

Addressing Racial Inequities in Breastfeeding in the Southern United States

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BACKGROUND: Race is a predictor of breastfeeding rates in the United States, and rates are lowest among African American infants. Few studies have assessed changes in breastfeeding rates by race after implementing the Ten Steps to Successful Breastfeeding (hereafter referred to as the Ten Steps), and none have assessed the association between implementation and changes in racial disparities in breastfeeding rates. Our goal was to determine if a hospital- and community-based initiative in the Southern United States could increase compliance with the Ten Steps, lead to Baby-Friendly designation, and decrease racial disparities in breastfeeding.

METHODS: Hospitals in Mississippi, Louisiana, Tennessee, and Texas were enrolled into the Communities and Hospitals Advancing Maternity Practices initiative from 2014 to 2017 and received an intensive quality improvement and technical assistance intervention to improve compliance with the Ten Steps. Community partners and statewide organizations provided parallel support. Hospitals submitted monthly aggregate data stratified by race on breastfeeding, skin-to-skin care, and rooming in practices.

RESULTS: The disparity in breastfeeding initiation between African American and white infants decreased by 9.6 percentage points (95% confidence interval 1.6–19.5) over the course of 31 months. Breastfeeding initiation increased from 66% to 75% for all races combined, and exclusivity increased from 34% to 39%. Initiation and exclusive breastfeeding among African American infants increased from 46% to 63% ($P < .05$) and from 19% to 31% ($P < .05$), respectively. Skin-to-skin care after cesarean delivery was significantly associated with increased breastfeeding initiation and exclusivity in all races; rooming in was significantly associated with increased exclusive breastfeeding in African American infants only.

CONCLUSIONS: Increased compliance with the Ten Steps was associated with a decrease in racial disparities in breastfeeding.

The Ten Steps to Successful Breastfeeding (hereafter referred to as the Ten Steps) constitute the pillars of the World Health Organization and United Nations Children's Fund Baby-Friendly Hospital Initiative (BFHI), launched in 1991, to improve breastfeeding rates worldwide. Race is

associated with breastfeeding rates in the United States.^{1–6} Populations in the American South suffer from high rates of infant mortality^{7,8} and chronic illness.^{9–11} The South also has some of the nation's greatest racial and/or ethnic breastfeeding disparities.⁴ Between 2010 and 2013, Mississippi

abstract



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had the nation's lowest breastfeeding rates, and breastfeeding initiation between African American and white infants differed by 25 percentage points in Mississippi and 32 percentage points in Louisiana.⁴

Previous multistate initiatives to implement the BFHI included Best Fed Beginnings,¹² Empower (both funded by the Centers for Disease Control and Prevention), and the Indian Health Service (IHS) Baby-Friendly Initiative.¹³ All resulted in Baby-Friendly designation of multiple hospitals; Best Fed Beginnings achieved significant improvements in breastfeeding rates and practices,¹² and the IHS designated 100% of federally operated IHS hospitals.¹⁴ BFHI implementation is associated with increased breastfeeding prevalence in many settings.^{12,15-19} The single randomized control trial on the BFHI revealed increased exclusive breastfeeding and duration, but race was not addressed.¹⁵ Single-hospital studies have shown improvements in breastfeeding rates among minority patients after sites gained Baby-Friendly designation,^{16-18,20} but to our knowledge, the association between racial inequities in breastfeeding and implementation of the Ten Steps has not been assessed in a multihospital initiative.

Communities and Hospitals Advancing Maternity Practices (CHAMPS) was launched in 2014 with 3 years of funding from the W.K. Kellogg Foundation. The project aim was to decrease racial disparities in breastfeeding by using a community and hospital collaborative strategy to improve maternity care practices and to implement the Ten Steps in 4 Southern US states. The CHAMPS team planned to enroll at least 25 hospitals to increase compliance with the Ten Steps (resulting in Baby-Friendly designation when possible), decrease racial inequities, and provide hospital-based technical assistance and quality improvement

(QI). This work was performed before the World Health Organization's 2018 revision to the Ten Steps²¹; thus, hospitals seeking designation in this initiative followed the original Ten Steps (Supplemental Information).

METHODS

Context and Interventions

The Ten Steps were introduced from the outset as the framework around which improvement would be based; some hospitals in the target region were already familiar with the BFHI, and others were not. In contrast to other recent initiatives, which used a competitive approach for applicant hospitals,¹² all hospitals that requested to join CHAMPS were accepted. CHAMPS did not require written commitment from physicians or upper levels of management.

At enrollment, hospital teams were asked if they wanted to pursue Baby-Friendly designation; those who stated they did not selected any 3 steps to implement. Within the 3 years, however, 91% of CHAMPS hospitals were pursuing designation. As hospitals expressed a desire to pursue designation, CHAMPS teams familiarized them with the requirements for progressing through the discovery, development, dissemination, and designation phases of the Baby-Friendly USA (BFUSA) 4-D Pathway (Fig 1).

A summary of the CHAMPS intervention is provided in Fig 2; it involved intense on-site and remote coaching (workshops, webinars, and QI training), on-site education to clinicians, access to online Baby-Friendly compatible education, charting and data collection training, and (for hospitals nearing designation) assistance preparing for BFUSA's assessment, including a mock assessment from the CHAMPS team. Simultaneously, CHAMPS teams collaborated with state departments

of health; the Special Supplemental Nutrition Program for Women, Infants, and Children; Blue Cross & Blue Shield of Mississippi (BCBSMS); and the Ochsner and Merit Health Systems, among others. Given the background of racial inequities in Mississippi, direct and meaningful collaboration with the community was critical to prepare women for changing practices and to support women who were breastfeeding postpartum in regions with low breastfeeding rates. Reaching Our Sisters Everywhere, a national organization to promote breastfeeding in communities of color, partnered with CHAMPS, implementing community transformer trainings in populations around enrolled hospitals, enabling parent panels at conferences, and acting as ongoing and integral partners at all team and strategic planning meetings. CHAMPS also had a physician lead and local consultants and held regional conferences in collaboration with partners such as BCBSMS.

Data Collection

We intentionally limited data collection on the basis of experience with previous initiatives to minimize the data collection burden for participant hospitals. Thus, CHAMPS hospitals did not collect data on all Ten Steps; rather, they collected data specifically on breastfeeding initiation and exclusivity, skin-to-skin care (step 4), and rooming in (step 7). Skin-to-skin care and rooming in were selected because, on the basis of previous experience, the CHAMPS team knew they would be popular steps to adopt first, relatively easy to track, and heartening to hospital staff as indications of progress and change. In addition, both steps are linked by the evidence to increased breastfeeding rates.²²⁻²⁴ To ensure consistency, hospitals submitted data on these practices regardless of whether a hospital initially selected to

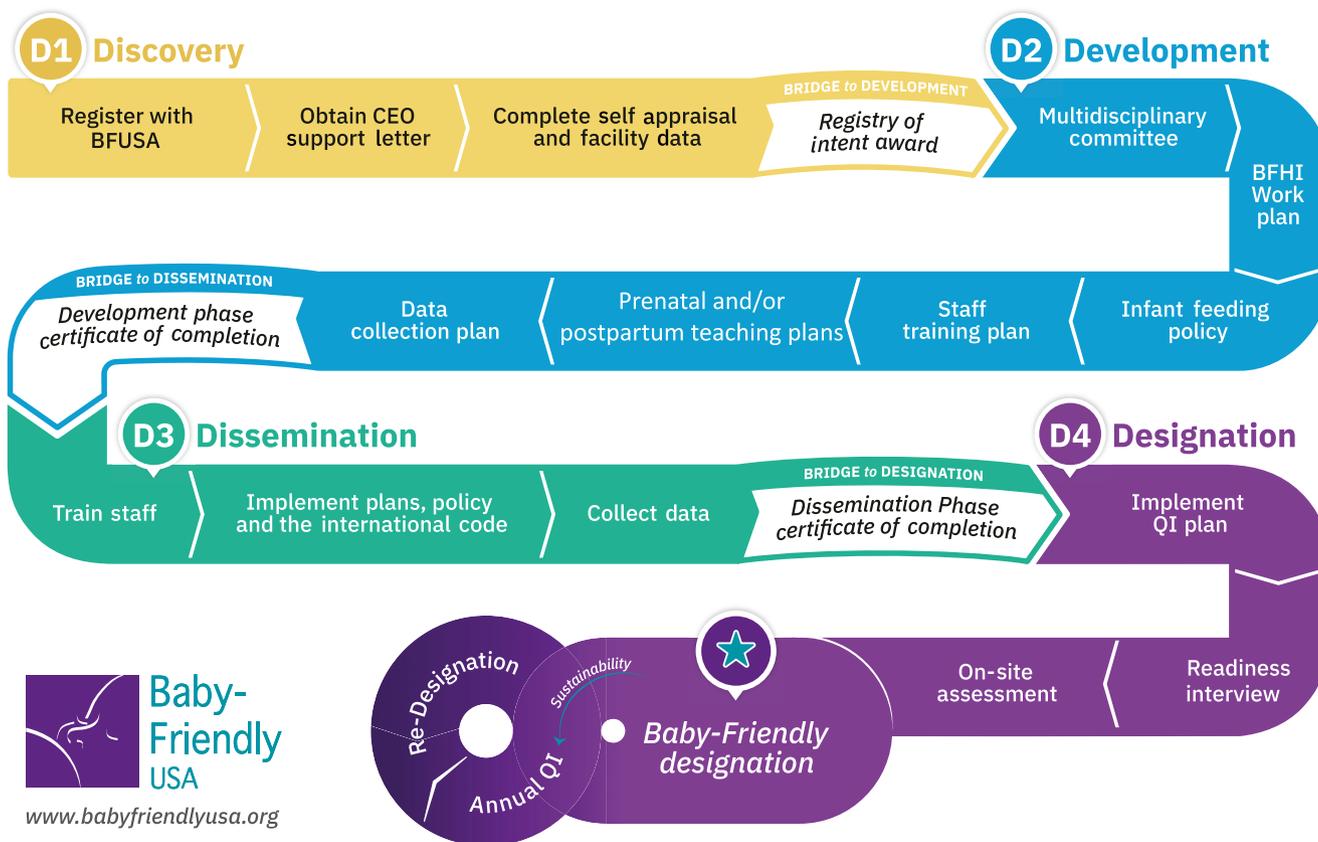


FIGURE 1
The 4-D Pathway to Baby-Friendly designation.

adopt these steps, but, in fact, all hospitals chose to work on at least 1 of these measures. Step 4 requires that hospital staff “help mothers breastfeed within 1 hour of birth,” but guidance for this step is now focused on uninterrupted skin-to-skin care for 1 hour immediately after birth. This is a known strategy for supporting breastfeeding initiation and applies to all mothers, regardless of their feeding decision, as an optimal maternity care practice.

Race and/or ethnicity was defined by the infant’s birth certificate or medical record as Hispanic, non-Hispanic African American, non-Hispanic white, or other. Hospitals were instructed to collect race and/or ethnicity data that were based on the birth certificate data preferentially because those data are reported directly by the parents, whereas race and/or ethnicity data in the medical

record could be reported by hospital staff. However, many hospitals found it difficult to link the birth certificate data to the QI data CHAMPS requested and therefore obtained race and/or ethnicity from the medical record.

Hospitals were trained (see Fig 2) to extract data from the medical record and follow Joint Commission sampling minimums.²⁵ If a practice was not charted, it was considered that the practice did not happen. Hospitals submitted de-identified aggregate data monthly via an online Qualtrics (Provo, UT) survey.

Barriers or errors early in the data collection process were identified and corrected through regular feedback, including on-site record checking. Additional training was provided when needed. Identified errors were corrected retrospectively.

Measures

Breastfeeding initiation during the hospital stay was defined as an infant receiving any breast milk, and exclusive breastfeeding was defined as an infant receiving only breast milk with no supplementation. Infants were excluded from the denominator of both breastfeeding practices if they met the Joint Commission Perinatal Core Measure 5 Exclusion Criteria (NICU admit, galactosemia diagnosis, parenteral infusion, length of stay of >120 days, enrolled in clinical trial, transferred out, prematurity, or infant death).²⁵ Skin-to-skin care and rooming in were defined (and exclusions were made) on the basis of BFUSA’s Guidelines and Evaluation Criteria for Facilities Seeking Baby-Friendly Designation, 2010 Revision.

Project Launch	<p>Fall 2014:</p> <ul style="list-style-type: none"> • 2-day meeting for team members and the funder to introduce team members and discuss goals and strategies • Public launch at Dillard University, a historically African American college near New Orleans, at the HealthConnect One conference • October 2014–August 2016: engagement with and active recruitment of hospitals in New Orleans, Mississippi, Texas, and Southern Tennessee through online advertisements, the CHAMPS Web site, local announcements, state departments of health, WIC, regional conferences, community organizations, breastfeeding coalitions, and hospital networks
Applications	<p>Application forms were available on the CHAMPS Web site; were e-mailed to interested parties, and were handed out at conferences on paper (Exhibit A). On receipt of application, CHAMPS set up a phone call or on-site visit to review the application, answer the hospital’s questions, and set goals (Baby-Friendly designation versus implementation of 3 of the Ten Steps). On-site visits almost always included a community representative (usually a WIC employee). All hospitals committed to a goal of becoming Baby-Friendly or at least adopting 3 of the Ten Steps to Successful Breastfeeding, and all hospitals that applied were accepted and enrolled on a first come, first served basis until resources were exhausted.</p>
Enrollment	<p>Upon enrollment, hospitals were asked to complete and submit several tasks:</p> <ul style="list-style-type: none"> • <u>Team roster</u>: a list of team members who would be incorporated into a task force to work on achieving their goals; in September 2015, CHAMPS presented the webinar “Building a Baby-Friendly Taskforce.” Subsequently, the webinar link was provided as a resource for completing the team roster and made publicly available online. • <u>CHAMPS clinician education plan</u>: a document to outline the hospital’s plan for meeting step 2 (clinician education); hospitals that did not have step 2 as a goal were not required to do this; however, over time, almost all adopted a Baby-Friendly goal and completed this requirement by BFUSA. In January 2015, CHAMPS presented the webinar “Clinician Training Needs for Baby-Friendly and How CHAMPS Can Help.” Subsequently, the webinar link was provided as a resource for completing the clinician education plan and made publicly available online. • <u>Data training</u>: CHAMPS scheduled hospitals for data collection training on how to collect and submit data on breastfeeding initiation and exclusivity, skin-to-skin care, and rooming in. Most training occurred virtually, but some was provided in person.
Initial Follow-up	<ul style="list-style-type: none"> • After CHAMPS received a hospital’s roster, all the contacts were added to our contact lists. • Once hospitals returned their clinician training plan, interested facilities were connected with Lactation Education Resources, a company that provides online lactation training. CHAMPS grant funding paid for 10 slots per hospital in the Lactation Education Resources 15-hour Baby-Friendly online training for nursing staff. Hospitals could purchase additional slots at a reduced price of \$45 each. Hospitals were also given a link to a free 3-hour online training for providers through Community Health Training Institute. Both trainings provided CEUs.
Maintenance: Ongoing Technical Assistance	<ul style="list-style-type: none"> • <u>Monthly workshops</u>: For hospitals on the Baby-Friendly pathway, CHAMPS offered monthly workshops tailored to specific phases of the 4-D Pathway. For hospitals not on the pathway, workshops were tailored to specific steps. Hospitals in the same phase were encouraged to attend workshops together to promote sharing. • <u>QI training</u>: During workshops and conferences, hospitals were taught QI skills, such as plan-do-study-act cycles. • <u>Web site</u>: a Web site was created to house information about CHAMPS (www.cheerequity.org/champs-south). • <u>Patient education material reviews</u>: CHAMPS developed a tool and provided patient education material reviews for hospitals to ensure that they met Baby-Friendly standards. • <u>Infant feeding policy reviews</u>: CHAMPS developed a tool for and provided infant feeding policy reviews for hospitals to ensure that they met Baby-Friendly standards. This service was offered to all hospitals working on policy updates. • <u>Monthly data review and reports</u>: Data submissions were reviewed for errors each month, and continued technical assistance around monthly data was offered to all hospitals. CHAMPS provided quarterly data reports to hospitals. • <u>Staff training</u>: CHAMPS provided resources for staff trainings to the hospitals (see enrollment follow-up section). CHAMPS also provided 4-hour clinical skills trainings for nursing staff directly to hospitals. • <u>Site visits</u>: On average, each hospital received 2 site visits over the course of the grant. CHAMPS invited community representatives (usually WIC staff) to attend site visits whenever possible. • <u>Wednesday webinars</u>: CHAMPS, in collaboration with the Mississippi State Department of Health, hosted monthly webinars for hospital staff and community partners on a variety of topics related to the Ten Steps to Successful Breastfeeding and the BFHI. The webinars were recorded and archived on the CHAMPS Web site.
Designation	<p>Before a hospital’s on-site assessment with BFUSA, CHAMPS provided intensive assistance and preparation:</p> <ul style="list-style-type: none"> • <u>Readiness assessment interview workshop</u>: Before a hospital’s readiness assessment interview with BFUSA, CHAMPS offered hospitals a workshop to help them prepare for the interview. • <u>Mock assessment and/or report</u>: CHAMPS performed 14 1-day mock assessments at hospitals preparing for designation. After each mock assessment, a detailed report was sent to hospitals in which any areas that did not meet BFHI standards were highlighted.

FIGURE 2

Diagram of the CHAMPS intervention in relation to the enrolled hospitals. CEU, continuing education unit; WIC, Special Supplemental Nutrition Program for Women, Infants, and Children.

Data Analyses

Run charts were provided to hospital teams, in real time on a quarterly basis to inform their QI efforts. Hospitals were encouraged to share their quarterly run charts with their hospital teams and use them to guide practice change. CHAMPS teams analyzed data from the hospitals that submitted any data on all 5 measures and excluded data from hospitals that failed to submit at least 1 month of data for any of the measures. We calculated monthly rates of breastfeeding initiation and exclusivity, skin-to-skin care after vaginal birth, skin-to-skin care after cesarean delivery, and rooming in at hospital discharge for all infants and stratified data by infant's race and/or ethnicity.

Generalized estimating equations (GEEs) were run at the end of the project to conduct a statistical analysis of the changes in outcomes over time that accommodated a maximum data to test for changes. We used GEEs using a negative binomial distribution with an exchangeable correlations structure and bootstrapped SEs to formally test (1) for statistical changes in process measures and breastfeeding over time, which was counted as month of data submission, and (2) whether improvements in process measures (eg, skin-to-skin care) correlated with improved breastfeeding rates. GEEs allowed us to account for the autocorrelation of the data over time and quantify the strength of the relationship between process measures and breastfeeding rates.

The first set of analyses were focused on identifying whether there were statistical changes in process measures and breastfeeding outcomes over time. Models included the month of data submission as the primary explanatory variable, data on each of the process measures, and

breastfeeding as the outcome variables of interest. We included a race and/or ethnicity variable and an interaction between race and/or ethnicity and time to test for racial and/or ethnic inequities in hospital practices, breastfeeding, and identifying whether time trends differed by racial ethnic groups.

We next tested whether improvements in process measures were associated with breastfeeding outcomes (any breastfeeding and exclusive breastfeeding) and whether these relationships differed by race and/or ethnicity. We ran 2 models, 1 testing for associations between practice measures and any breastfeeding and a second to test for associations between practice measures and exclusive breastfeeding. Process measures served as the explanatory variables of interest, and breastfeeding indicators served as the outcomes of interest. Models included a race and/or ethnicity variable and an interaction between race and/or ethnicity and the process measures to test whether relationships differed across racial and/or ethnic groups.

An a priori significance level of $P < .05$ was used in tests. Analyses and data management were conducted by using Stata/SE 14.1 (Stata Corp, College Station, TX). Data from 39 272 births over the 31-month observation period from January 2015 to July 2017 were used in analyses.

As a health care improvement activity, as defined by the Standards for Quality Improvement Reporting Excellence,²⁶ this initiative did not require institutional review board approval because it was not considered formal human subjects research and did not meet the criteria for institutional review board requirement at Boston University Medical Center.

RESULTS

Thirty-three hospitals (18 in MS, 9 in greater New Orleans, 2 in TN, and 5 in TX) were enrolled into CHAMPS on a rolling basis between October 2014 and August 2016. All applicant hospitals were accepted until financial and time restraints made additional enrollment unfeasible. On average, hospitals enrolled 4 months (TN), 5 months (New Orleans), 6 months (TX), and 9 months (MS) after CHAMPS was launched. Thirty-one hospitals submitted data on all 5 QI measures. Of the 2 hospitals that did not submit data on all 5 measures, 1 failed to submit any data, and 1 only submitted breastfeeding data. Hospitals had a mean of 1267 births (range: 210–3953) and a range of racial makeups (range: 2%–85% African American; Table 1).

Before the project, no hospital collected breastfeeding data by race and/or ethnicity nor any data on skin-to-skin care or rooming in. Of those submitting data, 50% contributed ≥ 26 months of data (interquartile range: 24–31 months), although 10 did not initially submit data by race and/or ethnicity. By the end of the project, 29 of 31 hospitals were submitting data successfully on all 5 measures by race and/or ethnicity, and 2 hospitals were submitting all measures except rooming in by race and/or ethnicity. Significant inequities existed in breastfeeding initiation and in exclusive breastfeeding rates by race at baseline but not in other indicators.

The average rate of breastfeeding initiation at CHAMPS-enrolled hospitals rose from 66% to 75% ($P < .05$), and the average rate of breastfeeding exclusivity rose from 34% to 39% ($P < .05$; Fig 3). The disparity in initiation between African American and white infants decreased by 9.6 percentage points (95% confidence interval [CI]

TABLE 1 Characteristics of CHAMPS Hospitals by Region (*n* = 31)

General Hospital Characteristics	All Hospitals (<i>N</i> = 31)	Greater New Orleans Area Hospitals (<i>n</i> = 7)	Mississippi Hospitals (<i>n</i> = 17)	Southern Tennessee Hospitals (<i>n</i> = 2)	Texas Hospitals (<i>n</i> = 5)
Total No. births	39 272	11 060	16 127	4630	7455
No. births per hospital, mean (range)	1267 (210–3953)	1580 (230–3367)	949 (210–2316)	2315 (677–3953)	1491 (800–3119)
Patients' race and/or ethnicity, median (range), %					
African American, non-Hispanic	34 (2–85)	33 (6–58)	42 (17–85)	60 (40–79)	4 (2–16)
Hispanic	5 (0–90)	9 (2–25)	2 (0–20)	7 (4–9)	61 (4–90)
White, non-Hispanic	46 (5–81)	37 (14–77)	54 (12–81)	30 (10–50)	19 (5–68)
Other	3 (0–44)	9 (2–44)	2 (0–15)	5 (3–6)	12 (1–29)
Provides level-II NICU care or above, <i>n</i> (%)	23 (33)	6 (86)	11 (65)	2 (100)	4 (80)
Average No. NICU beds for hospitals with a NICU, mean (range)	25 (4–100)	21 (5–52)	23 (4–100)	40 (10–69)	29 (6–58)
Provides donor milk for hospitals with an NICU, <i>n</i> (%)	11 (48)	2 (33)	5 (45)	1 (50)	3 (75)
Prenatal care status					
Hospital-operated clinic, <i>n</i> (%)	15 (48)	6 (86)	5 (29)	2 (100)	2 (40)
BFHI characteristics at enrollment					
Paying for formula, <i>n</i> (%)	3 (10)	0 (0)	1 (6)	0 (0)	2 (40)
Not distributing formula industry-sponsored gift bags, <i>n</i> (%)	13 (42)	6 (86)	2 (12)	1 (50)	4 (80)

Thirty-one of 33 CHAMPS hospitals submitted data on all 5 QI measures.

1.6–19.5) over 31 months. Breastfeeding initiation and exclusivity among African American infants increased from 46% to 63% ($P < .05$) and from 19% to 31% ($P < .05$), respectively. Overall, skin-to-skin care after vaginal birth increased from 33% to 88% ($P < .01$), skin-to-skin care after cesarean delivery increased from 11% to 69% ($P < .05$), and rooming in increased from 11% to 75% ($P < .01$). Skin-to-skin care after cesarean delivery was significantly associated with increased breastfeeding initiation and exclusivity overall, with the greatest impact among African American infants (Table 2). Rooming in was significantly associated with increased exclusive breastfeeding in African American infants; African American infants who roomed in were 1.54 times more likely to exclusively breastfeed than infants who did not (95% CI: 1.14–2.07).

By 2017, 91% of all CHAMPS hospitals (100% [18 of 18] of Mississippi CHAMPS hospitals) were on the Baby-Friendly pathway, and 1 hospital had gained Baby-Friendly designation. By November 2018, 14

CHAMPS hospitals were designated. During enrollment with CHAMPS, the proportion of hospitals paying for infant formula increased from 10% to 45%, and the number of hospitals discontinuing distribution of formula industry sample packs increased from 42% to 97%. CHAMPS trained 876 hospital staff, Reaching Our Sisters Everywhere trained 126 community transformers and supported 54 breastfeeding clubs, and CHAMPS enabled the opening of the first “Baby Cafés” in Mississippi and Louisiana.

DISCUSSION

Increased compliance with the Ten Steps as part of a broad-based initiative incorporating community education, staff training, and QI at 33 hospitals in 4 Southern US states was associated with a decrease in racial and/or ethnic inequities in breastfeeding initiation in the hospital and with increased breastfeeding initiation, breastfeeding exclusivity, skin-to-skin care, and rooming in across all races. Compliance with specific steps was associated with increased breastfeeding rates, most clearly in

African American dyads. This is the first time such outcomes have been reported by race across a cohort of hospitals in connection with the BFHI.

Initial enrollment was slow but gained momentum over time. We did not analyze why specific hospitals signed up for CHAMPS, but some approached us spontaneously, and others approached CHAMPS for help because, for example, BCBSMS was requesting they improve compliance with the Ten Steps. In 2014, no Mississippi hospital was Baby-Friendly designated, and only 2 were on the pathway. By 2017, 100% of Mississippi CHAMPS hospitals were pursuing designation, as were 81% of all Mississippi birthing hospitals.

Breastfeeding initiation at our hospitals rose from 66% to 75% ($P < .05$), and exclusivity rose from 34% to 39% ($P < .05$). As a comparison, the national Best Fed Beginnings project,¹² in which 90 hospitals were enrolled nationally between 2012 and 2014, reported an increase in initiation from 79% to 83% and in exclusivity from 39% to 61%. In CHAMPS, skin-to-skin care after

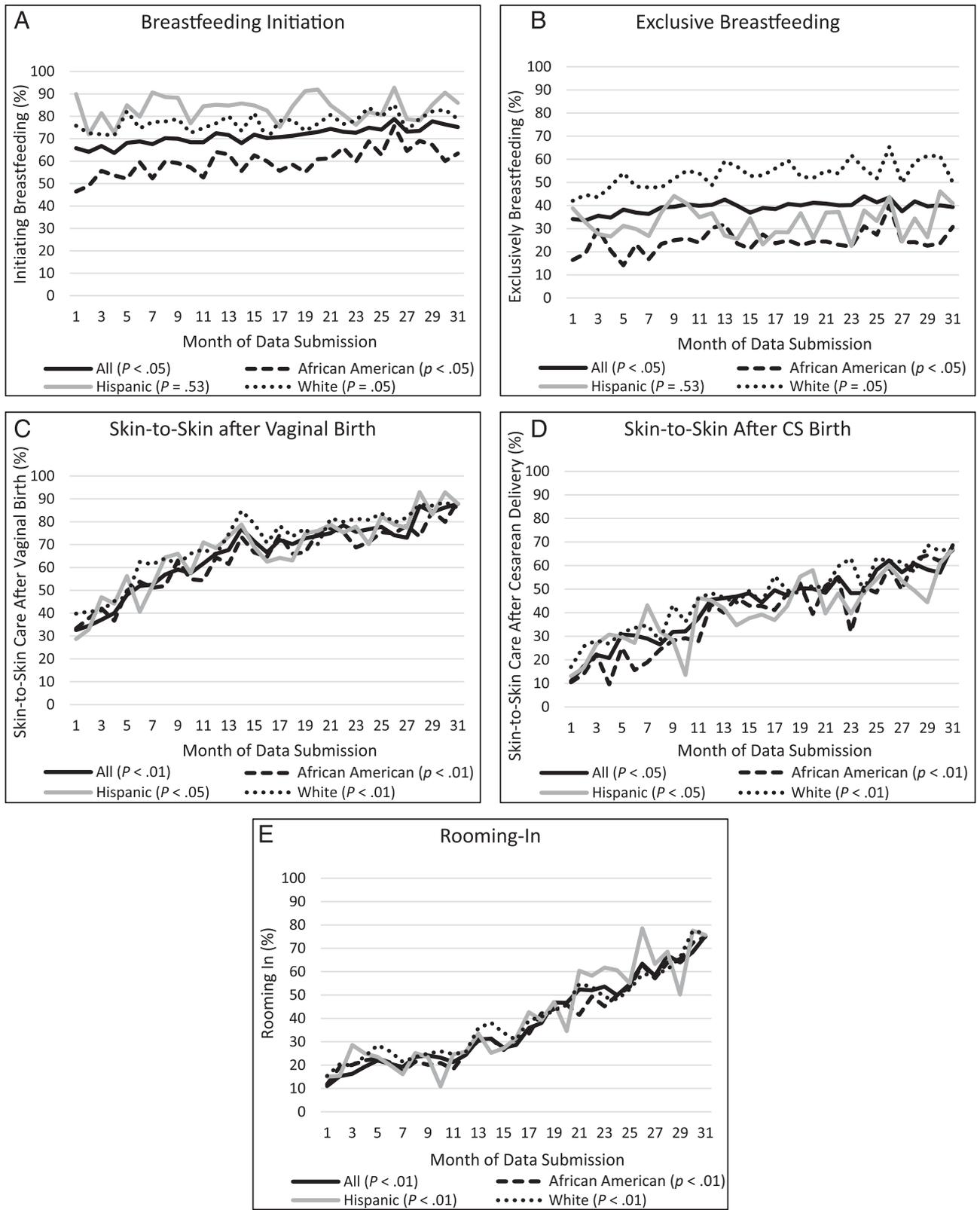


FIGURE 3 Breastfeeding rates and Baby-Friendly practices by race over time among CHAMPS hospitals. A, Breastfeeding initiation. B, Exclusive breastfeeding. C, Skin-to-skin care after vaginal birth. D, Skin-to-skin care after cesarean delivery. E, Rooming in.

TABLE 2 Associations Between Improvements in Maternity Practices and Breastfeeding Initiation and Exclusivity

	Overall		African American		Hispanic		White	
	Rate Ratio	95% CI	Rate Ratio	95% CI	Rate Ratio	95% CI	Rate Ratio	95% CI
Breastfeeding initiation								
Skin-to-skin care, vaginal delivery	1.09	(1.03–1.15)	1.12	(0.99–1.26)	1.21	(1.07–1.37)	1.04	(0.97–1.11)
Skin-to-skin care, cesarean delivery	1.15	(1.08–1.23)	1.38	(1.25–1.53)	1.19	(1.07–1.32)	1.05	(0.99–1.12)
Rooming in	1.07	(1–1.15)	1.15	(0.99–1.32)	1.02	(0.93–1.12)	1.08	(0.99–1.18)
Breastfeeding exclusivity								
Skin-to-skin care, vaginal delivery	1.14	(1.04–1.25)	1.19	(0.94–1.52)	1.33	(0.9–1.95)	1.17	(0.96–1.44)
Skin-to-skin care, cesarean delivery	1.20	(1.07–1.34)	1.65	(1.31–2.08)	1.50	(1.18–1.91)	1.10	(1–1.21)
Rooming in	1.10	(0.99–1.22)	1.54	(1.14–2.07)	1.30	(0.89–1.89)	1.12	(0.99–1.28)

vaginal birth rose from 33% to 88% ($P < .01$); in Best Fed Beginnings, it rose from 18% to 65% ($t = 13.8$; $P < .001$). In CHAMPS, rooming in rose from 11% to 75% ($P < .01$); in Best Fed Beginnings, it rose from 21% to 76%.

We believe CHAMPS's broad reach was assisted by proactive development of partnerships at many levels and from the specificity of the geographic focus. One strong collaboration was with BCBSMS, which recognized the significant health benefits of increasing breastfeeding rates in the state and made Baby-Friendly designation a QI requirement of its network hospitals. BCBSMS actively encouraged all hospitals to engage in the Baby-Friendly process and enroll in CHAMPS.

One CHAMPS goal was increased compliance with the Ten Steps, which, in many cases, would be expected to lead to Baby-Friendly designation. Only 1 hospital gained Baby-Friendly designation within the project time frame, although 14 CHAMPS hospitals in the South are now designated. Given that all CHAMPS hospitals in Mississippi enrolled in BFUSA's 4-D Pathway, we might have expected more hospitals to actually gain designation. However, we conclude that the Baby-Friendly process takes time to implement safely and that full compliance for a multiple-hospital initiative within a 3-year time frame may not be realistic, especially in regions

where practices require the most change.

During the process, many outdated and non-evidence-based practices, such as breast binding, universal "trials of swallowing" with bottles of sterile water, physician orders stating that infants must be fed every 2 to 3 hours, nasogastric tubal insertion for healthy newborns, long periods of maternal/infant separation, and supplementation of all newborns with glucose water to "prevent hypoglycemia" came to light. Evidence-based practices, such as delayed cord clamping, placing infants on their backs for safe sleep, and visits to the pediatrician within the American Academy of Pediatrics' recommended 48 hours postdischarge time frame, were often lacking. As hospitals worked toward improving practices, policies and practices were adapted to eliminate these unsafe practices and replace them with updated, evidence-based care.

One limitation is that hospitals collected their own data and were not blinded to desired outcomes. That said, no hospitals were collecting data on skin-to-skin care or rooming in before this initiative. One limitation that may have biased results away from the anticipated outcomes is that some hospitals were not able to improve practices, but their data are included with the more proactive hospitals. Further study is warranted to examine actual internal processes and progress by hospitals that may have contributed

to how quickly they implemented change. However, using GEEs in our analysis allowed us to account for the autocorrelation of the data over time and quantify the strength of the relationship between process measures and breastfeeding rates. Another potential limitation is that we did not systematically collect or analyze balancing measures in a quantitative way, although CHAMPS coaches and the physician lead were in constant communication with hospital leads for qualitative feedback. We are aware that many non-evidence-based and potentially unsafe practices were eliminated from maternity units, and we were not made aware of any adverse consequences. We did not find any baseline racial inequities in non-breastfeeding-related practices, but our data were trending in that direction, and we propose the lack of significance was due to sample size.

CONCLUSIONS

An initiative to increase compliance with the Ten Steps, incorporating community engagement and hospital-based change, decreased racial inequities in breastfeeding initiation and exclusivity in the Southern United States, where breastfeeding rates are low and public health outcomes are poor. The initiative increased breastfeeding initiation and exclusivity across enrolled hospitals, catalyzed activity throughout the states involved, and was particularly

successful in Mississippi. Because adoption of the Ten Steps is based on policy and practice change, outcomes should be sustained.

As a result of this success, the project has been refunded by The Kellogg Foundation and by the Bower Foundation for 3 more years in Mississippi, with a goal of Baby-Friendly designation for all Mississippi birthing hospitals. In late 2018, CHAMPS received a new grant from the Bower Foundation to assist with sustainability, which will also be maintained through Baby-Friendly USA's ongoing reassessment

requirements for retaining Baby-Friendly designation.

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ABBREVIATIONS

BCBSMS: Blue Cross & Blue Shield of Mississippi
BFHI: Baby-Friendly Hospital Initiative
BFUSA: Baby-Friendly USA
CHAMPS: Communities and Hospitals Advancing Maternity Practices
CI: confidence interval
GEE: generalized estimating equation
IHS: Indian Health Service
QI: quality improvement

Dr Merewood conceptualized and designed the project, drafted the initial manuscript, and reviewed and revised the manuscript; Dr Bugg led the community component of the project and reviewed and revised the manuscript; Ms Burnham coordinated and supervised data collection, advised hospitals, and reviewed and revised the manuscript; Ms Krane assisted with the conceptualization and design of the study, performed internal evaluation and feedback on an ongoing basis, and reviewed and revised the manuscript; Dr Edwards assisted with the conceptualization and design of the study, performed internal evaluation and feedback on an ongoing basis during implementation of the study (including interviewing staff at every hospital at baseline and >90% of hospitals at 2 years), and reviewed and revised the manuscript; Dr Nickel worked as the statistician on the study, advised and assisted with the overall design, conceptualized, designed, verified, and performed all data analyses, and reviewed and revised the manuscript; Dr Broom provided liaison to Blue Cross & Blue Shield of Mississippi and reviewed and revised the manuscript; Dr Feldman-Winter acted as physician lead, provided ongoing advice on medical topics and quality improvement, contributed to the initial draft of the manuscript, and reviewed and revised the manuscript; and all authors approved the final manuscript as submitted and agree to be accountable for all aspects of the work.

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REFERENCES

1. Kane JB, Miles G, Yourkavitch J, King K. Neighborhood context and birth outcomes: going beyond neighborhood disadvantage, incorporating affluence. *SSM Popul Health*. 2017;3:699–712
2. Yourkavitch J, Kane JB, Miles G. Neighborhood disadvantage and neighborhood affluence: associations with breastfeeding practices in urban areas. *Matern Child Health J*. 2018; 22(4):546–555
3. Davis KE, Li X, Adams-Huet B, Sandon L. Infant feeding practices and dietary consumption of US infants and toddlers: National Health and Nutrition Examination Survey (NHANES) 2003–2012. *Public Health Nutr*. 2018;21(4): 711–720
4. Anstey EH, Chen J, Elam-Evans LD, Perrine CG. Racial and geographic differences in breastfeeding - United States, 2011–2015. *MMWR Morb Mortal Wkly Rep*. 2017;66(27):723–727
5. Merewood A. Race, ethnicity, and breastfeeding. *Pediatrics*. 2006;118(4): 1742–1743
6. McKinney CO, Hahn-Holbrook J, Chase-Lansdale PL, et al; Community Child Health Research Network. Racial and ethnic differences in breastfeeding. *Pediatrics*. 2016;138(2): e20152388
7. Matthews TJ, MacDorman MF, Thoma ME. Infant mortality statistics from the 2013 period linked birth/infant death

- data set. *Natl Vital Stat Rep.* 2015;64(9): 1–30
8. MacDorman MF, Hoyert DL, Mathews TJ. Recent declines in infant mortality in the United States, 2005–2011. *NCHS Data Brief.* 2013;(120):1–8
 9. Croft JB, Wheaton AG, Liu Y, et al. Urban-rural county and state differences in chronic obstructive pulmonary disease - United States, 2015. *MMWR Morb Mortal Wkly Rep.* 2018;67(7):205–211
 10. Dwyer-Lindgren L, Bertozzi-Villa A, Stubbs RW, et al. Trends and patterns of differences in chronic respiratory disease mortality among US counties, 1980–2014. *JAMA.* 2017;318(12): 1136–1149
 11. Robbins C, Boulet SL, Morgan I, et al. Disparities in preconception health indicators - behavioral risk factor surveillance system, 2013–2015, and pregnancy risk assessment monitoring system, 2013–2014. *MMWR Surveill Summ.* 2018;67(1):1–16
 12. Feldman-Winter L, Ustianov J, Anastasio J, et al. Best Fed Beginnings: a nationwide quality improvement initiative to increase breastfeeding. *Pediatrics.* 2017;140(1):e20163121
 13. Merewood A. Baby-friendly and the Indian Health Service: a new standard of care. *J Hum Lact.* 2015;31(2):207–208
 14. Karol S, Tah T, Kenon C, et al. Bringing baby-friendly to the Indian Health Service: a systemwide approach to implementation. *J Hum Lact.* 2016;32(2): 369–372
 15. Kramer MS, Chalmers B, Hodnett ED, et al; PROBIT Study Group (Promotion of Breastfeeding Intervention Trial). Promotion of Breastfeeding Intervention Trial (PROBIT): a randomized trial in the Republic of Belarus. *JAMA.* 2001;285(4):413–420
 16. Merewood A, Mehta SD, Chamberlain LB, Philipp BL, Bauchner H. Breastfeeding rates in US Baby-Friendly hospitals: results of a national survey. *Pediatrics.* 2005;116(3):628–634
 17. Merewood A, Philipp BL, Chawla N, Cimo S. The Baby-Friendly Hospital Initiative increases breastfeeding rates in a US neonatal intensive care unit. *J Hum Lact.* 2003;19(2):166–171
 18. Philipp BL, Merewood A, Miller LW, et al. Baby-Friendly Hospital Initiative improves breastfeeding initiation rates in a US hospital setting. *Pediatrics.* 2001;108(3):677–681
 19. Ware JL, Schetzina KE, Morad A, Barker B, Scott TA, Grubb PH. A statewide quality improvement collaborative to increase breastfeeding rates in Tennessee. *Breastfeed Med.* 2018;13(4): 292–300
 20. Merewood A, Patel B, Newton KN, et al. Breastfeeding duration rates and factors affecting continued breastfeeding among infants born at an inner-city US Baby-Friendly hospital. *J Hum Lact.* 2007;23(2):157–164
 21. World Health Organization. Protecting, promoting, and supporting breastfeeding in facilities providing maternity and newborn services: the revised Baby-Friendly Hospital Initiative 2018: implementation guidance. 2018. Available at: www.who.int/nutrition/publications/infantfeeding/bfhi-implementation/en/. Accessed June 15, 2018
 22. Moore ER, Anderson GC, Bergman N, Dowswell T. Early skin-to-skin contact for mothers and their healthy newborn infants. *Cochrane Database Syst Rev.* 2012;(5):CD003519
 23. Jaafar SH, Ho JJ, Lee KS. Rooming-in for new mother and infant versus separate care for increasing the duration of breastfeeding. *Cochrane Database Syst Rev.* 2016;(8): CD006641
 24. Ward LP, Williamson S, Burke S, et al. Improving exclusive breastfeeding in an urban academic hospital. *Pediatrics.* 2017;139(2):e20160344
 25. The Joint Commission. Specifications manual for Joint Commission national quality measures. 2012. Available at: https://www.jointcommission.org/specifications_manual_for_national_hospital_inpatient_quality_measures.aspx. Accessed November 10, 2018
 26. Standards for Quality Improvement Reporting Excellence. Revised standards for quality improvement reporting excellence Squire 2.0. 2018. Available at: <http://www.squire-statement.org/index.cfm?fuseaction=page.viewpage&pageid=471>. Accessed November 10, 2018

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