Wednesday Webinar: October 2019

Associations Between Breastfeeding Initiation and Infant Mortality in an Urban Population (Memphis, Tennessee)

Presented by
Dr. Julie Ware, MD, MPH, Center for Breastfeeding Medicine at Cincinnati Children's Hospital Medical Center (formerly of Memphis, Tennessee and the Shelby County Breastfeeding Coalition)

Jennifer Kmet, MPH Senior Epidemiologist, Shelby County Health Department and Co-Chair of Shelby County Breastfeeding Coalition

Moderated by
Dr. Lori Feldman-Winter, MD, MPH, FAAP, FABM, Cooper University Health Care

Press *6 to mute your line, #6 to unmute. Please do not press hold.
You can use the chat box for questions during the presentation.

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Upcoming CHAMPS Trainings

- **Tuesday, October 29th-** Safe Implementation of Evidence-Based Maternity Practices
  - 1-3:30 PM
  - Clyde Muse Center, Pearl, MS
  - Registration Link: https://bit.ly/33v9r0x

Trainings are open to all CHAMPS hospitals and CHAMPS community partners. You can register for the trainings at CHEERequity.org/trainings

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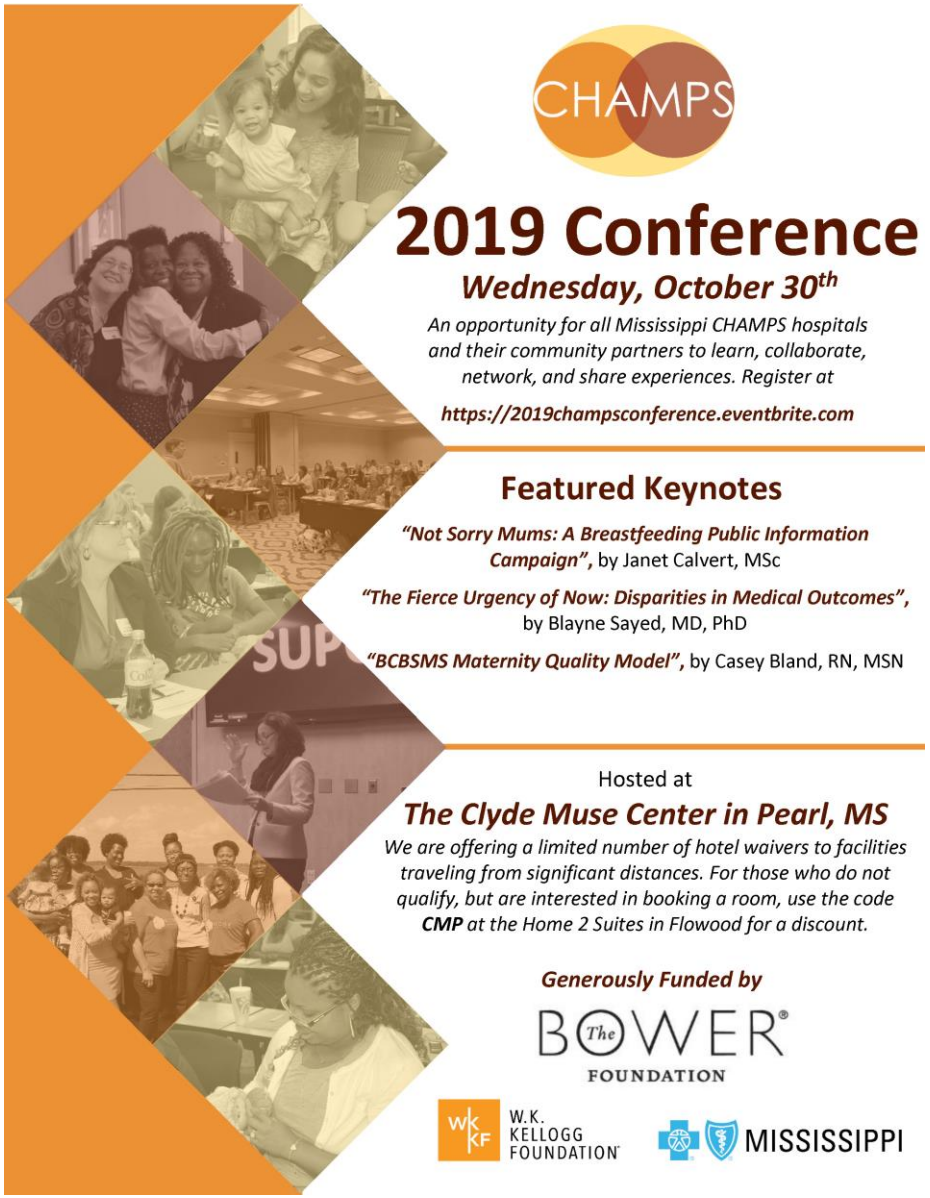

Registration Link: https://2019champsconference.eventbrite.com

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Upcoming Wednesday Webinars

Webinars are held in collaboration with the Mississippi State Department of Health and are scheduled on Wednesdays from 12-1PM CST

- **November 13th**: The BFUSA Onsite Assessment: Experiences and Advice from CHAMPS Hospitals
  - *Presented by CHAMPS Hospitals*

- **December 11th**: Inter-Professional Breastfeeding Education: The UMMC IPE
  - *Presented by Dr. Anne Merewood and UMMC Faculty*

For log-in information or for slides and recordings of past webinars, visit: cheerequity.org/webinars.html

If there are topics you would like covered, please email CHAMPSbreastfeed@gmail.com or talk to your CHAMPS hospitals coach about your ideas.

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Associations between Breastfeeding Initiation and Infant Mortality in an Urban Population

CHAMPS Webinar
October 2, 2019

Julie Ware, MD, MPH, IBCLC, Cincinnati Children's Medical Center
Jennifer Kmet, MPH Shelby County Health Department

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Disclosures

- We have no relevant financial relationships to disclose
- We will not be discussing an unapproved use of a commercial product or device

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Objective

- Explain the association of increased breastfeeding rates and decreased infant mortality observed in Shelby County, Tennessee over an 11 year period.

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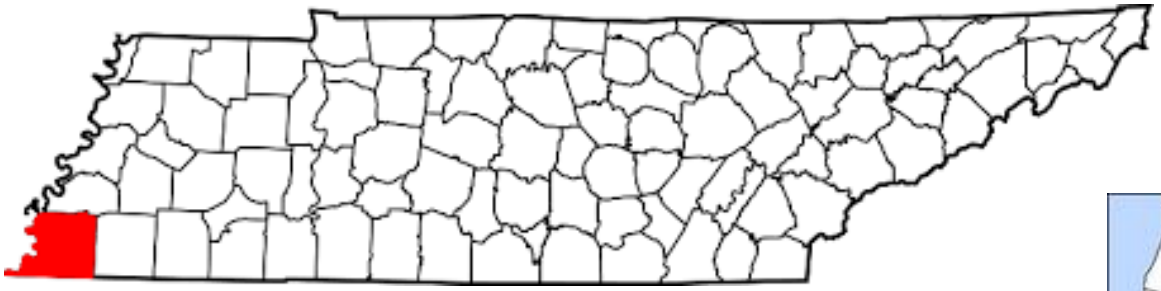
Shelby County, Tennessee Mississippi Delta Region

- Low breastfeeding
- High infant mortality, poverty



2017
936,961 total population
53.5% African American
6.4% Hispanic
13,177 births
35.8% children under 5 in poverty

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Data Sources: US Census Bureau 2017 (ACS 1-Yr); TN Dept of Health, Shelby County Resident Birth Certificate Data

A Crisis of Infant Mortality in Memphis

http://thedocumentarygroup.com/portfolio/babyland/

"Born to Die"
Community gravesite in Memphis, TN
Commercial Appeal, March 2005
Karen Pulfer Focht, photojournalist

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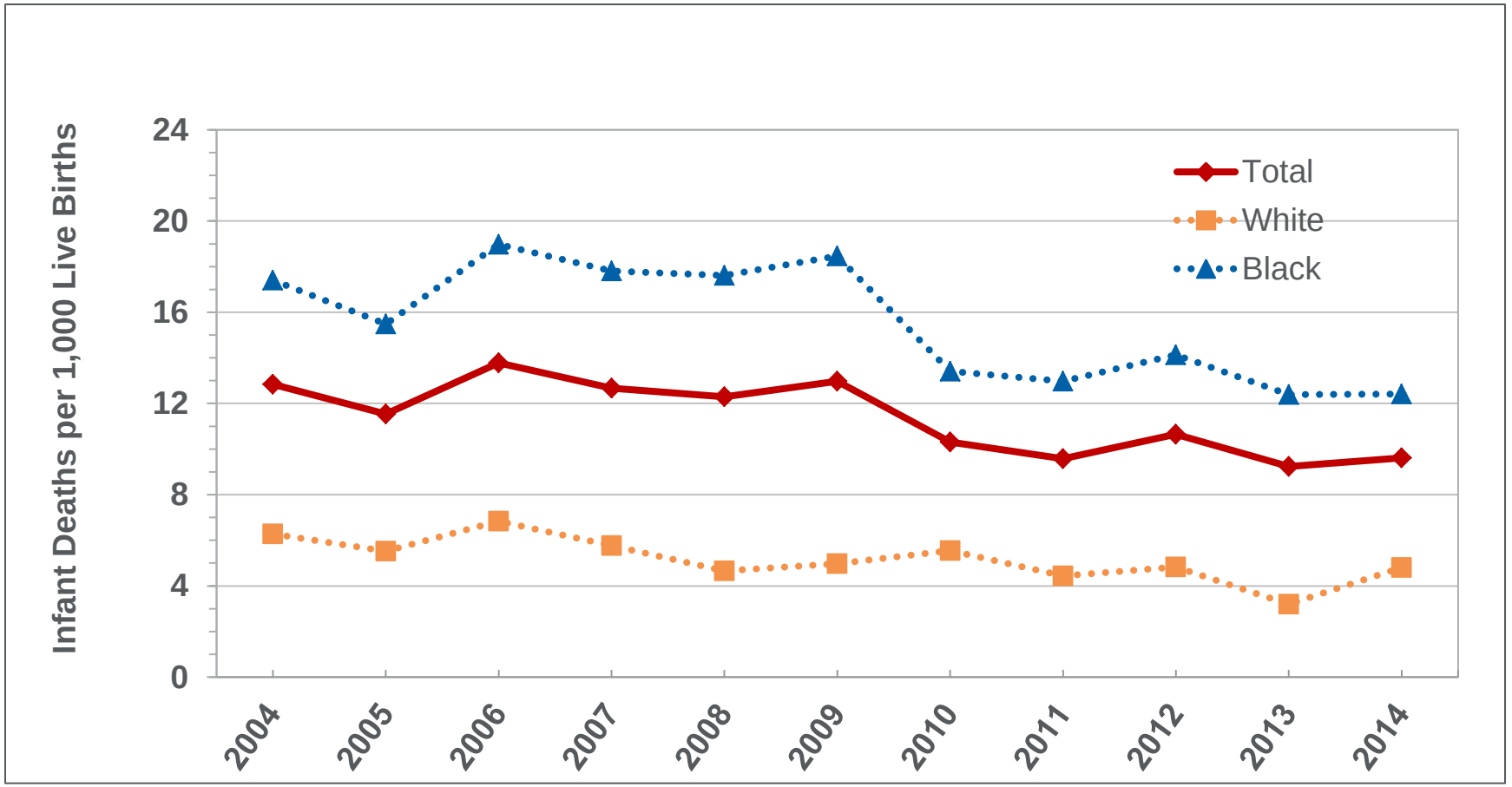
Infant Mortality, Shelby County 2004-2014



Infant mortality rate by race in Shelby County Tennessee 2004-2014. Data Source: Tennessee Department of Health, Office of Policy, Planning and Assessment, Division of Health Statistics, Birth and Death Certificate Data for Shelby County Residents, 2004-2014.
Prepared by Shelby County Health Department, Office of Epidemiology and Infectious Diseases.

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Infant Mortality Funding

- Tennessee Infant Mortality Summit
- Governor's Office of Children's Care Coordination (GOCCC)
- $7.5 Million 2006-2010
  - CenteringPregnancy – (group prenatal care)
  - Community Voices – March of Dimes

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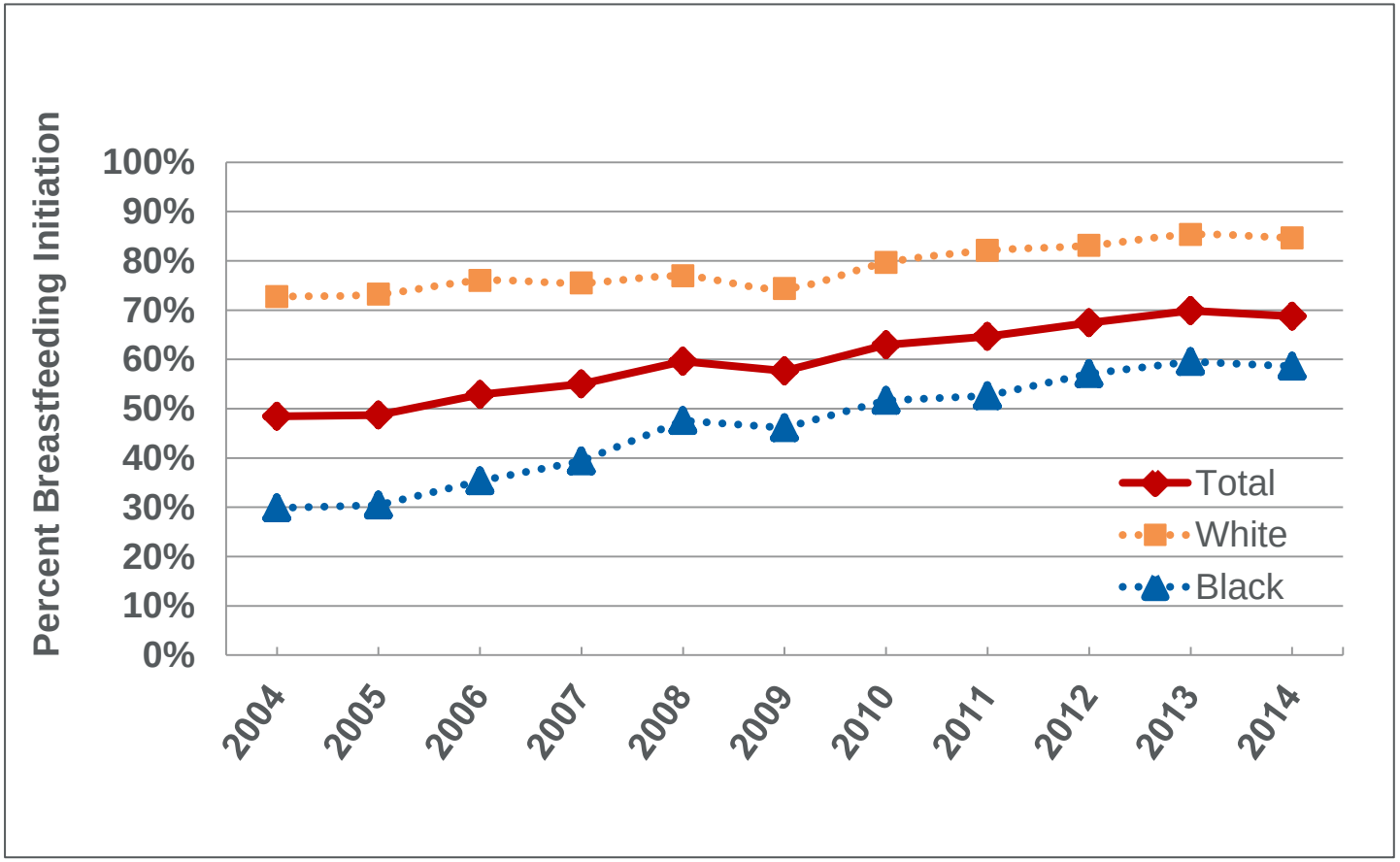
Breastfeeding Initiation Shelby County 2004-2014



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Data Source: Tennessee Department of Health, Office of Policy, Planning and Assessment, Division of Health Statistics, Birth Certificate Data for Shelby County Residents, 2004-2014.
Prepared by Shelby County Health Department, Office of Epidemiology and Infectious Diseases.
Note: Calculations exclude records with Missing/Unknown values.

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Shelby County Breastfeeding Coalition The Beginning

- WIC Breastfeeding Coordinator
  Roberta Russell

- Breastfeeding Initiation ~ 3% in 1998 in urban hospital

- Shelby County Breastfeeding Coalition (SCBC) Formed in 2004 with private and public partners

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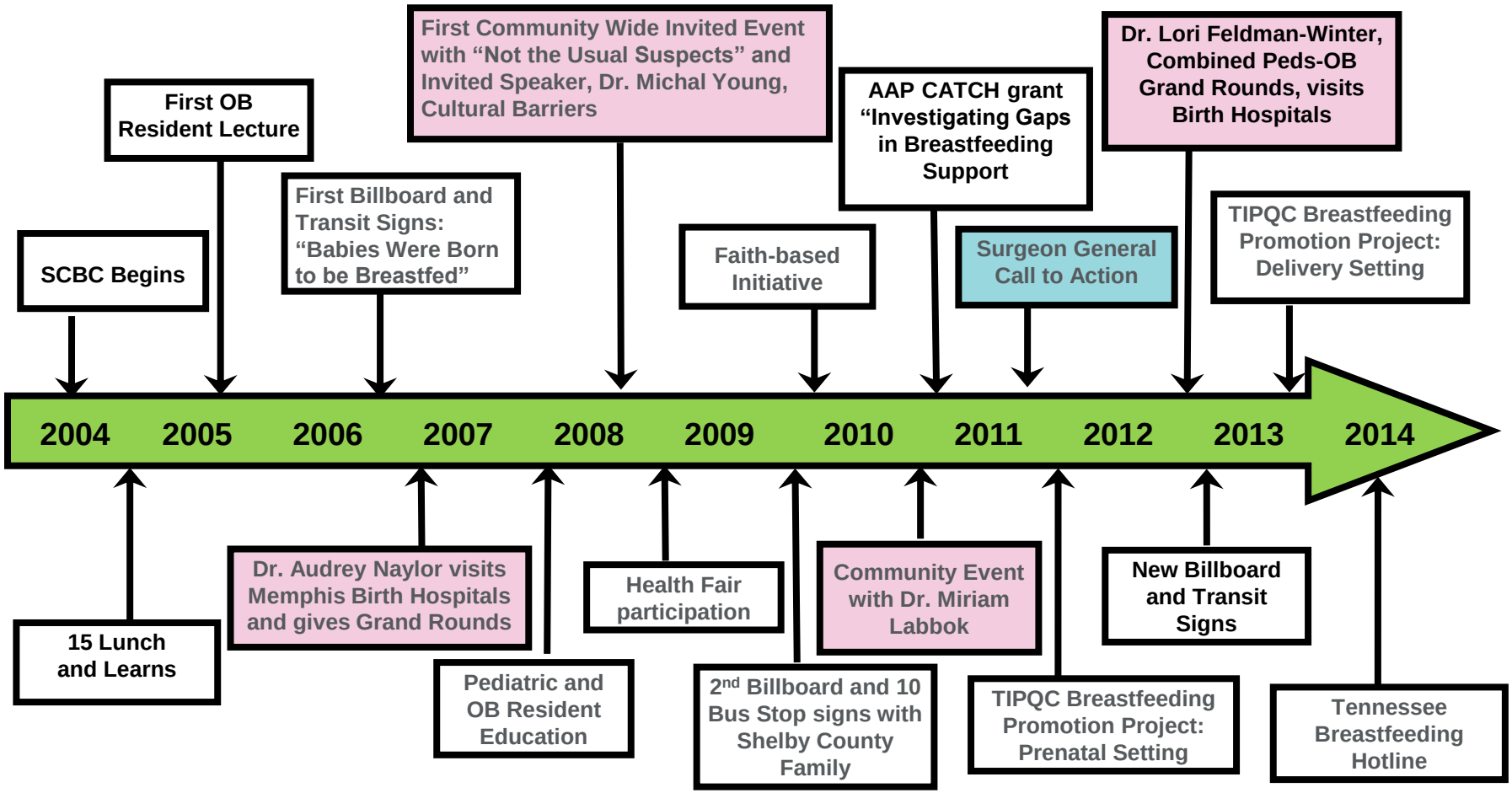
Shelby County Breastfeeding Timeline



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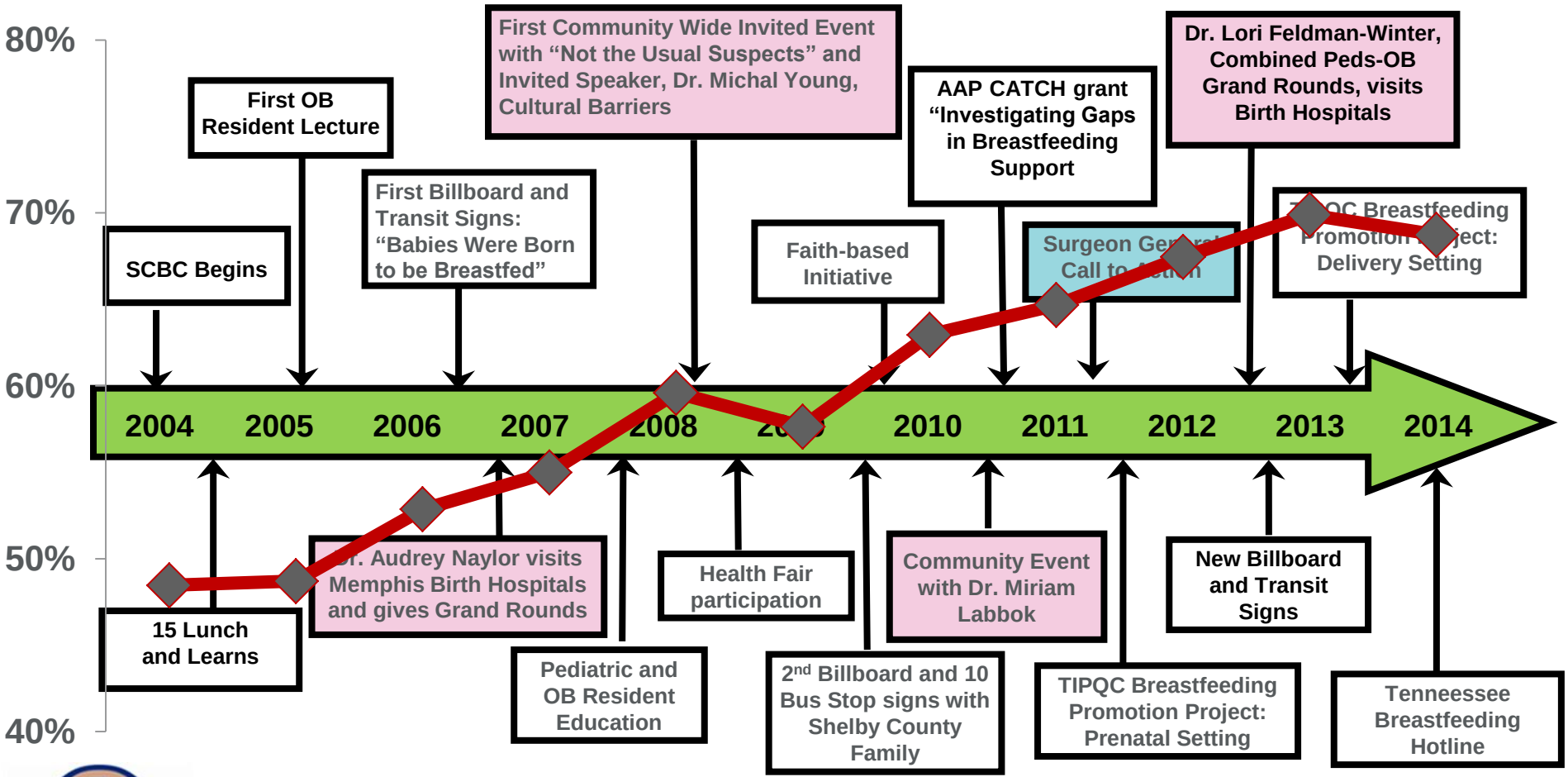
Shelby County Breastfeeding Timeline



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Expertise Shared with Community

Audrey Naylor

Nancy Wight

Lori Feldman-Winter

Susan Landers

malca

Miriam Labbok

Thomas Hale and Michelle Brenner

Michal Young

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Shelby County Breastfeeding Coalition

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“Is Memphis Baby Friendly?” Grand Rounds

- ***Capitalize on outside expertise***
- Visit from Dr. Audrey Naylor, of Wellstart International in 2007
- Toured all birth hospitals, reviewed breastfeeding policies and statistics

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We Listened!

- #1 reason for current low initiation from birth hospitals - to Dr. Naylor. “It’s our demographic.”
- WBW Breastfeeding Update with Dr. Michal Young and Mishawn Purnell to discuss Cultural Barriers
- “Breaking Down the Cultural Barriers to Breastfeeding” 2008

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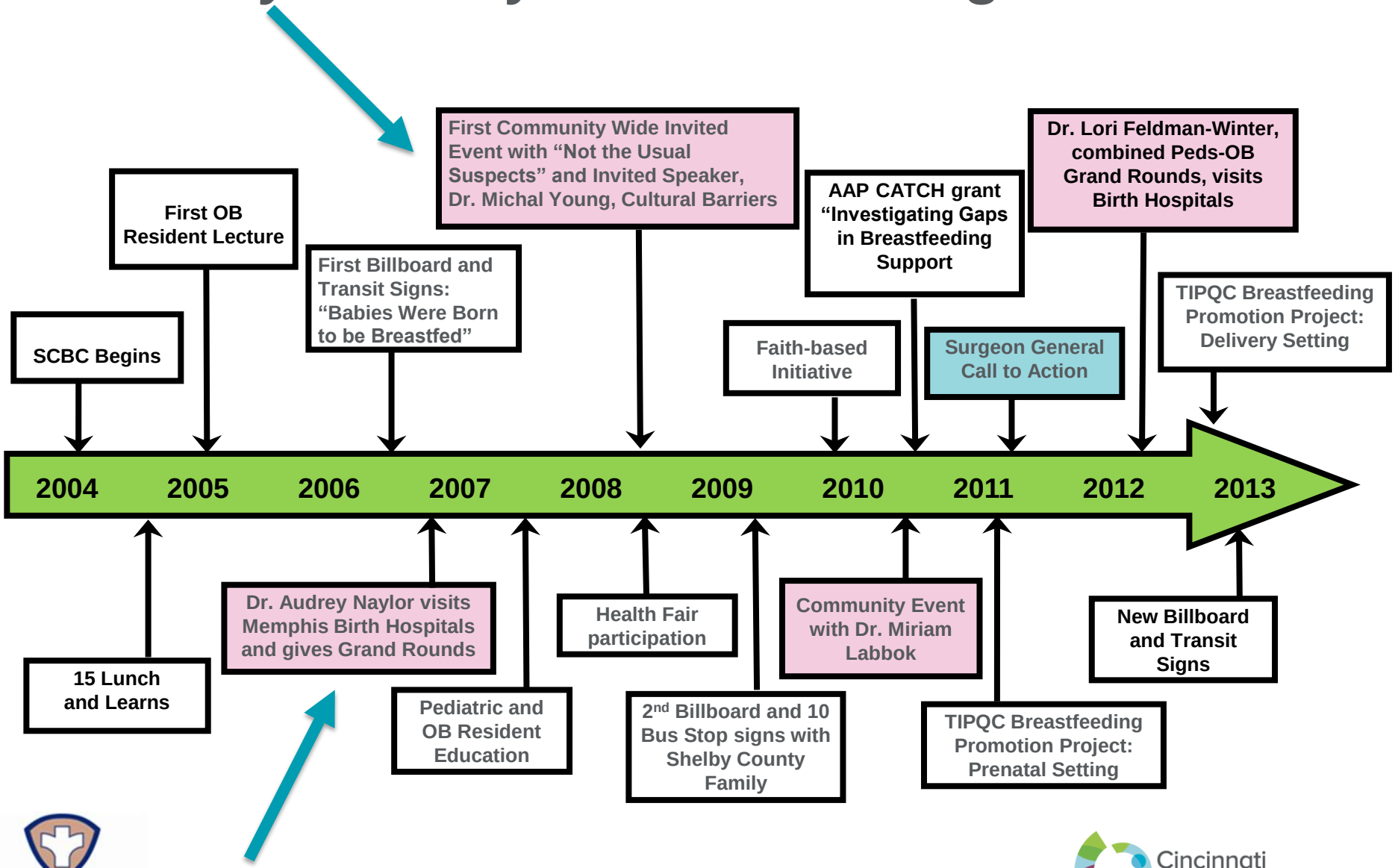
Shelby County Breastfeeding Timeline



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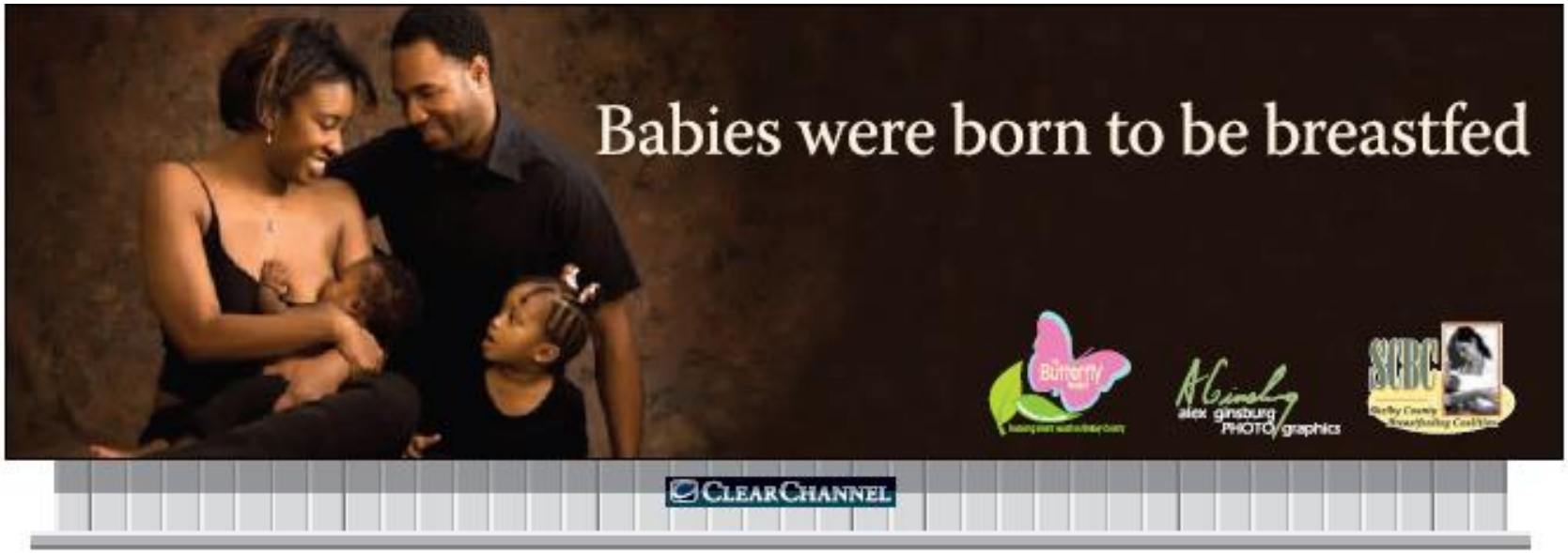
“Picture-Perfect Family for Campaign”

March 2009



- Shelby County Infant Mortality Reduction Initiative provided funding, as well as community members.
- 1 Billboard and 10 transit signs placed
- Billboard stayed up for over 2 years!

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Not the Usual Suspects

The Right Start

Collaborating with Obesity Prevention

Leaders of the Let's CHANGE partnership

Renee Frazier, CEO, HMCT

Yvonne Madlock, Shelby County Health Director

- Let's Commit to Healthy Activity and Nutrition Goals Everyday
- 50 organizations
- Importance of breastfeeding in obesity prevention

Let's CHANGE B-5-2-1-0

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Collaboration with Maternal and Child Health Groups

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Early Success Coalition

No Wrong Door Referral

What about Maternity Care Practices?

- Most area Birth Hospitals involved in the TIPQC "Breastfeeding Promotion: Delivery Project"
- 3 Memphis Practices joined "Breastfeeding Promotion: Prenatal Project" (Step 3 of the Ten Steps)

Tennessee Initiative for Perinatal Quality Care
TIPQC

unicef

Methodist Healthcare

Regional Medical Center at Memphis

BAPTIST MEMORIAL HEALTH CARE

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Saint Francis Hospital - Memphis
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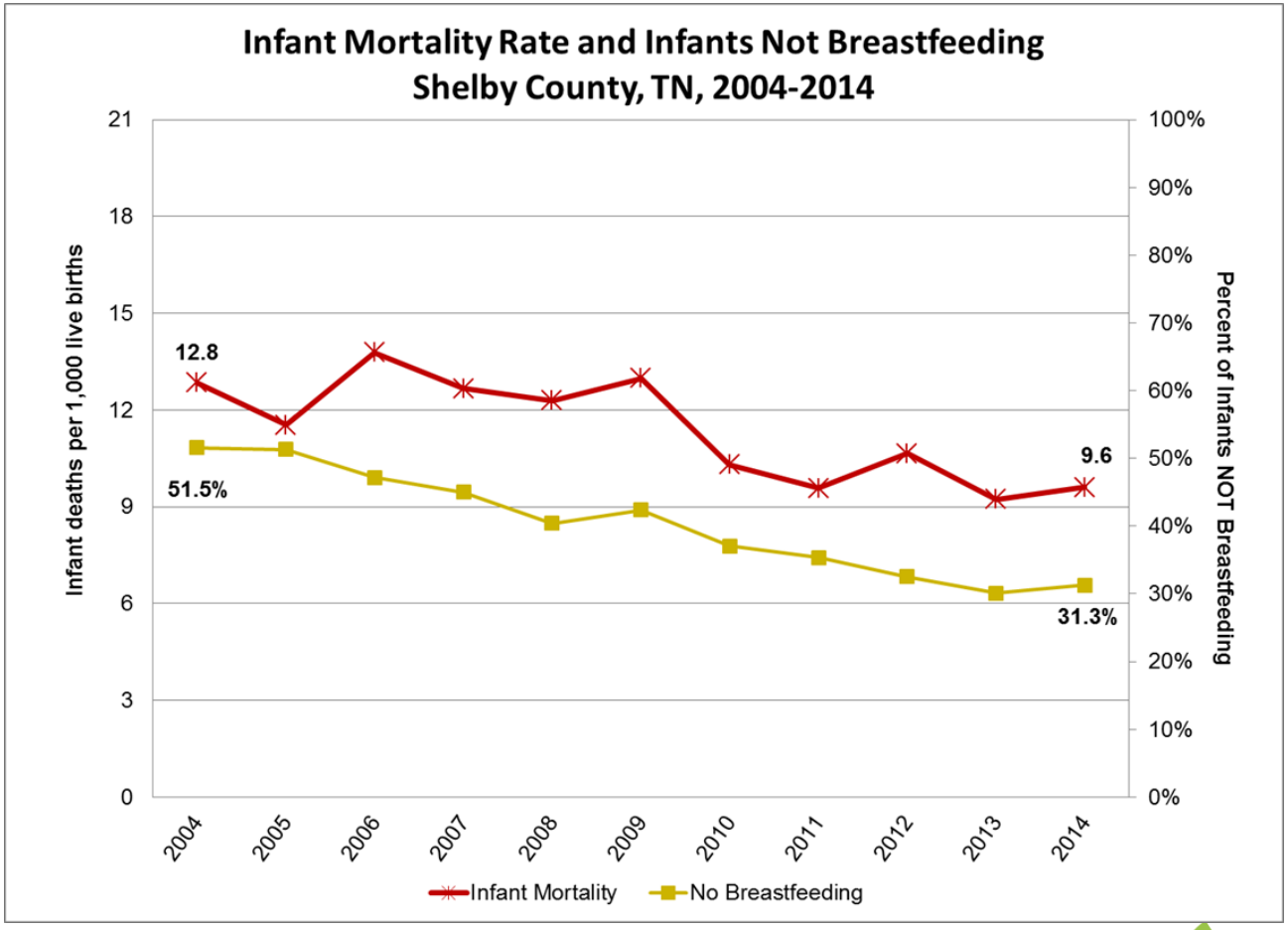
NOT Breastfeeding and Infant Mortality



Data Source: Tennessee Department of Health, Office of Policy, Planning and Assessment, Division of Health Statistics, Birth and Death Certificate Data for Shelby County Residents, 2004-2013. Prepared by Shelby County Health Department, Office of Epidemiology and Infectious Diseases.

Note: Calculations exclude records with Missing/Unknown values.

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Breastfeeding and the Risk of Postneonatal Death in the United States

Aimin Chen, MD, PhD; and Walter J. Rogan, MD

- Case-control study from 1998 survey
- 1204 Cases; 7740 Controls
- Infant deaths >28 days
- Logistic regression – maternal age, education, smoking, infant sex, race, birthweight, congenital anomalies, live birth order, birth plurality, and WIC status
- 20% reduction in post-neonatal infant mortality with any breastfeeding in the US (OR 0. 79 95% CI 0.67-0.93)

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OFFICIAL JOURNAL OF THE AMERICAN ACADEMY OF PEDIATRICS

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Chen & Rogan, Breastfeeding and the risk of postneonatal death in the US, *Pediatrics*, 113(5):e435-439

Aim

- To investigate the associations between breastfeeding initiation and infant mortality, neonatal mortality, and post-neonatal mortality in an urban population with high infant mortality and historically low breastfeeding rates.

BREASTFEEDING MEDICINE
Volume 14, Number 7, 2019
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DOI: 10.1089/bfm.2019.0067

Associations Between Breastfeeding Initiation and Infant Mortality in an Urban Population

Julie L. Ware,[1] Aimin Chen,[2] Ardythe L. Morrow,[2] and Jennifer Kmet[3]

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Methods

- 2004 to 2014 Birth Cohort in Shelby County, Tennessee
  - Data source: Tennessee Department of Health, Birth and Death Certificate Data, 2004-2014
  - Live Birth Certificate linked to Infant Death Certificate
  - Excluded infants <500g, death < 7 days, deaths due to congenital anomalies and malignant neoplasms
  - 148,679 live births, 598 infant deaths, 153 neonatal deaths, 445 post-neonatal deaths

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Methods

- Univariate analyses comparing infants who survived vs. infant deaths on maternal and infant characteristics
- Cochran-Mantel Haenszel analyses comparing breastfeeding and infant death on maternal and infant characteristics

- Logistic regression analysis
  - Outcome - Infant death (death before 1st birthday)
    - Neonatal death (death < 28 days)
    - Post-neonatal death (death ≥ 28 days & before 1st birthday)
  - Exposure - Breastfed ever/never
  - Adjustment for potential confounders

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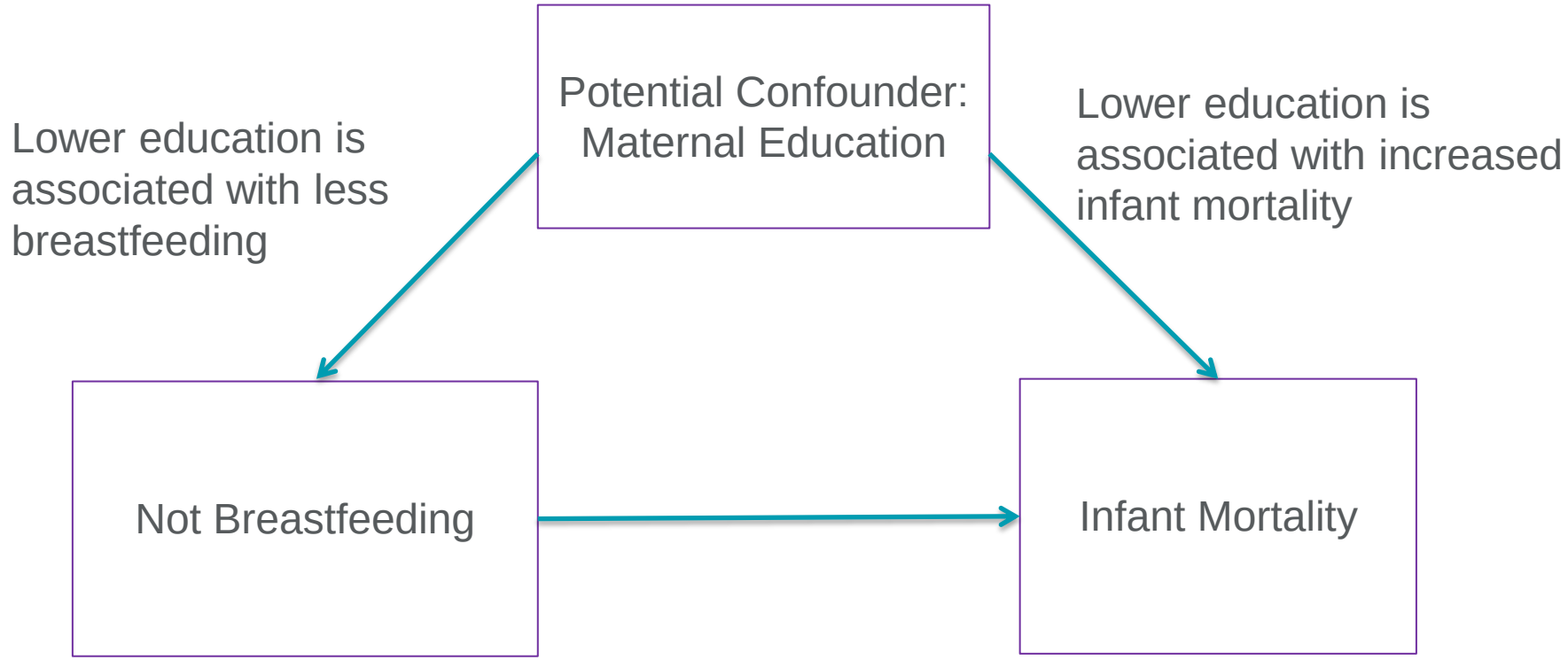
Potential Confounders

Example:



If education is not controlled for, "Not breastfeeding" could be mistakenly associated with infant mortality

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Potential Confounders

- Race
- Maternal age
- Maternal education
- Medicaid/WIC status
- Marital Status
- Maternal BMI
- Smoking During Pregnancy
- Prenatal Care
- Cesarean Delivery
- Birth Plurality
- Sex
- Birth order
- Birth weight

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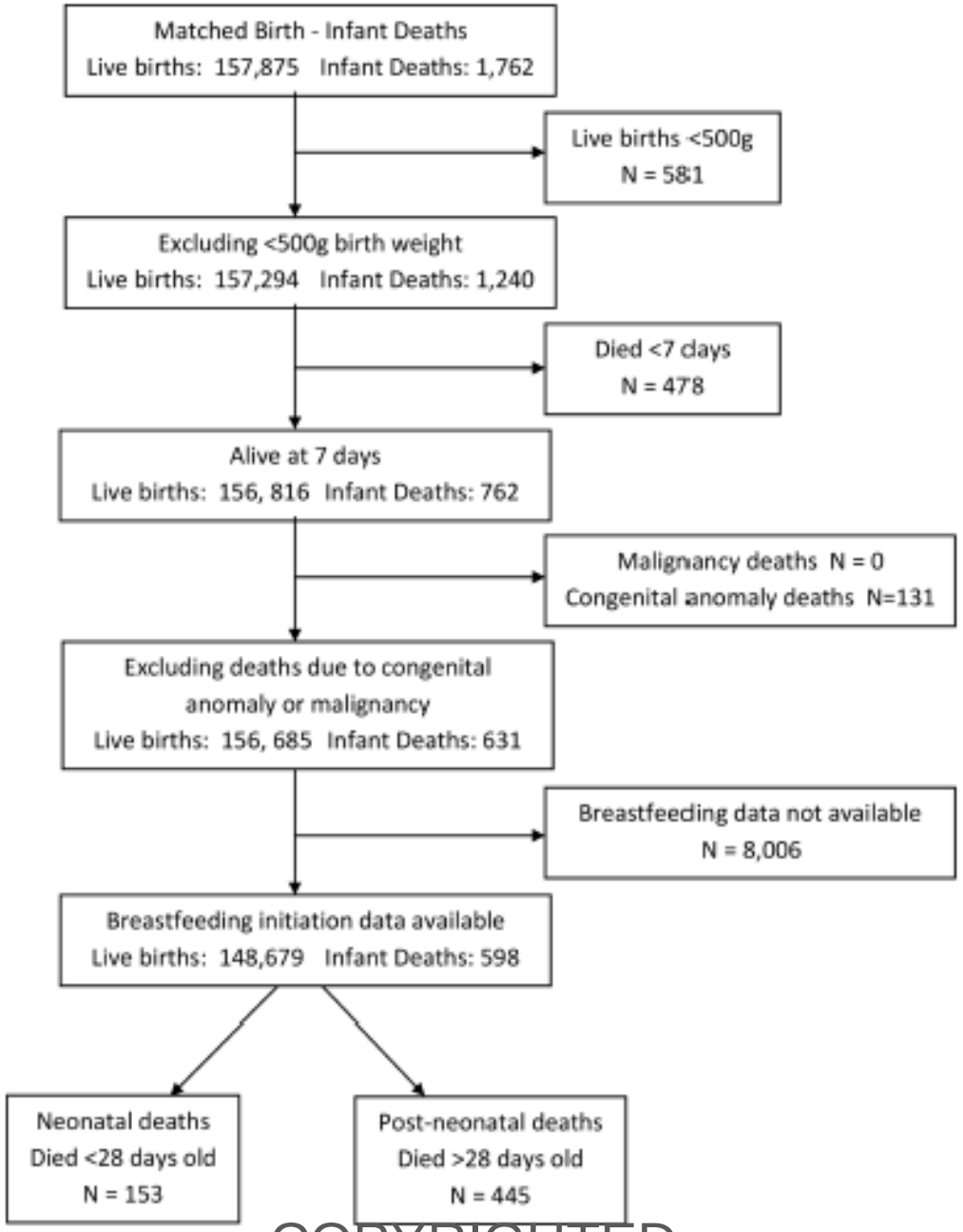
CONSORT Diagram



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Shelby County Birth Cohort 2004-2014

59.1% self-reported as black
37.4% self-reported as white
56.1% maternal age between 20-29
73.8% had at least a high school education
68.6% in poverty (WIC/Medicaid as proxy)
60.2% unmarried
7.2% smoking during pregnancy
48.1% overweight or obese
33% Cesarean delivery
12.3% < 37 weeks
10.6% < 2500 grams
7.9% admitted to NICU

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Cohort Characteristics

- After exclusions (< 500 gram, deaths < 7 days, congenital anomalies, malignancies)
  - 598 deaths (153 neonatal/445 post-neonatal)
- Infant mortality rate 4.0/1000 live births
  - Black infant mortality 5.4/1000 live births
  - White infant mortality 2.0/1000 live births
- Univariate analysis statistically significant in ***all*** categories except infant sex

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Breastfeeding Characteristics of Cohort

- 59.6% of entire cohort initiated breastfeeding
  - 78.5% white babies initiated breastfeeding
  - 46.7% black babies initiated breastfeeding
- Among overall infant deaths
  - 54.1% white babies initiated breastfeeding
  - 36.4% black babies initiated breastfeeding
- Significant differences in breastfeeding between infant deaths and survived births for each characteristic and overall, neonatal, and post-neonatal mortality

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Overall Infant Mortality Logistic Regression

	N	Adjusted OR	95% CI	p value
Total	590	0.81	0.68-0.97*	0.0229
Race – Black	472	0.91	0.75-1.12	0.4053
Race – Non-Black	120	0.52	0.35-0.76*	0.0008
BW < 2500 gram	310	0.77	0.23-0.58*	0.0404
BW ≥ 2500 gram	280	0.89	0.69-1.15	0.3647
Gestation < 37 wk	313	0.80	0.62-1.02	0.0749
Gestation ≥ 37 wk	273	0.92	0.71-1.19	0.5098

Logistic Regression Models and Adjusted Odds Ratios with 95% CI.
All models were adjusted for maternal race (except for race subgroup analysis), maternal age, maternal education, poverty indicator, marital status, maternal BMI, smoking during pregnancy, prenatal care, type of delivery, birth plurality, birth order, sex, and birth weight < 2500 grams (except for birth weight subgroup analysis). * $p < 0.05$.
NA -Results not available due to small numbers and questionable validity of the model fit.

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Neonatal Mortality Logistic Regression

	N	Adjusted OR	95% CI	p value
Total	150	0.49*	0.34-0.72	0.0002
Race Black	127	0.58*	0.39-0.87	0.0085
Race Non-Black	24	NA		
BW < 2500 gram	112	0.37*	0.23-0.58	<0.0001
BW ≥ 2500 gram	38	NA		
Gestation > 37 wk	116	0.41*	0.26-0.64	<0.0001
Gestation ≥ 37 wk	33	NA		

Logistic Regression Models and Adjusted Odds Ratios with 95% CI.
All models were adjusted for maternal race (except for race subgroup analysis), maternal age, maternal education, poverty indicator, marital status, maternal BMI, smoking during pregnancy, prenatal care, type of delivery, birth plurality, birth order, sex, and birth weight < 2500 grams (except for birth weight subgroup analysis). * $p < 0.05$.
NA -Results not available due to small numbers and questionable validity of the model fit.

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Post-Neonatal Mortality Logistic Regression

	N	Adjusted OR	95% CI	p value
Total	440	0.95	0.78-1.17	0.6506
Race - Black	345	1.08	0.86-1.34	0.5181
Race - Non-Black	96	0.63*	0.41-0.98	0.0387
BW < 2500 grams	198	1.13	0.83-1.53	0.4468
BW ≥ 2500 grams	242	0.86	0.65-1.13	0.2772
Gestation < 37 wk	197	1.15	0.84-1.57	0.3738
Gestation ≥ 37 wk	240	0.89	0.68-1.17	0.4009

Logistic Regression Models and Adjusted Odds Ratios with 95% CI.
All models were adjusted for maternal race (except for race subgroup analysis), maternal age, maternal education, poverty indicator, marital status, maternal BMI, smoking during pregnancy, prenatal care, type of delivery, birth plurality, birth order, sex, and birth weight < 2500 grams (except for birth weight subgroup analysis). * $p < 0.05$.
NA - Results not available due to small numbers and questionable validity of the model fit.

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Summary of Findings in Cohort

- Overall infant mortality – ↓ 19%
  adjusted OR = 0.81 (95% CI 0.68-0.97)
- Neonatal mortality – ↓ 51%
  adjusted OR = 0.49 (95% CI 0.34-0.72)
- Post-neonatal mortality
  adjusted OR = 0.95 (95% CI 0.78-1.17)

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Causes of Death

Cause of Death	Live births used in model (N)	Infant deaths (N)	Adjusted* Odds Ratio Ever/Never BF (95% CI, p-value)
Infection	146,818	107	0.492** (0.316-0.765, 0.002)
SIDS	146,798	87	1.165 (0.738-1.841, 0.5120)
Injuries	146,815	104	1.189 (0.789-1.793, 0.4081)
Other	146,972	266	0.795 (0.605-1.044, 0.0987)

Logistic Regression Models by Causes of Death * All models were adjusted for maternal race, maternal age, maternal education, poverty indicator, marital status,maternal BMI, smoking during pregnancy, prenatal care, type of delivery, birth plurality, birth order, sex, and birth weight < 2500 grams. ** $p < 0.05$.

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Summary of Results

- Initiation of any breastfeeding is significantly associated with reduced infant mortality in a cohort of Shelby County, Tennessee babies
  - -- even when controlling for selected confounders
  - -- adjusted OR = .81, (95% CI 0.68-0.97)

- This association holds for neonatal deaths, but is not statistically significant for post-neonatal deaths
  - -- Neonatal Mortality: -- adjusted OR = .49, (95% CI 0.34-0.72)
  - -- Post-neonatal Mortality: -- adjusted OR = .95, (95% CI 0.78-1.17)

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Limitations

- Only breastfeeding initiation was included in our study, and babies included as "breastfed" may have only nursed briefly

Tennessee data from 2011-2015

	Any BF	EBF at 6 mo	Any Breastfeeding at 1 year
Non-Hispanic Black	55.5%	7.3%	14.4%
Non-Hispanic White	73.8%	17.4%	20.0%

Antsey, et al. Racial and Geographic Differences in Breastfeeding, MMWR, 2017

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Limitations

- Reverse causality – Were some babies too sick to breastfeed?
- Could salutatory effects of breastfeeding be blunted by other non-measurable factors (racism, stress, violence, ACE's)?
- Small sample size after exclusions led to lack of statistical significance in some categories

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Breastfeeding is Important!

- Risk factors for Infant Mortality should include "Not Breastfeeding"
- Breastfeeding duration and exclusivity should be captured in studies related to infant mortality.
- Breastfeeding moms need our support for breastfeeding success!

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Breastfeeding Promotion and Support is Important for Infant Mortality Reduction!

- AAP – Breastfeeding is a Public Health Imperative (2012)
- Lancet – 823,000 lives saved if breastfeeding "scaled up" to recommendations (2016)
- Thompson et al.- SIDS reduced 40% with breastfeeding more than 2 months, and 60% with breastfeeding for 6 months
- Chen and Rogan – Any breastfeeding associated with a 20% reduction in post-neonatal mortality (2004)
- Ware et al., Any breastfeeding associated with 19% reduction in infant mortality (2019)

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Wonderful Breastfeeding Work in Shelby County Continues! BSTARS!

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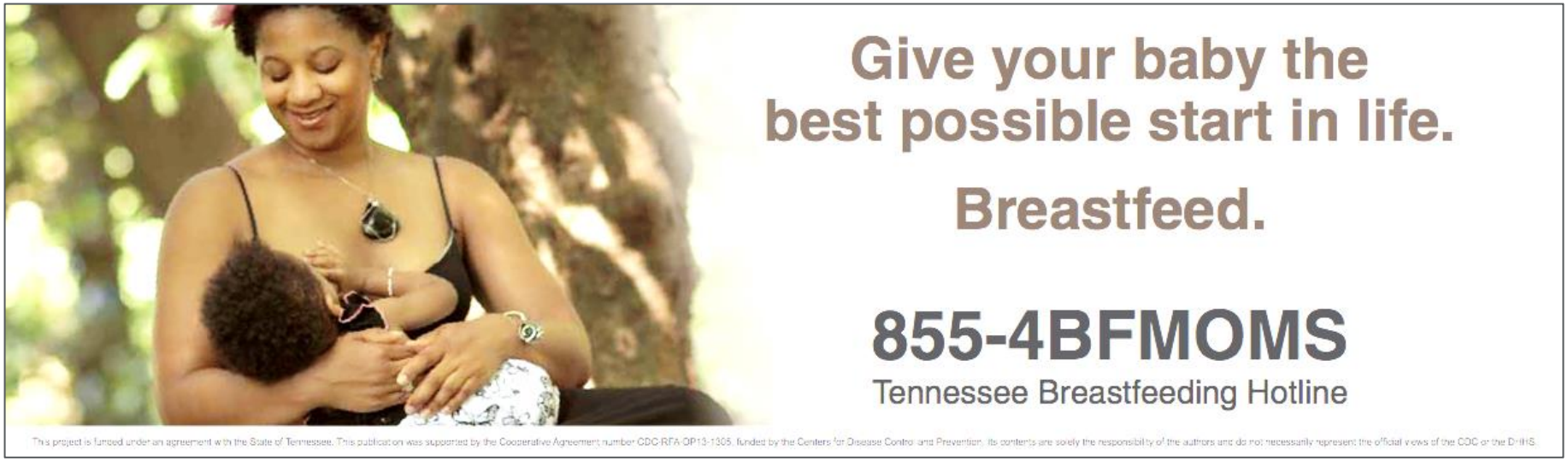
Tennessee State Ad Campaign



24 hours a day/7 days a week

TENNESSEE BREASTFEEDING HOTLINE

855-4BFMOMS

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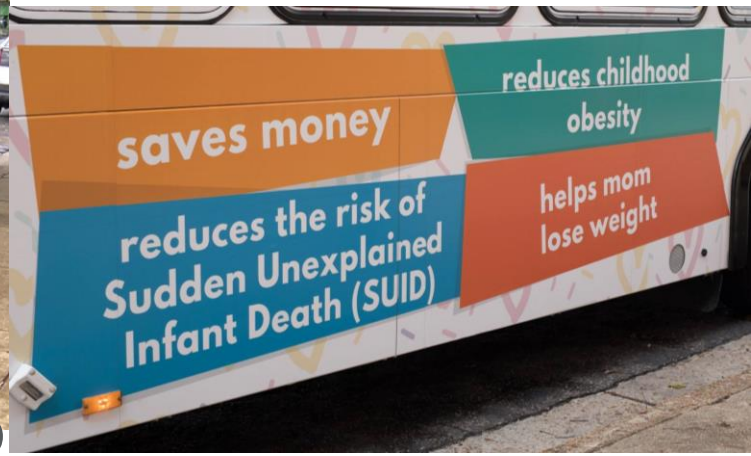
Shelby County Health Dept. Bus Wrap!



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More Memphis Hospitals Working on Improved Maternity Care Practices!

Tennessee CHAMPS
St. Francis, Bartlett
Regional One, Memphis

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Acknowledgements

- Thanks to the Shelby County Breastfeeding Coalition and many partners making breastfeeding a part of the landscape of infant mortality reduction!
- Thanks to Drs. Aimin Chen and Ardythe Morrow, of University of Cincinnati School of Medicine, Dept. of Environmental Health, for their expertise
- Thanks to David Sweat, Administrator, Bureau of Epidemiology and Infectious Diseases

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What about SUID/SIDS among Infants < 7 days after birth?

Manuscript in Press *Journal of Pediatrics*:

Bartick M, Boisvert ME, Philipp BL, and Feldman-Winter L. **Trends in breastfeeding interventions, skin-to-skin care, and sudden infant death in the first 6 days after birth.**

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What are the issues and concerns?

- Assertions: BFHI and SSC increases risk, decreases safety, leads to sudden death
- Confusion and overlap with SUPC and SUID

- Assertion: **29.2% of *neonatal* SUID deaths in 2018** (those that occur within 1 month after birth) occur within the first 6 days after birth
- Neonatal SUID comprises 2.6% of all SUID deaths (CDC data from 2007-2017)

Cooper Medical School of Rowan University

Bartick et al. *J Pediatr* In press. 2019

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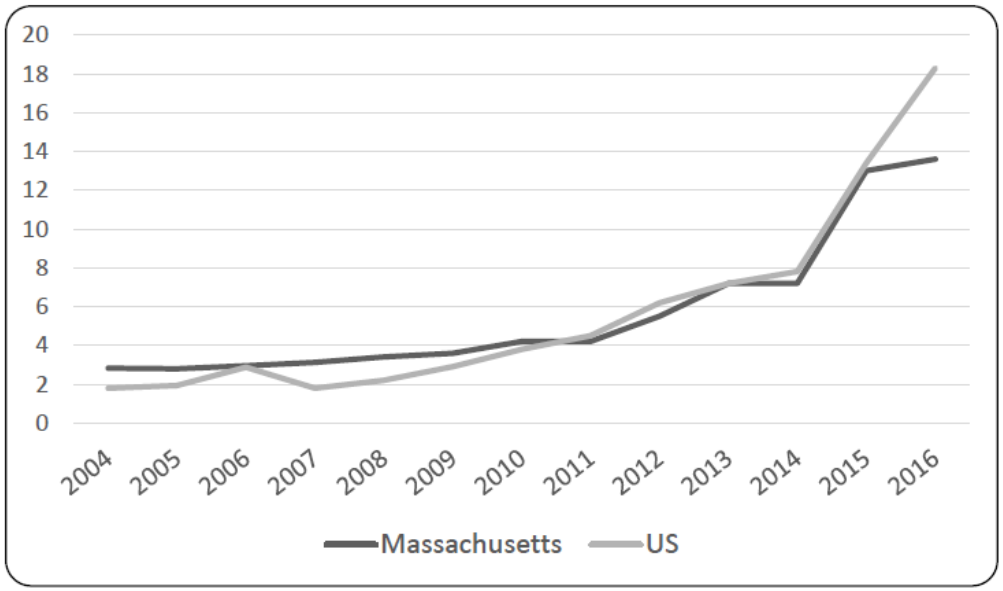
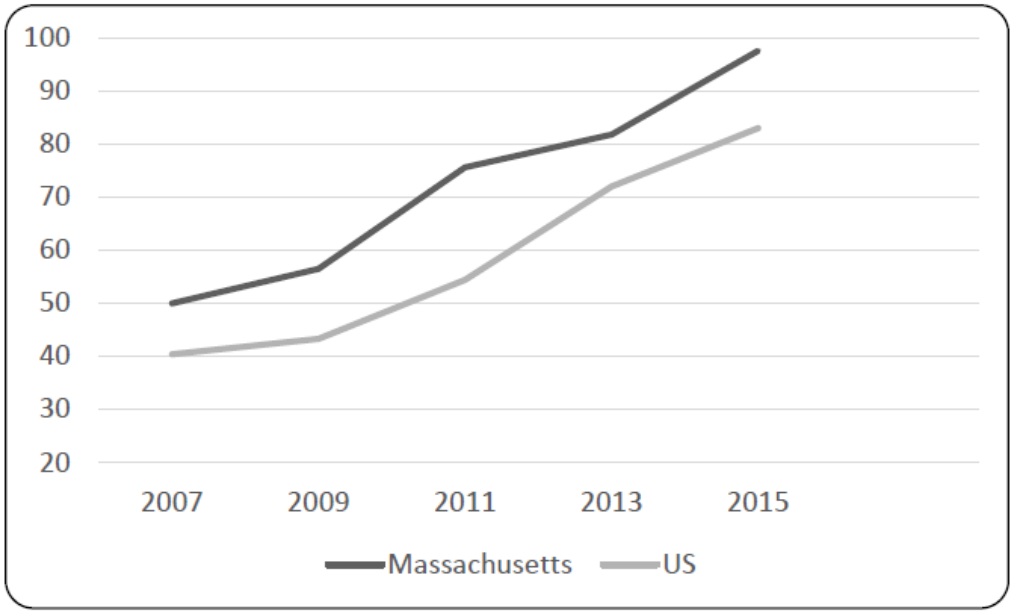
BFHI Designation



Skin-to-Skin



Bartick et al. *J Pediatr* In press. 2019

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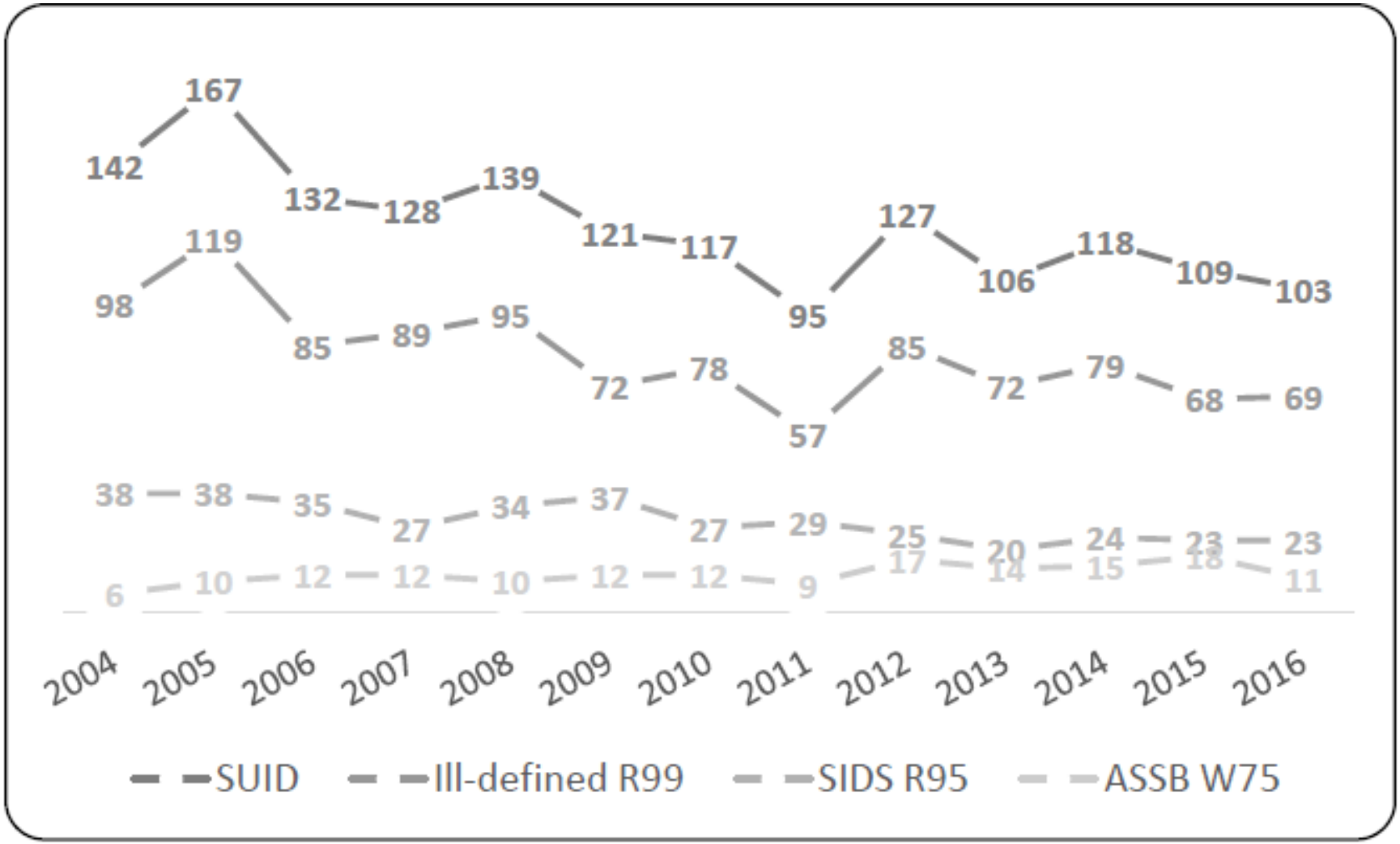
Deaths in infants <7 days



Bartick et al. *J Pediatr* In press. 2019

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Black/White Disparities Evident even among infant < 7days after birth

	2004-2009	2010-2016	OR 2010-16 compared to 2004-09	95% CI
%. SUID are non-Hispanic white, US (% of US births that are non-Hispanic white)	52.7% (54.2%)	53.3% (46.2%)	1.17	(0.96, 1.42)
% SUID are non-Hispanic black US (% of US births that are non-Hispanic Black)	**39.0% (14.4%)**	**21.8% (14.8%)**	0.56	(0.45,0.69)
SUID prevalence non-Hispanic white	0.030	0.032	1.08	(0.94, 1.24)
SUID prevalence non-Hispanic Black	0.089	0.036	**0.40**	(0.34, 0.49)

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Bottom Line

- In the US 2004-2016, births in Baby-Friendly facilities rose from 1.8% to 18.3% and the percentage of facilities in which most dyads experienced skin-to-skin care rose from 40% to 83%.
- SUID prevalence among infants <7 days was rare (0.72% of neonatal deaths) and decreased significantly from 2004-09 compared to 2010-16, from 0.033 per 1000 live births to 0.028: **OR 0.85 (95% CI 0.77,0.94); 15% decrease.**
- Asphyxia deaths remained <20 per year.
- In Massachusetts, births in Baby-Friendly facilities rose from 2.8% to 13.9% and skin-to-skin care rose from 50% to 97.8%.
- SUID prevalence decreased significantly from 2010-16 compared to 2004-2009: **OR 0.32 (95% CI 0.13, 0.82); 68% decrease, with 0 asphyxia deaths during the 13-year period.**

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Thank you for joining!

Tune in on November 13th for the next webinar in the series, *The BFUSA Onsite Assessment: Experiences and Advice from CHAMPS Hospitals*

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