

## ORIGINAL ARTICLES

# Evaluating the impact of provider breastfeeding encouragement timing: Evidence from a large population-based study

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## ABSTRACT

**Background:** Exclusive breastfeeding is the healthiest and most economical form of infant nutrition. Although research has indicated that professional support increases the length of time women breastfeed, the optimal timing of provider encouragement to sustain mothers' breastfeeding is unknown. We evaluated the impact of the timing of provider encouragement on breastfeeding initiation and three-month duration, especially among racial/ethnic minority mothers who have been underrepresented in breastfeeding outcomes research.

**Methods:** We used data from the 2010 Los Angeles Mommy and Baby (LAMB) Survey. LAMB is a population-based mail survey, distributed to women in Los Angeles County who recently gave birth to a live infant. Participants were asked about their perceptions of provider encouragement of breastfeeding at three specific time points: during prenatal care visits, during the birth hospital stay after the baby was born, and during early well-baby checkups. Mothers were asked whether they breastfed or pumped breast milk to feed their baby after delivery and if they were still breastfeeding at the time of the survey.

**Results:** Overall, 87.6% of LA County mothers initiated breastfeeding after delivery. At 3 months, 60% were still breastfeeding. Adjusted logistic regression analysis showed a positive association between provider encouragement at the delivery hospital and breastfeeding initiation (aOR = 2.7, 95% CI = 1.60-3.96) that was significant across all races/ethnicity. Encouragement during well-baby checkups was positively associated with breastfeeding at 3 months (aOR = 1.5, 95% CI = 1.22-1.93). This latter association was found among all races and ethnicities, except for Black mothers. There was no association between encouragement provided during prenatal care and breastfeeding practices.

**Conclusions:** The optimal timing of provider encouragement on breastfeeding initiation is likely during the birth hospitalization, while sustained breastfeeding likely requires professional support after discharge. Culturally appropriate interventions to maintain positive breastfeeding practices must be identified, especially for black mothers.

**Key Words:** Breastfeeding duration, Physician encouragement, Lactation support

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## 1. INTRODUCTION

Exclusive breastfeeding is undeniably the healthiest and most economical form of infant nutrition. It is therefore recommended through the first six months of an infant's life by all major medical organizations.<sup>[1]</sup> Breastfeeding can prevent many childhood illnesses ranging from viral infections, Sudden Infant Death Syndromes (SIDS), ear infections, diabetes, asthma, necrotizing enterocolitis, and even leukemia and obesity.<sup>[2]</sup> If 90% of infants in the United States exclusively breastfed past six months, the United States would have saved \$13 billion per year and prevent an excess nine hundreds and eleven deaths.<sup>[3,4]</sup>

Systems-based efforts in the United States to help mothers sustain breastfeeding have predominantly focused on the birth hospital setting, most notably The Baby-Friendly Hospital Initiative. Unfortunately, increasing public awareness of the many benefits of breastfeeding and rapid implementation of Baby-Friendly hospital practices are *necessary but insufficient* to carry most mothers for six months. In 2012, only 43% of mothers in US still exclusively breastfed by three months. By age of six months, only 21.9% of mother were still exclusively breastfeeding. Racial/disparity in breastfeeding practices exists among four major race/ethnic groups. White women had the highest rate to initiate breastfeeding (82.4%) and to continue exclusively breastfeeding for six months (48%), while Black women had the lowest rate to initiate (64.4%) or to exclusively breastfeeding for six months (13.9%).<sup>[5]</sup>

In a large national survey in 2001, Lu *et al.* found that provider encouragement was associated with a four-fold increase in breastfeeding initiation.<sup>[6]</sup> Encouragement significantly increased initiation by more than threefold among low-income, young, and less educated women; by nearly fivefold among black women; and by nearly 11-fold among single women. The study did not specify how long provider encouragement might sustain mothers' breastfeeding. A 2012 Cochrane Review of 52 randomized breastfeeding support trials (totaling 56,451 women) found that mothers who were encouraged by health care providers to breastfeed were less likely to stop breastfeeding at four months after birth.<sup>[7]</sup> "Encouragement" was defined broadly to include reassurance, praise, information, the opportunity to discuss and respond to mothers' questions, and staff training. Study neither identified nor addressed the optimal timing of provider encouragement.

Health care providers can influence patient decisions about infant feeding but have less and less time nowadays to counsel patients on a growing number of recommended preventive behaviors. Therefore, it is important to consider when

providers might deliver feeding encouragement for maximal effect. We sought to evaluate *the impact of the timing of provider encouragement on breastfeeding initiation and duration*, especially among LA's racial/ethnic minority mothers, who have traditionally been underrepresented in breastfeeding research.

## 2. METHODS

### 2.1 Procedure

We analyzed data collected by the 2010 Los Angeles Mommy and Baby (LAMB) Survey. LAMB participants were randomly selected from birth records to create a population-based sample of LA mothers who have delivered a live infant in a hospital in LA County. This produced a stratified simple random sample with oversampling of minority women (over sampled African Americans and API by 10%) and women less than 20 years old (over sampled by 10%) to ensure adequate inclusion of these cases.

The 2010 LAMB Survey was approved by both LA County's and the State of California's Institutional Review Boards.

Selected mothers completed a one-time questionnaire within five months of delivery. LAMB followed the Centers for Disease Control and Prevention's Pregnancy Risk Assessment Monitoring System protocol, and used proven methods to maximize response rates including tailored cover letters, multiple mailings, non-respondent follow-up and incentives.<sup>[8-10]</sup> Mothers were mailed a survey in English, Spanish, or Chinese about events that may have occurred before, during, and right after pregnancy. About 4% of respondents completed the survey by phone, including mothers who did not speak English, Spanish, or Chinese and 96% of respondents completed the survey by mail.

### 2.2 Provider encouragement

The LAMB questionnaire assessed maternal perceptions of provider encouragement of breastfeeding at three time points: (1) *during prenatal care (PNC) visits*; (2) *during the birth hospital stay after the baby was born*; and (3) *during well-baby checkups*. Specifically, LAMB asked mothers whether a doctor or nurse gave them any help or encouragement to breastfeed.

### 2.3 Breastfeeding practices

LAMB also asked mothers whether they ever breastfed or pumped breast milk to feed their baby after delivery and if they were still breastfeeding at the time of the survey. Duration of breastfeeding was dichotomized as greater or less than 3 months because most LAMB survey respondents completed the survey four months postpartumly.

### 2.4 Covariates

Assessed covariates included: maternal race/ethnicity, age (< 20, 20-24, 25-34, 35 and over), marital status (married or unmarried), level of education achieved (< 12th, 12th or General Educational Development, > 12th), foreign birth, WIC (Women, Infants, and Children) used during pregnancy, trouble paying bills during pregnancy, parity (null, multi), health status (fair/poor, good/excellent), late prenatal care (began after 3 months gestation), and delivery of a low birth weight baby (< 2,500 gm).

### 2.5 Statistical analysis

Prevalence rates for perceived provider encouragement during PNC visits, delivery hospital stays, and well-baby check-ups were calculated for the total sample and by demographics. Potential risk factors were assessed using the above covariates and chi-square analyses were used to test differences in prevalence rates based on assessed demographics and potential risk factors.

To assess the strength of association after controlling for potential confounders, we used the SAS Survey logistic procedure,<sup>[11]</sup> which fits logistic regression models for discrete response survey data by the method of maximum likelihood. Covariates were considered to be confounders and retained in the final model if they were associated with both the exposure and the outcome at a  $p < .20$  level. Separate subset analyses using similar logistical regression models were conducted after the sample was stratified by race/ethnicity.

## 3. RESULTS

### 3.1 Sample characteristics

There were 6,593 responded to the 2010 LAMB Survey. Based on calculations proposed by the American for Public Opinion Research,<sup>[12]</sup> the response rate was 57% after adjusting for faulty addresses (10%), language issues (0.4%), maternal deaths (0.02%), and loss to follow-up due to inability to locate the respondent (3.9%).

The final sample size for this study was 5,302 mothers. We only included mothers who had singleton live births and who self-identified as Asian-Pacific Islander (API), Black, Latino, or White, and those who completed the survey and had babies at least 3 months of age. Table 1 shows characteristics of the final sample. Among them, 62.4% were Hispanic, 17.6%, White, 12.1%, API, and 7.9%, Black. Over 50% of them were between 25 and 34 years old, or married, or having some college education. Close to 90% of women received provider encouragement to breastfeed at delivery hospital, and 2/3 of them were encouraged to breastfeed at either prenatal care or well-baby visit.

**Table 1.** Characteristics of study sample: 2010 Los Angeles mommy and baby survey\*

Maternal Sociodemographic Characteristics	Unweighted N	Prevalence (%)	95% Confidence Limits
<b>Overall</b>	5,302		
<b>Race/Ethnicity</b>			
White	1,426	17.6	16.5-18.8
Latina	1,867	62.4	60.7-64.0
Black	961	7.9	7.3-8.5
Asian/Pacific islander	1,048	12.1	11.2-13.0
<b>Age, years</b>			
< 20	1,144	8.7	8.1-9.3
20-24	700	19.5	17.8-21.2
25-34	2,382	51.8	49.8-53.7
35+	1,076	20.1	18.6-21.6
<b>Marital status</b>			
Married	2,805	56.7	54.7-58.6
Unmarried	2,441	43.3	41.4-45.3
<b>Education</b>			
< 12 <sup>th</sup> grade	1,036	24.9	23.1-26.8
12 <sup>th</sup> grade or GED	1,165	23.9	22.2- 25.6
> 12 <sup>th</sup> grade	3,026	51.2	49.2-53.1
<b>Provider encouragement</b>			
In prenatal care visit	3,052	62.4	60.4-64.4
At delivery hospital	4,698	89.9	88.6-91.2
At well-baby visit	3,352	66.4	64.4-68.4

\*There were 5,302 women included in this study who self-identified as Asian-Pacific Islander (API), Black, Latino, or White with singleton live births and completed survey whose baby was > 3 months old.

Overall, 87.6% of the mothers initiated breastfeeding in the delivery hospital. At 3 months, only 60% were still breastfeeding (see Table 2). Both breastfeeding initiation and continuation at 3 months increased significantly with increasing maternal age and level of education achieved. Women who used Special Supplemental WIC services during pregnancy were less likely to initiate or continue breastfeeding compared to women who did not use or need these services ( $p$  value < .0001).

Late prenatal care was associated with less breastfeeding; mothers who began prenatal care after 3 months gestation had a lower prevalence of breastfeeding initiation (82.0% vs. 88.4%;  $p$  value = .0004) and continuation (47.9% vs. 61.8%;  $p$  value < .0001). Mothers who delivered low birth weight babies had lower proportions of breastfeeding initiation (82.1% vs. 88.1%;  $p$  value = .0293) and continuation at 3 months (49.3% vs. 60.8%;  $p$  value = .0036). Married women had a higher prevalence of breastfeeding at delivery compared to unmarried women (91.4% vs. 83.2%;  $p$  value < .0001), with the disparity widening 3 months after delivery (69.3% vs. 48.6%;  $p$  value < .0001). Foreign-born women were only slightly more likely to initiate breastfeeding than their native-born counterparts (89.3% vs. 86.3%;  $p$  value = .0183) but significantly more likely to continue breastfeeding at 3 months (66.8% vs. 54.3%;  $p$  value < .0001).

**Table 2.** Characteristics of mothers who initiated and continued breastfeeding 2010 Los Angeles mommy and baby survey

Breastfeeding at Delivery Hospital (87.6%)				Breastfeeding to 3 months (60.0%)		
Sociodemographic Characteristics				Sociodemographic Characteristics		
Race/Ethnicity	Prevalence (%)	95% Confidence Limits	p-value	Prevalence (%)	95% Confidence Limits	p-value
White	94.3	92.9-95.7		73.8	70.9-76.8	
Latina	85.6	83.5-87.7	< .0001	56.1	52.3-59.8	< .0001
Black	77.7	74.4-81.1		43.9	40.2-47.7	
Asian/Pacific Islander	94.9	93.3-96.5		70.2	67.0-73.5	
<b>Age, years</b>						
< 20	83.34	80.83-85.85		36.5	33.3-39.6	
20-24	83.90	80.17-87.64		48.0	43.0-53.0	
25-34	88.58	86.65-90.51	.0006	64.5	61.8-67.2	< .0001
35+	90.92	88.27-93.58		70.3	66.4-74.2	
<b>Marital Status</b>						
Married	91.4	89.7-93.0		69.3	66.8-71.8	
Unmarried	83.2	80.9-85.5	< .0001	48.6	45.6-51.7	< .0001
<b>Education</b>						
< 12th grade	82.1	78.7-85.5		55.6	51.3-59.9	
12 <sup>th</sup> grade or GED	83.7	80.6-86.9	< .0001	47.4	43.2-51.7	< .0001
> 12 <sup>th</sup> grade	92.4	90.9-93.9		68.2	65.7-70.6	
<b>Foreign born</b>						
No	86.3	84.5-88.1		54.3	51.8-56.8	
Yes	89.3	87.2-91.4	.0365	66.8	63.9-69.8	< .0001
<b>Used WIC Services in Pregnancy</b>						
Yes	84.5	82.5-86.4		52.5	49.9-55.1	
No	92.7	90.4-95.2	< .0001	72.2	68.7-75.8	< .0001
Did Not Need	95.4	93.6-97.2		77.9	74.0-81.7	
<b>Had Trouble Paying Bills in Pregnancy</b>						
Yes	83.0	79.4-86.5		51.2	46.8-55.7	
No	89.0	87.6-90.5	.0005	62.5	60.4-64.7	< .0001
<b>Parity</b>						
Null parity	89.6	87.8-91.4		57.3	54.6-60.0	
Multiparty	86.2	84.2-88.2	.0131	62.0	59.3-64.7	.0162
<b>Health Status</b>						
Fair/poor	77.2	71.8-82.6		45.1	38.9-51.3	
Excellent/good	89.0	87.6-90.4	< .0001	62.1	60.1-64.2	< .0001
<b>Late Prenatal care: &gt; 3 mos.</b>						
Yes	82.0	77.2-86.8		47.9	41.8-54.0	
No	88.4	87.0-89.8	.0004	61.8	59.8-63.9	< .0001
<b>Low birth weight: &lt; 2,500 g</b>						
Yes	82.1	76.0-88.1		49.3	41.6-57.0	
No	88.1	86.7-89.5	.0277	60.8	58.8-62.8	.0037
<b>Provider Encouragement</b>						
<b>In Prenatal Care Visit:</b>						
No	86.7	84.2-89.1		62.7	59.4-66.0	
Yes	88.2	86.5-90.0	.3	59.2	56.6-61.8	.0978
<b>At Delivery:</b>						
No	75.8	69.9-81.6		60.4	53.8-67.0	
Yes	89.6	88.3-91.0	< .0001	61.1	59.1-63.2	.8253
<b>At Well-Baby Visit</b>						
No				56.3	52.5-60.0	< .0001
Yes				63.4	60.9-65.8	

Despite low initiation and continuation rates, Black mothers reported the highest prevalence of breastfeeding encouragement during PNC visits (73.5%;  $p$  value < .0001) and the second highest prevalence during well-baby checkups (75.3%;  $p$  value < .0001) (see Table 3).

**Table 3.** Race/Ethnicity of mothers who had provider encouragement on breastfeeding: 2010 Los Angeles mommy and baby survey

Overall	During Prenatal Care Visit			At the Delivery Hospital			At Well-Baby Check Up		
	62.4%			89.9%			66.6%		
Race/Ethnicity	Prevalence	95% Confidence Limits	P-value	Prevalence	95% Confidence Limits	P-value	Prevalence	95% Confidence Limits	P-value
White	57.5	54.1-60.8		93.0	91.4-94.6		71.6	68.6-74.7	
Latina	62.6	59.6-65.6	< .0001	87.5	85.5-89.5	< .0001	61.3	58.2-64.3	< .0001
Black	73.5	69.9-77.0		91.6	89.4-93.8		75.3	71.7-78.9	
Asian/Pacific Islander	61.6	57.9-65.2		96.3	95.1-97.5		77.4	74.3-80.5	

**3.2 Perceived provider encouragement and breastfeeding practices**

Because bivariate analysis was susceptible to confounding, the following logistic regression analyses were conducted to control for known confounders. Table 4 shows that compared to mothers who were not encouraged, mothers who perceived provider encouragement at the delivery hospital were 2.7 (aOR = 2.7, 95% CI = 1.60-3.96) times more likely

to initiate breastfeeding but not any more likely to breastfeed at 3 months. Perceived provider encouragement during PNC visits was not associated with any difference in breastfeeding initiation or continuation. Encouragement received during well-baby checkups, however, was positively associated with continued breastfeeding at 3 months (aOR = 1.5, 95% CI = 1.22-1.93), when compared to women who did not receive encouragement during well-baby checkups.

**Table 4.** Associations of breastfeeding encouragement with initiation and continuation at 3 months: 2010 Los Angeles mommy and baby survey

	Breastfeeding Initiation			Breastfeeding Continuation		
	Odds Ratio*	95% CI	p-value	Odds Ratio*	95% CI	p-value
<b>Provider encouragement (ref: No)</b>						
In prenatal care visit	1.0	0.72-1.65	.69	0.9	0.71-1.23	.616
At delivery hospital	2.7	1.60-3.96	< .0001	0.8	0.56-1.16	.242
At well-baby visit	-	-	-	1.5	1.22-1.93	.000
<b>Race/Ethnicity (ref: Black)</b>						
Asian/Pacific islander	1.7	0.99-2.89	.054	0.9	0.69-1.39	.922
Hispanic	1.5	1.07-2.14	.018	1.2	0.90-1.53	.254
White	2.3	1.53-3.52	.001	1.6	1.15-2.12	.004
<b>Maternal age (ref: over 30-year-old)</b>						
20-29	1.6	1.09-2.34	.017	1.0	0.79-1.29	.948
< 20	1.8	1.00-3.02	.031	0.8	0.58-1.16	.256
Married (ref: unmarried)	1.3	0.90-1.86	.166	1.4	1.07-1.77	.014
<b>Education (ref: &lt; high school)</b>						
12	1.3	0.87-1.94	.203	0.8	0.55-1.03	.072
> 12	2.3	1.39-3.78	.001	1.1	0.78-1.53	.593
Foreign born (ref: Native born)	2.1	1.41-3.12	.003	2.1	1.64-2.75	.001
Null parity (ref: multiparous)	0.9	0.64-1.34	.686	0.8	0.64-1.00	.060
Had early prenatal care (ref: after first trimester)	1.2	0.84-1.85	.268	1.3	0.97-1.84	.072
No previous LBW (ref: had previous LBW)	1.5	0.88-2.38	.148	1.4	0.95-2.03	.087
Healthy (ref: fair/poor health)	1.7	1.16-2.56	.007	1.4	0.99-1.92	.060

\*All logistic regression models included the covariates presented.

Table 5 shows separate logistic regressions for each race/ethnicity. Again, there was no statistically significant association between perceived provider encouragement during PNC visits and breastfeeding initiation or continuation for any race/ethnicity. Encouragement at the delivery hospital was associated with increased breastfeeding initiation for all races/ethnicities. When compared to women who

self-identified as the same race/ethnicity, White women encouraged at the delivery hospital had the highest odds of initiating breastfeeding (aOR = 11.2, CI = 5.4-23.2), followed by API (aOR = 6.1, CI = 1.33-20.11), Black (aOR = 2.8, CI = 1.38-5.77) and Latino women (aOR = 2.2, CI = 1.25-3.86).

**Table 5.** Adjusted\* associations of breastfeeding encouragement with initiation and continuation at 3 months stratified by race/ethnicity: 2010 Los Angeles mommy and baby survey

Provider Enc.	Breastfeeding Initiation			Breastfeeding Continuation		
	Odds Ratio <sup>1</sup>	95% CI	p-value	Odds Ratio <sup>1</sup>	95% CI	p-value
<b>White</b>						
In prenatal care visit	0.8	0.27-1.18	.460	1.0	0.66-1.61	.895
At delivery hospital	11.2	5.4-23.2	< .0001	2.0	1.04-3.83	.038
At well-baby visit	-	-	-	2.2	1.45-3.30	.000
<b>Hispanic</b>						
In prenatal care visit	1.2	0.68-2.05	.560	0.9	0.61-1.45	.793
At delivery hospital	2.2	1.25-3.86	.001	0.6	0.38-1.01	.052
At well-baby visit	-	-	-	1.5	1.16-2.15	.011
<b>Black</b>						
In prenatal care visit	1.1	0.52-2.4	.790	1.2	0.60-2.22	.658
At delivery hospital	2.8	1.38-5.77	.004	1.6	0.75-3.21	.236
At well-baby visit	-	-	-	1.0	0.60-1.54	.860
<b>Asian/Pacific islander</b>						
In prenatal care visit	0.9	0.37-2.06	.757	0.6	0.38-1.06	.084
At delivery Hospital	6.1	1.33-20.11	.002	2.1	0.88-5.19	.009
At well-baby visit	-	-	-	1.7	1.10-2.76	.046

\*The logistic regression models shown in Table 4 was used to generate the adjusted odds ratio for each stratum of race/ethnicity.

Interestingly, encouragement at the delivery hospital was only associated with an increased likelihood of breastfeeding at 3 months among White mothers (aOR = 2.0, CI = 1.04-3.83); no other races/ethnicities showed this positive association. Furthermore, encouragement during well-baby checkups was associated with significant breastfeeding continuation among White, Latino, and API women (aOR = 2.2, CI = 1.45-3.30; aOR = 1.5, CI = 1.16-2.15; aOR = 1.7, CI = 1.10-2.76, respectively). However, there was no association between encouragement during well-baby checkups and breastfeeding continuation among Black women.

#### 4. DISCUSSION

To our knowledge, this is the first study to address the relative effectiveness of health care provider breastfeeding encouragement at different times in the maternity lifecycle. Prenatal encouragement was not associated with breastfeeding initiation or duration, while in-hospital encouragement was associated with initiation but not duration, and well-baby checkup encouragement was associated with duration.

These findings are consistent with most studies which indicate that breastfeeding promotion, education and support during routine care impact mothers' intention to breastfeed.<sup>[13-15]</sup> However, it is difficult to compare our findings with previous studies which used smaller, non-representative samples and more intensive interventions. Oakley *et al.*<sup>[16]</sup> for example, found that 590 working-class women breastfed more after a median of 5 prenatal telephone and home contacts. Kristin N studied 159 predominantly low-income, Black, expectant mothers and found that those who received

prenatal encouragement from a physician or a nurse practitioner were more likely to breastfeed than controls,<sup>[17]</sup> contrasting with our findings.

Our study enriches the literature by helping to identify optimal times for providers to routinely encourage mothers to breastfeed and see results across different races/ethnicities. The authors of the only population-based study showing that provider encouragement significantly increased breastfeeding initiation felt that their respondents reflexively understood the question about "timing of provider encouragement to mean in-hospital, peripartum encouragement".<sup>[9]</sup> By differentiating the timing of encouragement, our study teases out that encouragement within the delivery hospital is likely to be most effective at getting mothers to start breastfeeding, while encouragement during well-baby checkups is likely to have the greatest impact on mothers continuing to breastfeed.

Other research shows similarly that in-hospital interventions such as The Baby-Friendly Hospital Initiative clearly increase breastfeeding initiation, while the lasting effects of these interventions on breastfeeding after discharge are less certain.<sup>[16-20]</sup> In-hospital provider encouragement is a likely outgrowth of Baby-Friendly requirements for staff education, but has not been studied independently to our knowledge. One study found five specific hospital practices-breastfeeding within the first hour, breast milk only, infant rooming-in, no pacifier use, and receipt of a telephone number for use after discharge-increased breastfeeding duration, but did not mention provider encouragement.

Our findings showed racial/ethnic disparities in the effective-

ness of providers. A higher percentage of Black mothers felt encouraged to breastfeed during prenatal care and well-baby checkups, yet they also had the lowest odds of breastfeeding for 3 months. We suspect this indicates significant disparities in the effectiveness of providers' encouragement of Black, breastfeeding women and possible disparities in cultural competence. Racial and ethnic disparities in breastfeeding care, especially among African Americans, were highlighted by *the U.S. Surgeon General's Call to Action to Support Breastfeeding*.<sup>[1]</sup> Mistrust of health care providers among Black women is well-documented and has been correlated with inadequate access to continuous care.<sup>[21]</sup>

Renfrew MJ, *et al.*<sup>[22]</sup> pointed out that when breastfeeding support is only offered reactively and women have to initiate the contact, it is unlikely to be effective. The reverse is also true. Scheduled, regular, face-to-face visits for breastfeeding support are very helpful. Encouragement of Black mothers may happen more reactively when concerns arise rather than in regular, scheduled visits for lactation support. Perhaps these mothers are also less likely to raise key concerns due to mistrust of their providers. In order to identify effective breastfeeding support strategies for this at-risk population, further research is needed into the gaps in provider effectiveness and cultural competence when encouraging Black mothers to breastfeed, and gaps in Black mothers' continuity of lactation care.

#### 4.1 Strengths

Unlike previous studies which focused on specific clinics or small communities,<sup>[16-18]</sup> LAMB 2010 used a generalizable, population-based survey with more participants than most infant nutrition surveys on record. For example, LAMB garnered a representative sample of 5,302 respondents culled from one city compared to only 1,177 respondents in the Infant Feeding Practices Study II studying families nationwide.<sup>[23]</sup>

LAMB findings show variability across socio-demographic indicators that mirror state and national level data, highlighting its nationwide relevance (and the diversity of Los Angeles). For example, California Newborn Screening in-hospital breastfeeding data for 2010 showed the same relatively higher rates of breastfeeding initiation for Asian (93.4%), White (92.9%), and Latino (90.5%) mothers compared to Black mothers (80.0%).<sup>[24]</sup> The National Immunization Survey, a nationwide random telephone survey with a sample of 15,912, showed similarly concerning disparities among rates of breastfeeding initiation for Asian or Pacific Islander (80.1% or 81.5%, respectively), Hispanic/Latino (79.3%), and Non-Hispanic White (78.7%) mothers, compared to Blacks mothers (63.3%).<sup>[25]</sup>

Although they are not randomized, population-based studies that can be analyzed across races and ethnicities are important because standard breastfeeding interventions may not have the same desired effect on all populations (evidenced by the low impact of encouragement on Black mothers in our study).<sup>[13,26]</sup> With slight modification, upcoming LAMB surveys could easily assess the effectiveness of interventions on Latino and Black mothers, who struggle disproportionately with obesity and other breastfeeding-preventable illnesses. Longitudinal study of the effects of breastfeeding interventions, especially on breastfeeding duration, is crucial for effective health prevention in this country.

#### 4.2 Weaknesses

Unfortunately, LAMB 2010 did not clearly distinguish between provider types. When asked about providers, mothers could have recalled nurses, nurse practitioners, physician assistants, physicians, midwives, or lactation consultants. Obstetric providers, for instance, tend to be least confident counseling mothers about breast milk production, which also happens to be one of the most prevalent and influential concerns of women who stop breastfeeding.<sup>[27-31]</sup> Pediatricians on the other hand are least confident with breast or nipple complaints, which are common but less likely to discourage mothers from breastfeeding. Data on potential biases among other provider types is sparse.

LAMB also did not specify the content of the provider's breastfeeding encouragement. Research suggests mothers receive more advocacy for and knowledge about breastfeeding than useful technical support.<sup>[32]</sup> Obstetricians and pediatricians are by their own admission poor at technical breastfeeding support.<sup>[33,34]</sup> Further study of the content of providers' encouragement on breastfeeding practices is needed.

In addition, LAMB did not assess for contraindications to breastfeeding, allowing for potential residual confounders. The American Academy of Pediatrics describes a limited number of contraindications including certain conditions (active untreated tuberculosis, active herpes simplex breast lesions, or HIV-positive status) and medications, such as statins to treat preeclampsia.<sup>[35]</sup> We found no statistically significant bivariate differences between breastfeeding encouragement at delivery or at well-baby visits and high blood pressures during pregnancy. There were also no significant differences between breastfeeding encouragement and cesarean versus vaginal delivery, accurately reflecting current standards of practice.

#### 4.3 Implications

Our study has important implications for the prevention of adverse maternal-child health outcomes from early breast-

feeding cessation. To be most effective at getting mothers to breastfeed longer, professional breastfeeding support interventions should focus more on the early postpartum period than on the prenatal or in-hospital periods. Training physicians, nurses and other health providers to sensitively and effectively address common breastfeeding concerns in the early postpartum period will likely have the most meaningful health impact on all populations.

## 5. CONCLUSIONS

Provider encouragement at the delivery hospital is most likely to improve initiation of breastfeeding, while provider encouragement at well-baby checkups is most likely to improve breastfeeding duration at 3 months. Significant disparities in

provider encouragement effectiveness likely exist for Black mothers. Further research should delineate more effective means of supporting all mothers; accepting that interventions may differ between races/ethnicities and at different points in the maternity lifecycle.

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