

# Reducing Infant Mortality Through Cradle Cincinnati

James M. Greenberg, MD  
Co-founder, Cradle Cincinnati  
Co-director, Perinatal Institute  
Professor of Pediatrics  
Cincinnati Children's Hospital Medical Center  
University of Cincinnati College of Medicine



# Infant Mortality is a Wicked Problem

- Tame: a problem you can solve
- VS.
- Wicked (malignant/risky/tricky/aggressive): a problem you can work at
- Wicked problems:
  - Lack a common definition
  - Require continuous (endless) attention
  - No single solution (bad/better/best)
  - Difficult to validate solutions

# Infant Mortality is a Wicked Problem

- Controlled trial and error is risky/impossible
- The value of previous knowledge is limited
- Are characterized by a more desired future state
- Those who attempt to solve wicked problems are open to criticism if they are “wrong”

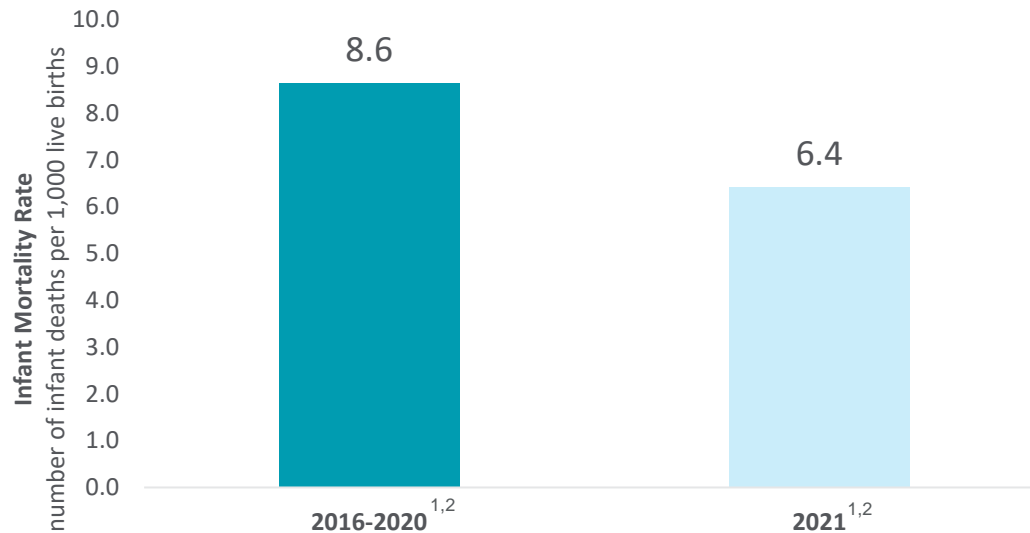
# What is ?

- Co-Founded with Elizabeth Kelly, MD, MPH, Executive Vice Chair, Department of Obstetrics and Gynecology, UCCOM in 2013 as a collective impact collaborative to eliminate infant mortality in Hamilton County OH
- Response to excess infant mortality in metropolitan Cincinnati
- Housed within the Perinatal Institute at the Cincinnati Children's Research Foundation/Cincinnati Children's Hospital Medical Center

# What is ?

- Budget
  - Annual: \$4.5M
    - Public (federal, state, local)
    - Maternal Health Centers
    - Philanthropy
  - Direct service
  - Data
  - Communication/Outreach/Advocacy

# Infant Mortality Rate, Hamilton County, 2016-2021



## Key Points:

- In 2021, 66 babies died in Hamilton County – 10 fewer than in 2020.
- With 10,266 live births, the 2021 Hamilton County infant mortality rate was 6.4 deaths per 1,000 live births.
- This is by far the lowest rate ever measured in Hamilton County since modern record keeping began in 1968.
- Hamilton County below the state (7.8)<sup>1</sup> and above the nation (5.6)<sup>3</sup>.

## Sources:

- 1 Ohio Department of Health (ODH) (2021)
- 2 Hamilton County Fetal and Infant Mortality Review (FIMR)
- 3 National Vital Statistics Reports (CDC) (2019)

# “Questions”

- What did you do?
- How did you do it?
- What are your interventions?
- We want to do this in (insert location/organization here). Can you help us get started?

# “Answers”

- Specifics are important
- But not necessarily relevant
- Context is key: “All politics is local”

But there are generalizable  
concepts



# 1. Choose a Framework

- Infant Mortality is a wicked problem
- Collective Impact: a framework for wicked problems
  - Common agenda
  - Shared measurement
  - Mutually reinforcing activities
  - Continuous communication
  - Backbone organization
- Cradle Cincinnati June, 2013
- [www.cradlecincinnati.org](http://www.cradlecincinnati.org)

Stanford **SOCIAL INNOVATION** Review  
*Informing and inspiring leaders of social change*

## Channeling Change: Making Collective Impact Work

An in-depth look at how organizations of all types, acting in diverse settings, are implementing a collective impact approach to solve large-scale social problems.

BY ANTHONY MANNING, ANDREW GILKIN, & MARK FLANZER

What does a global effort to reduce malnutrition have in common with a program to reduce teenage substance abuse in a small rural Massachusetts county? Both have achieved significant progress toward their goals: the Global Alliance for Improved Nutrition (GAIN) has helped reduce nutritional deficiencies among 500 million poor people across the globe, while the Communities That Care Coalition of Franklin County and the North Quabbin (Communities That Care) has made equally impressive progress toward its much more local goals, reducing teenage binge drinking by 21 percent. Surprisingly, neither organization owns its impact to a new paradigm of coordinated, joint activities, but to scaling up a high-performing nonprofit organization. Despite their dramatic differences in focus and scope, both succeeded by using a collective impact approach.

In the winter 2011 issue of *Stanford Social Innovation Review*, we introduced the concept of "collective impact" by describing several examples of highly structured collaborative efforts that had achieved substantial impact on a large-scale social problem, such as The Strive Partnership's educational initiatives in Cincinnati, the environmental cleanup of the Elizabeth River in Virginia, and the Shape Up Somerville campaign against childhood obesity in Somerville, Mass. All of these initiatives share the five key conditions that distinguish collective impact from other types of collaboration: a common agenda, shared measurement systems, mutually reinforcing activities, continuous communication, and the presence of a backbone organization. (See "The Five Conditions of Collective Impact" below.)

We hypothesized that these five conditions offered a more powerful and realistic paradigm for social progress than the prevailing model of isolated impact in which countless nonprofits, business, and government organizations each work to address social problems independently. The complex nature of most social problems holds the key: that any single program or organization, however well managed and funded, can single-handedly create lasting large-scale change. (See "Isolated Impact vs. Collective Impact" on page 2.)

Response to that article was overwhelming. Hundreds of organizations and indi-

### The Five Conditions of Collective Impact

<b>Common Agenda</b>	All participants have a shared vision for change including a common understanding of the problem and a joint agreement to achieving it through agreed upon actions.
<b>Shared Measurement</b>	Collecting data and measuring results consistently across all participants ensures efforts remain aligned and participants hold each other accountable.
<b>Regularly Reinforcing Activities</b>	Participant activities must be differentiated while still being coordinated through a mutually reinforcing plan of action.
<b>Continuous Communication</b>	Consistent and open communication is needed across the many players to build trust, assess mutual objectives, and create common narratives.
<b>Backbone Support</b>	Creating and managing collective impact requires a separate organization or unit with staff and a specific set of skills to serve as the backbone for the entire initiative and coordinate participating organizations and agencies.



## 2. Define the Primary Outcome

- The single variable that you will use to judge success.
- Measurable
- Easily understood
- Matters to all stakeholders

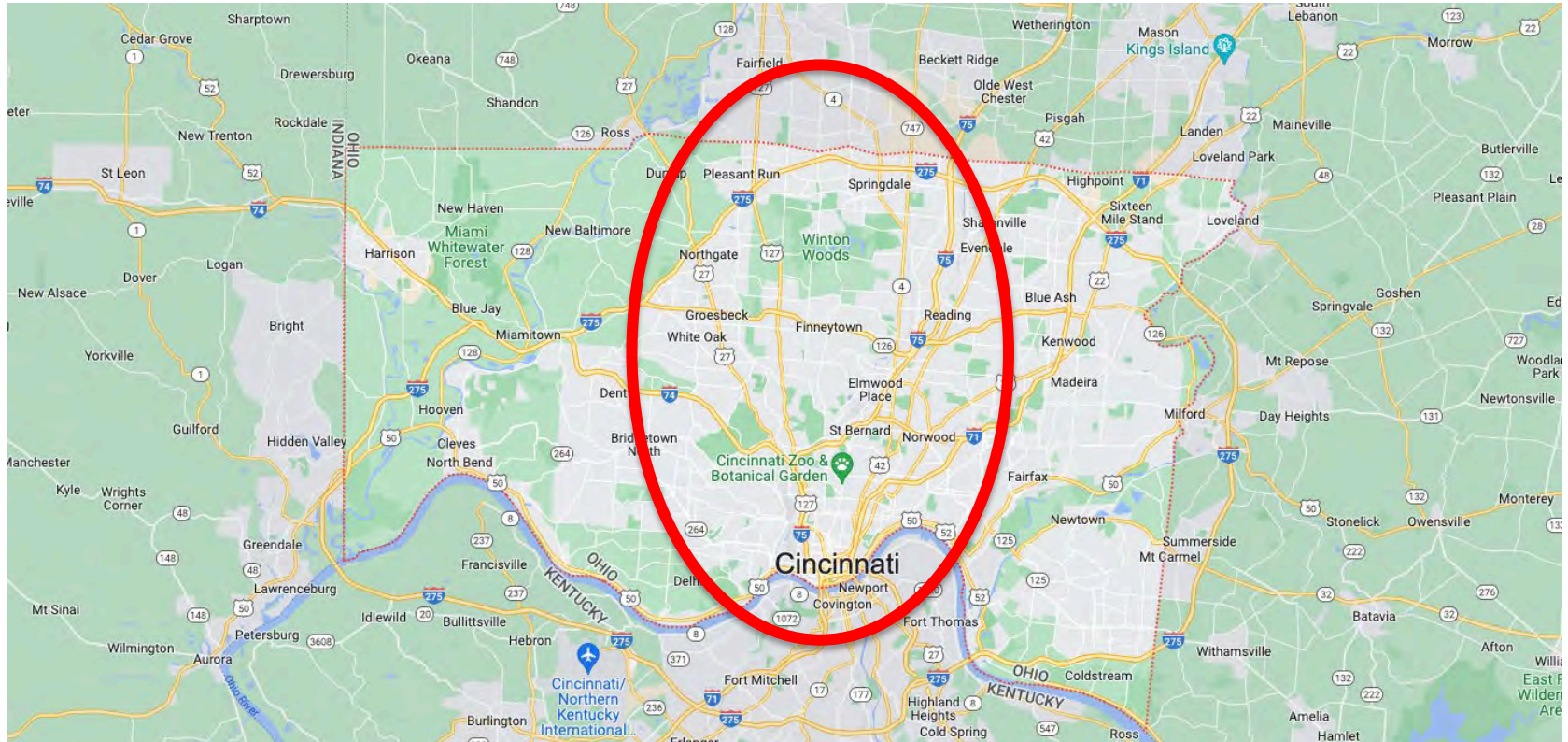
# Infant Mortality!

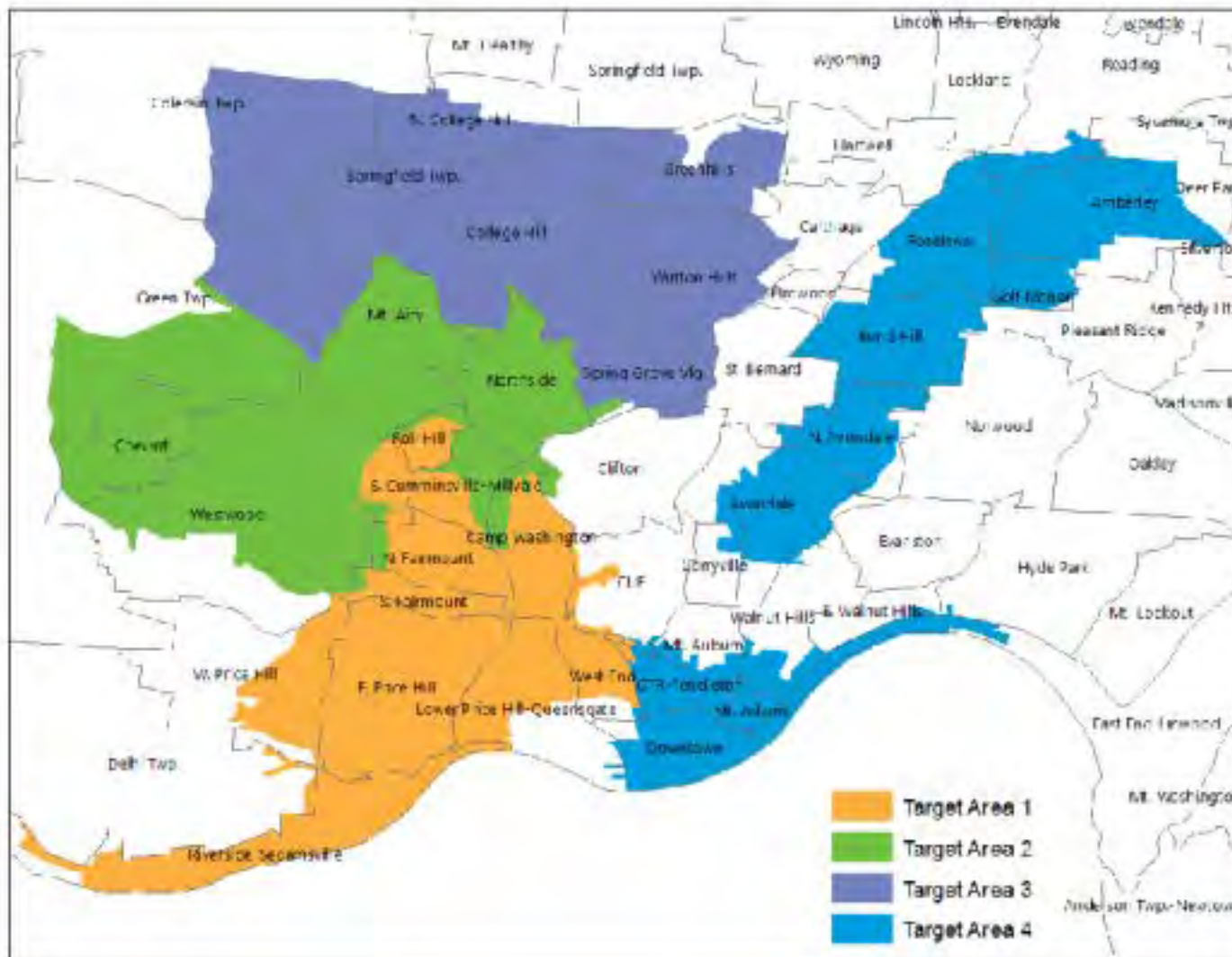
- **Among standard public health metrics, infant mortality is considered the “canary in the coal mine” as a measure of overall community well-being.**
- Deaths per 1,000 live births in a specific geographic location
- “Live birth” in Indiana:
  - Evidence of live outside the womb
  - Breathing/gasping, heart action, movement of skeletal muscles
- Counted until first birthday
- Counted at Mom’s home address

# 3. Define the Geography

- High incidence
- Reliable and sustainable measurement
- Minimal contamination
- Hamilton County OH
  - 10,200 live births/year
  - 2007: 120 infant deaths
  - Two major public health department jurisdictions

# Some Modifications

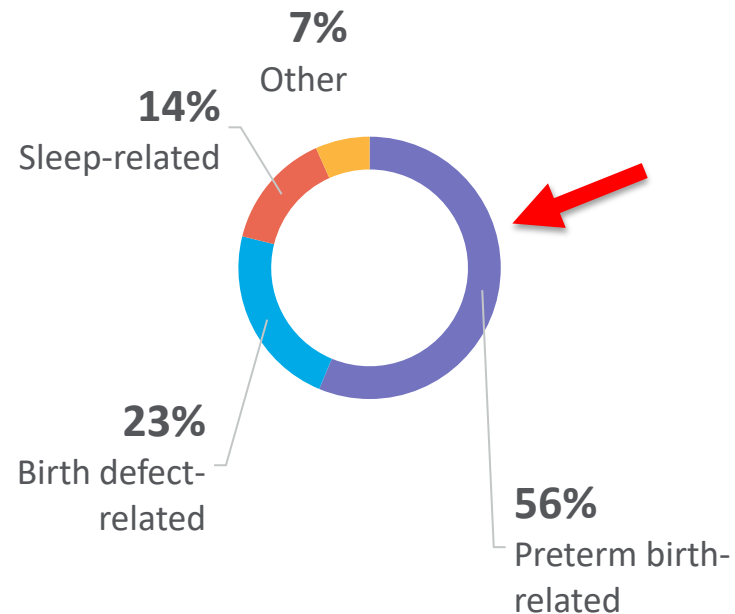




# 4. Data, Data, Data

- Sources
- Access
- Trust
- ODH
- Hamilton County
- City of Cincinnati
- Maternity centers

**Causes of Infant Death  
Hamilton County 2015-2019**



Sources: Hamilton County FIMR, Hamilton County Public Health, City of Cincinnati Health Department

# 5. Translate Theory Into Action

- Theory (preterm birth):

SES

Stress

Racism

Social Determinants

Health Behaviors

Geography

Nutrition



- Infection
- Inflammation
- Genetics
- Health Status



- Uterine contractions
- Dilation of cervix/LUS
- ROM

Preterm Birth

Term Birth



# A. Strategy

- **Community-driven!**
- Is it effective?
  - Published evidence/Plausibility
  - Learning from others
- Will it matter?
- Is it feasible?
  - Cost
  - Time
- Is it measurable?

# B. Tactics

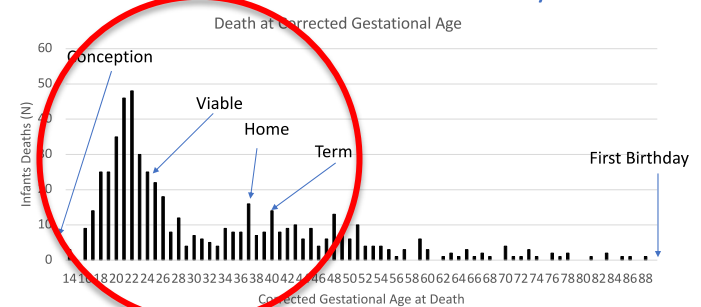
## Community-driven!

- The “3 S’s”
  - Smoking
  - Spacing
  - Sleep
- Smoking
- Spacing
- Sleep
- Equity

# 6. Avoid Well-Intended Distractions

- Impact on IMR:
  - Poverty
  - Education
  - Housing
  - **Breast feeding**
  - **Parent support/Home visiting**
  - **Infant vaccination**

Post “Conception” Age at Time of Infant Death-Hamilton County



7.

Health Care  $\neq$  Public Health

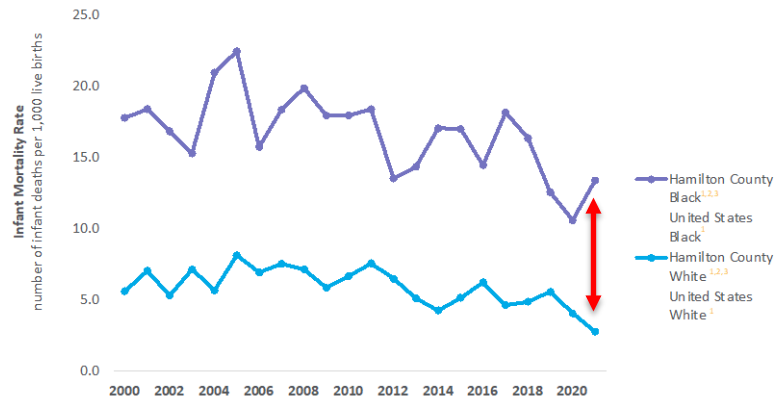


Health Care & Public Health

# 8. Learn Along the Way-This is Important!



## Racial Disparity in Infant Mortality, Hamilton County and United States, 2000-2021



### Key Point:

- The racial disparity in infant mortality continues in Hamilton County.

### Notes:

- Black = non-Hispanic Black as defined by mother
- White = non-Hispanic White as defined by mother
- 2020-2021 United States infant mortality by race data not yet released.

### Sources:

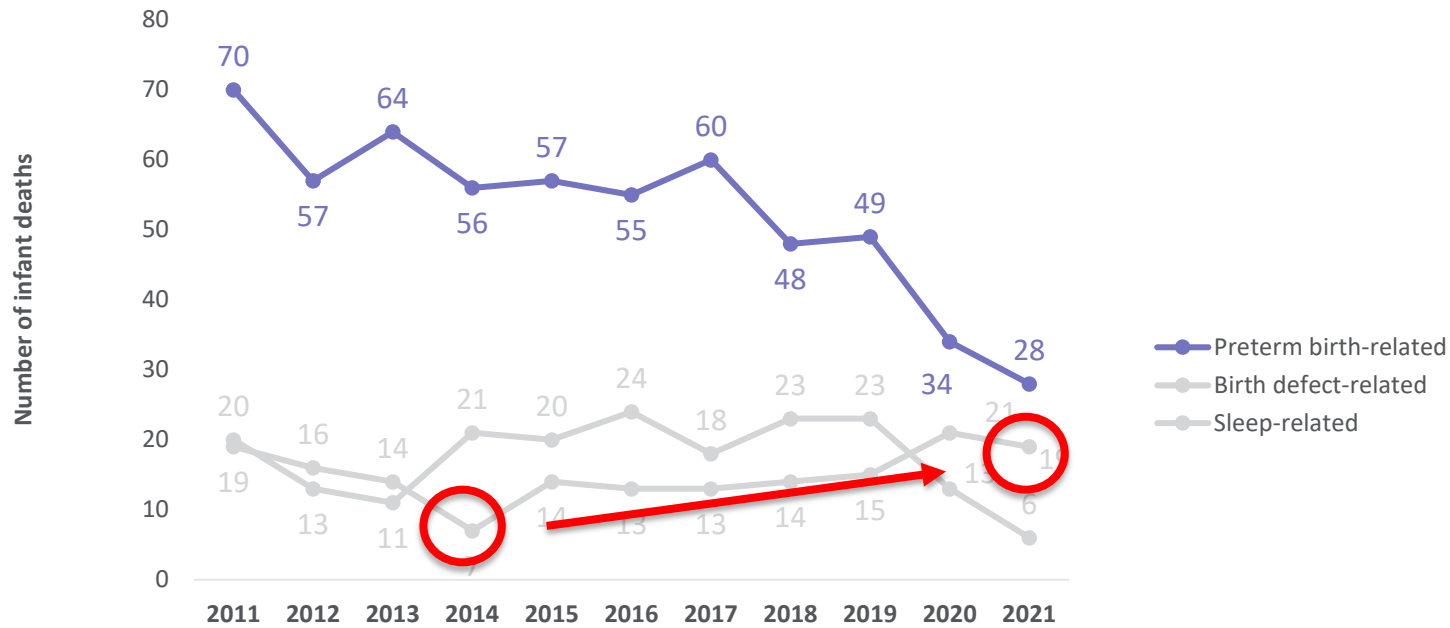
- Centers for Disease Control and Prevention (CDC)
- Ohio Department of Health (ODH)
- Hamilton County Fetal and Infant Mortality Review (FIMR)

Disparity

cradlecincinnati.org

23

# Learning Along the Way...



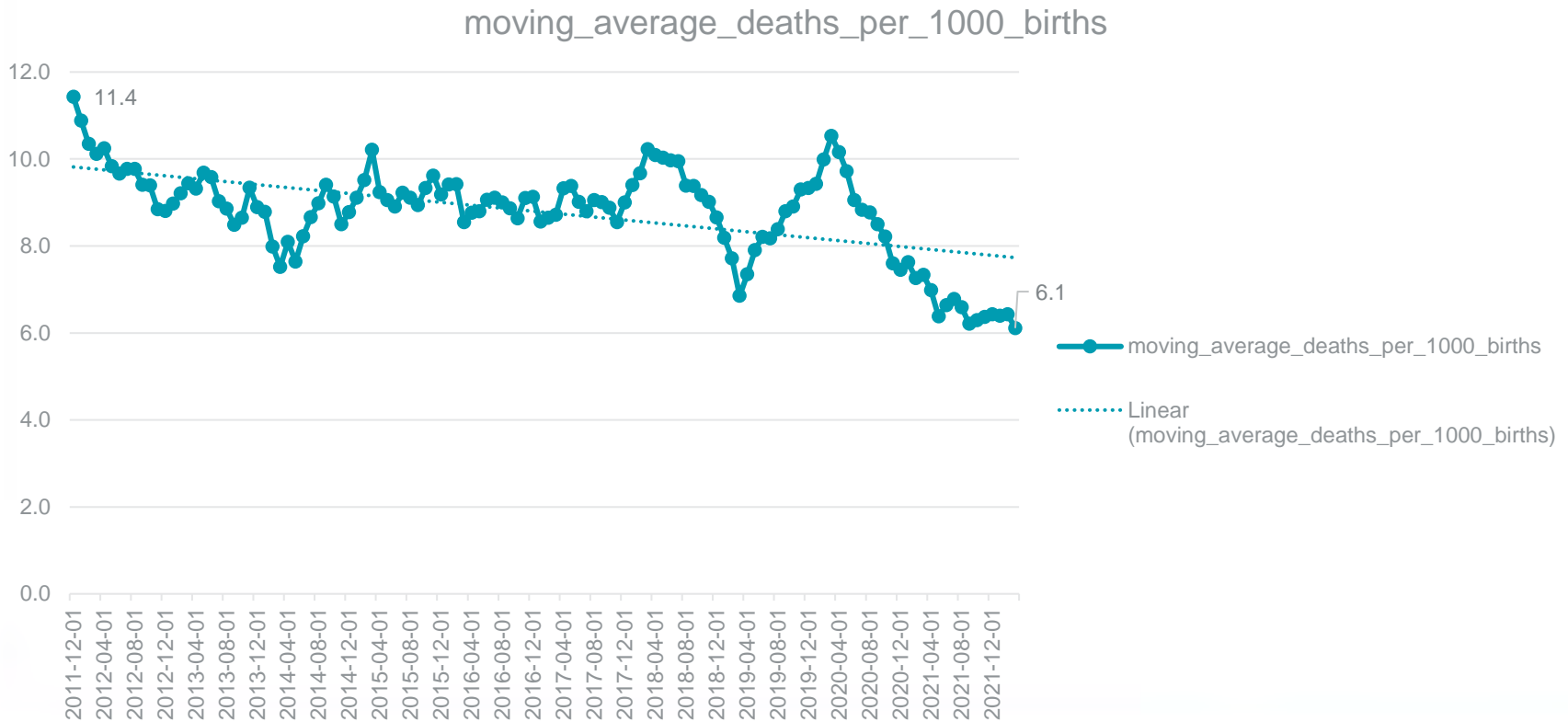
# A Few Final Thoughts

- This is not easy work (IM is a wicked problem)
- Focus
- Persistence
- Systems thinking
- **Equity-the racial disparity of infant mortality**

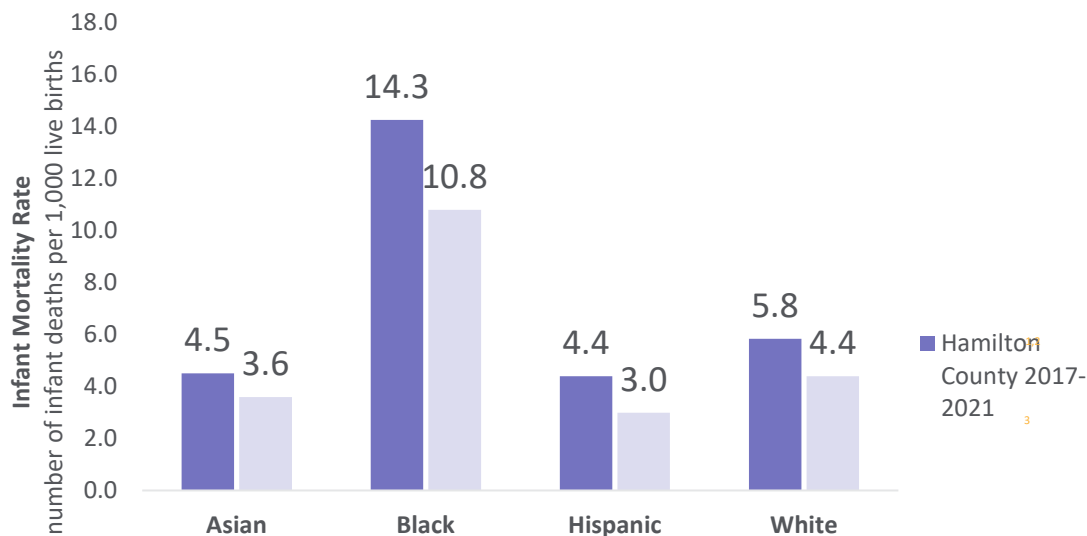
# Supplemental Slides



# Where Are We Today? All Cause Infant Mortality Hamilton County Ohio 2011-2021



# Infant Mortality Rate by Race and Ethnicity, Hamilton County and United States, 2017-2021



### Key Point:

- Black infant mortality in Hamilton County and the United States continues to be far greater than other racial and ethnic groups.

### Notes:

- Asian = non-Hispanic Asian as defined by mother
- Black = non-Hispanic Black as defined by mother
- Hispanic = Hispanic or Latinx origin as defined by mother
- White = non-Hispanic White as defined by mother
- United States Asian infant death data not available for 2014-2016

### Sources:

- Ohio Department of Health (ODH)
- Hamilton County Fetal and Infant Mortality Review (FIMR)
- Centers for Disease Control and Prevention (CDC)

Disparity

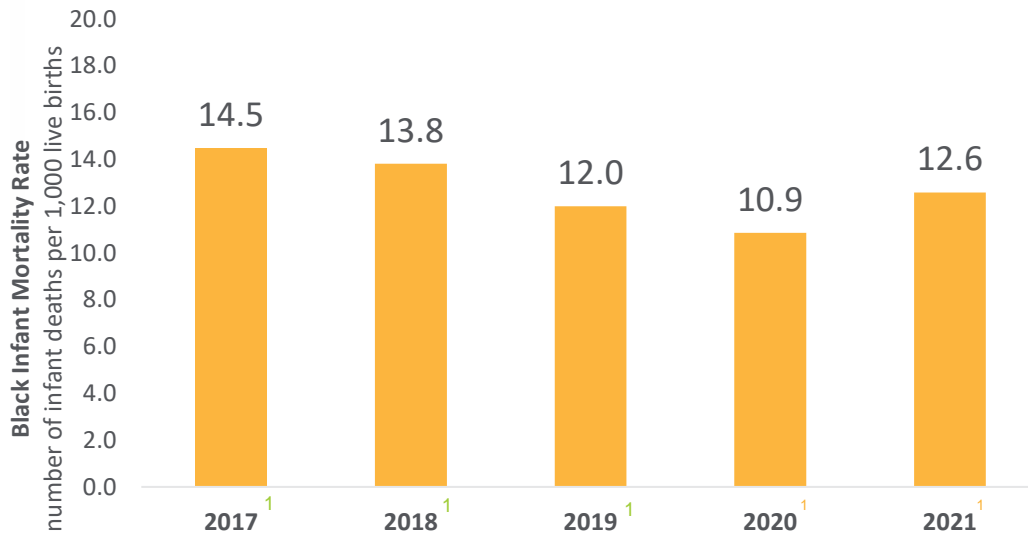
Preterm Birth

Birth Defect

Sleep

Place

# Black Infant Mortality Rate, Hamilton County, 2017-2021



### Key Points:

- In 2021, we saw an increase in the Black infant mortality rate in Hamilton County.
- The Black infant mortality has rose above the national rate of 10.5<sup>2</sup>.
- Any racial disparity is unacceptable, but we are encouraged by the work happening in the community to guide us in next steps.

### Note:

- Black = non-Hispanic Black as defined by mother
- 2019-2020 United States infant mortality by race data not yet released.

### Sources:

- <sup>1</sup> Hamilton County Fetal and Infant Mortality Review (FIMR)
- <sup>2</sup> Centers for Disease Control and Prevention (CDC) National Vital Statistics System WONDER Online Database (2019)

Disparity

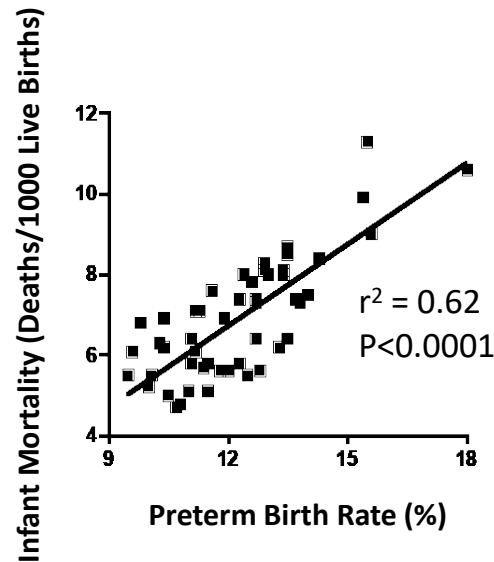
Preterm Birth

Birth Defect

Sleep

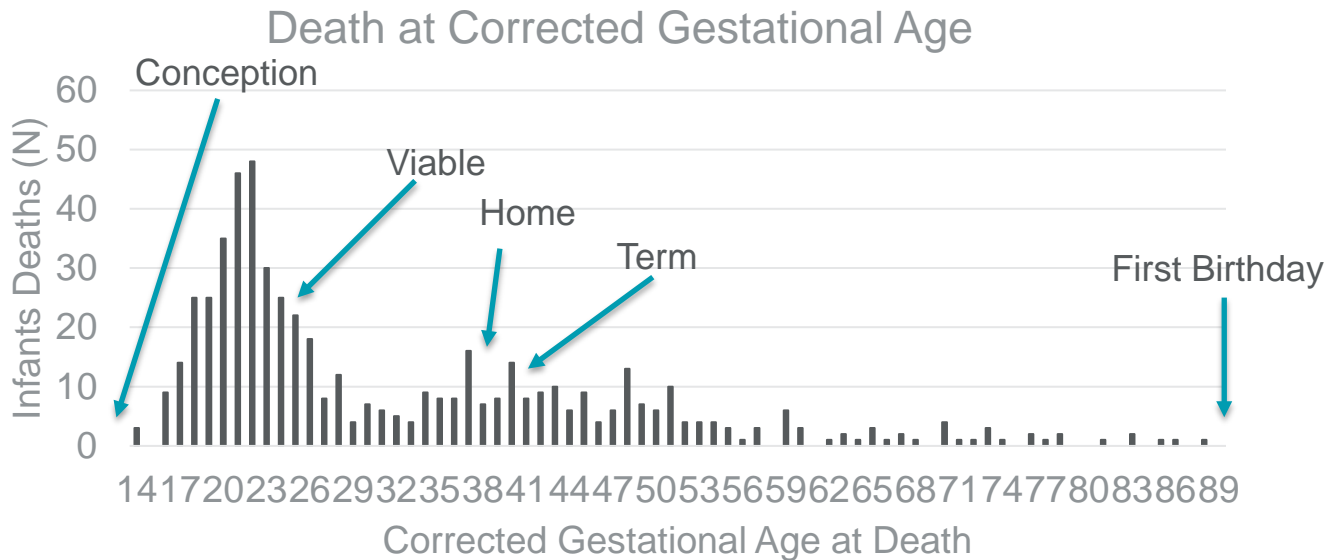
Place

# Preterm Birth is the Driving Force Behind Infant Mortality in the US

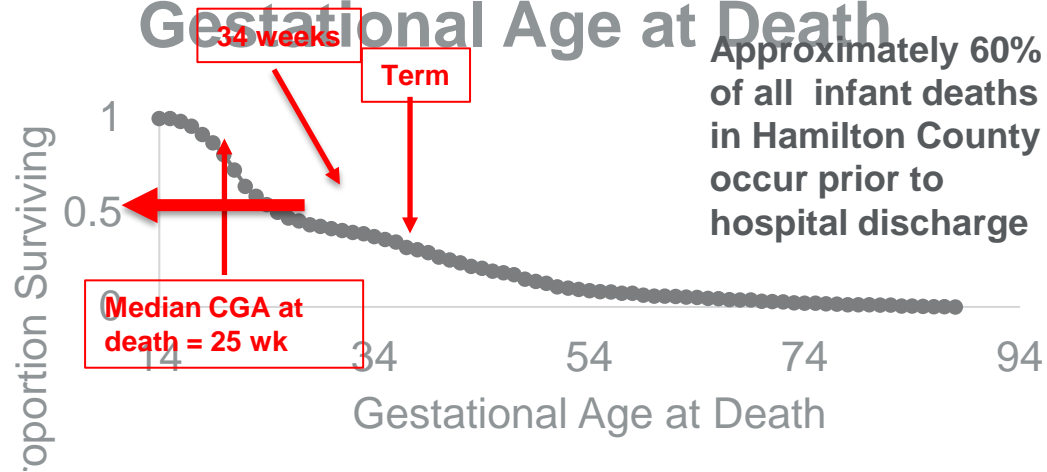


Generated from 2007 US Vital Records  
Data, Courtesy of L. Muglia, MD PhD

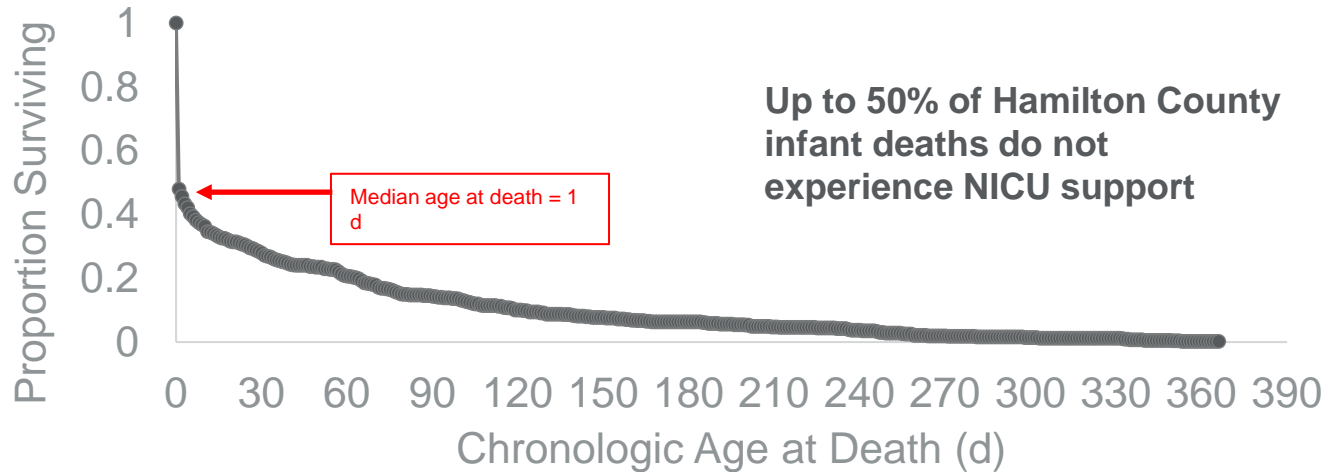
# When Are Infants Dying?



# Survival Curve Hamilton County by Corrected Gestational Age at Death



## Survival Curve of IM in Hamilton County- Chronologic Age



# Social Determinants

Meyer *et al* 2021 SMFM

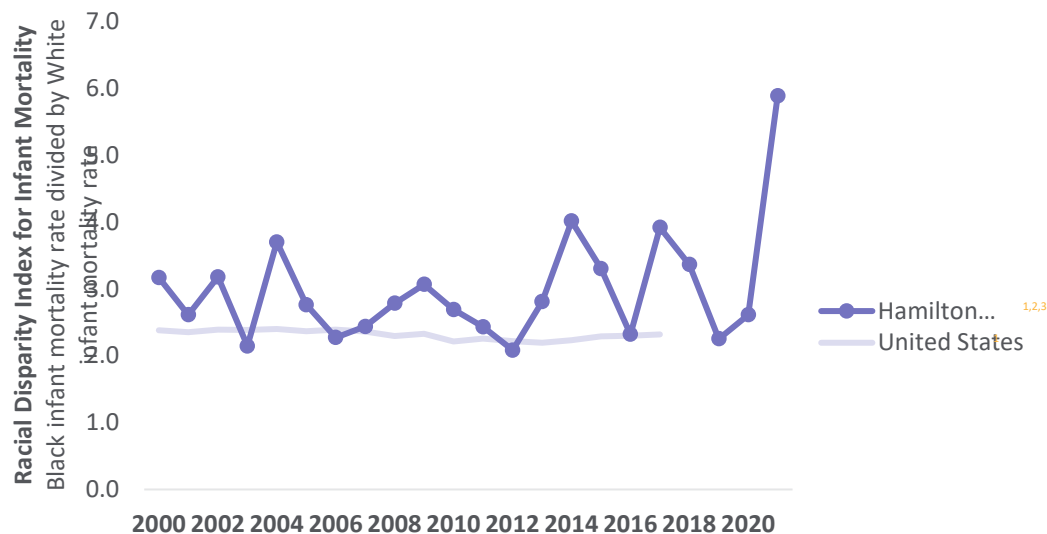
- Prospective cohort nested case control study
- 261 Non-Hispanic Black postpartum women
- 14.5% preterm birth
- Significantly less social/emotional/financial support
- Diminished resilience
- Substandard housing, food insecurity



# Designing Direct Service

- Wraparound model
- Emphasis on trust
- Linking health care and community (public) health
- Care delivered by community health workers
- Focus on Black Women in 12 geographic zones

# Racial Disparity in Infant Mortality, Hamilton County and United States, 2000-2021



### Key Point:

- Racial disparity in Hamilton County rarely dips below the national disparity.
- The racial disparity index for 2021 is 5.9.

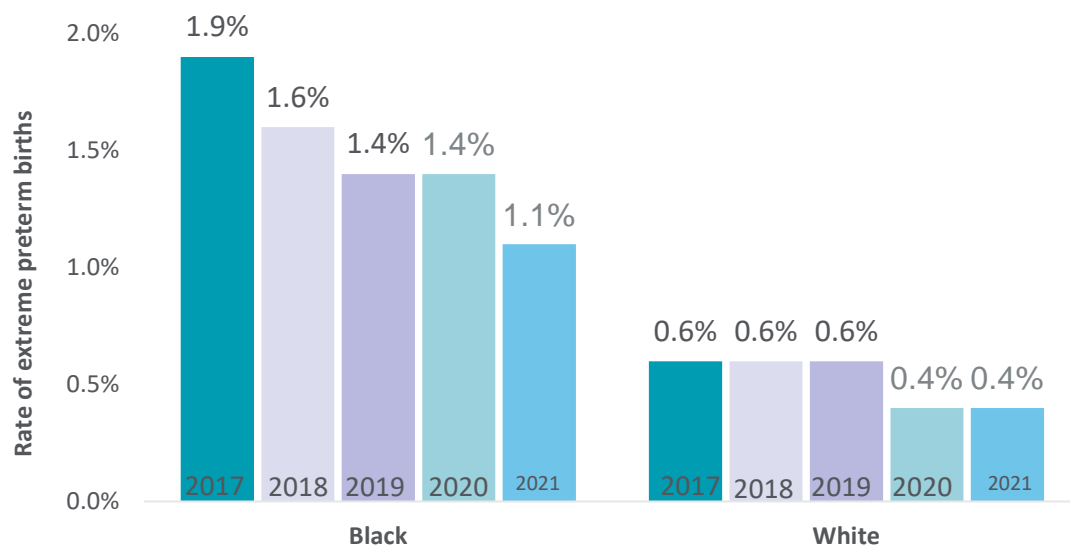
### Notes:

- Black = non-Hispanic Black as defined by mother
- White = non-Hispanic White as defined by mother
- 2019-2020 United States infant mortality by race not yet released.

### Sources:

- <sup>1</sup> Centers for Disease Control and Prevention (CDC)
- <sup>2</sup> Ohio Department of Health (ODH)
- <sup>3</sup> Hamilton County Fetal and Infant Mortality Review (FIMR)

# Extreme Preterm Birth Rate by Race, Hamilton County, 2017-2021



### Key Points:

- Extreme preterm birth is defined as a child born at less than 28 weeks gestation.
- Despite recent improvement, persistent racial disparity in this outcome drives overall disparities in death.

### Notes:

- Asian = non-Hispanic Asian as defined by mother
- Black = non-Hispanic Black as defined by mother
- Hispanic = Hispanic or Latinx origin as defined by mother
- White = non-Hispanic White as defined by mother
- Extreme preterm birth = Less than 28 weeks gestation
- Rate of extreme preterm births in 2016-2020
  - non-Hispanic Asian = 0.7%
  - Hispanic = 0.7%

### Source:

- Ohio Vital Statistics

Disparity

Preterm Birth

Birth Defect

Sleep

Place