: Medi-Cal	22.1	57.1	76.6	1496	83.1	High	4802	61.1	High Avg	<.01
Maternal education levels: Some high school or less	3.3	10.4	19.5	839	46.6	High	2437	31.0	High	<.01
Pregnancy complications										
Preeclampsia	8.8	11.1	15.4	263	14.6	High Avg	1195	15.2	High Avg	0.43
Maternal outcomes										
NTSV cesarean birth	20.2	23.3	26.0	73	16.4	Low	527	24.0	High Avg	<.01
SMM including transfusion cases	1.3	2.0	2.9	79	4.4	High	149	1.9	Low Avg	<.01
SMM excluding transfusion-only cases	0.5	0.7	1.1	63	3.5	High	63	0.8	High Avg	<.01
Neonatal outcomes; N (%)										
5 minute Apgar score <=3	0.3	0.4	0.7	4	0.2	Low	48	0.6	High Avg	0.04
Severe UNC	0.9	1.4	2.2	29	1.8	High Avg	86	1.3	Low Avg	0.14

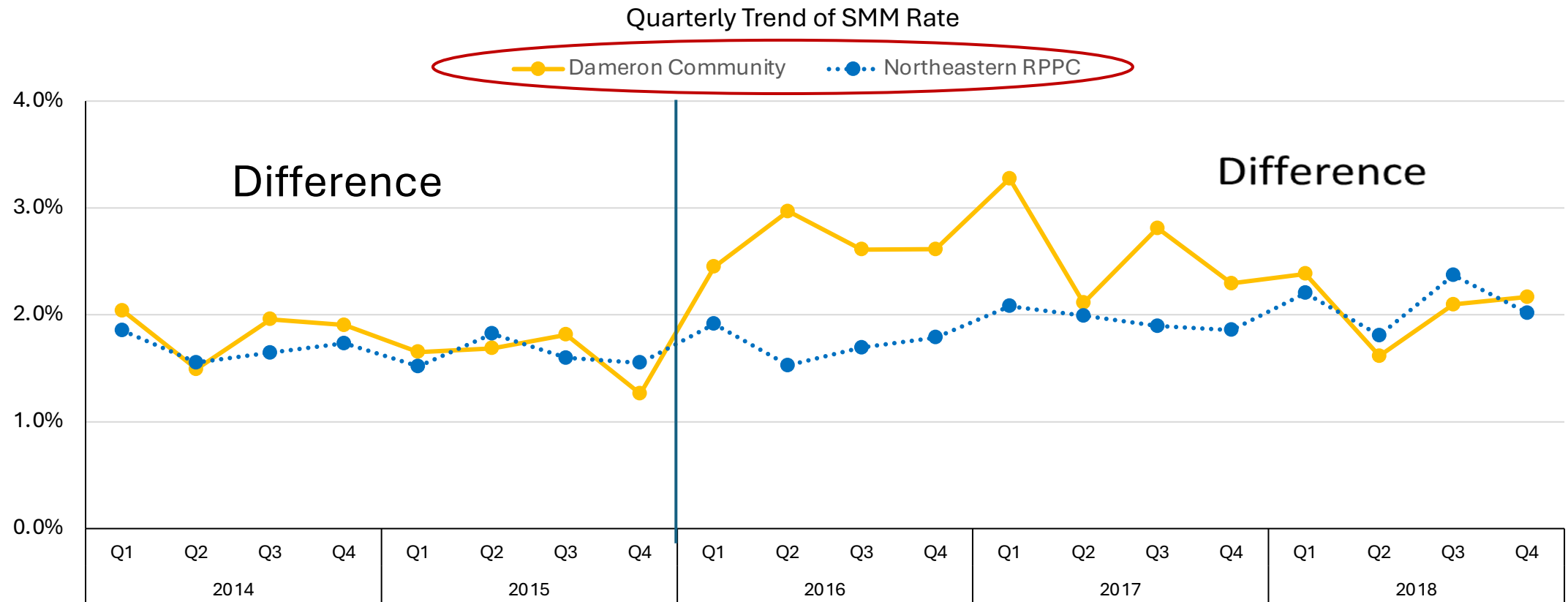
Funding: HRSA State Maternal Health Innovation Program, 6 U7AMC50517-01-02

Further Sub-Classifications Based on Relative Quality & Accessibility

13 Rural Community Based Sites

	CAH / Rural / Urban	NICU Level	Maternal Outcomes Group: Closed service is:	Newborn Outcomes Group: Closed service is:	Accessibility Group	All Patient share (%) of the closed hospital	N of patients in the closed hospital / per year
Post-closure Outcome comparisons of these four rural sub-categories are in progress	CAH	I	Better or comparable	Better or comparable	Low	36%	262
	CAH	I	Better or comparable	Better or comparable	Low	45%	74
	CAH	I	Better or comparable	Better or comparable	Low	47%	51
	CAH	I	Better or comparable	Better or comparable	Low	16%	29
	Rural:H	I	Better or comparable	Worse	Moderate	29%	731
	Rural	II	Better or comparable	Worse	Moderate	34%	434
	Rural	I	Better or comparable	Worse	Moderate	21%	123
	Rural:H	I	Worse	Better or comparable	Low	36%	143
	CAH	I	Worse	Better or comparable	Low	53%	63
	CAH	I	Worse	Better or comparable	Low	44%	51
Rural:H – Rural:Entire Hospital Closure							
	Rural	I	Worse	Worse	Moderate	29%	672
	CAH	II	Worse	Worse	Moderate	27%	210
	Rural	I	Worse	Worse	Moderate	11%	174

Forecast Outcomes Based on the Experience of Similar Birthing Sites Using the Difference in Difference Strategy



Learn From Key Informants

- What needs arose when X closed its birthing service?
- Was the impact greater for certain folks?
- How did you address these needs?
- Do you have any tips to help in similar situations?



Future Collaboration

Let's Share Our Approaches and Experience

Contact:

Jeffrey Gould, MD, MPH
jbgould@stanford.edu

Technical Manual:

As it develops, will be posted on
www.CAMaternalHealth.org



Funding: HRSA State Maternal Health Innovation Program, 6 U7AMC50517-01-02



Thank You