The Problem of Infant Mortality and Approaches to Evaluation

Michele Walsh, MD, MSE
Interim Chair, Department of Pediatrics
Chief, Division of Neonatology
UH Rainbow Babies & Children’s Hospital
Case Western Reserve University
Outline

• Scope of Infant Mortality Problem
• Causes of Infant Mortality in Ohio
• Opportunities
• Prior Work The Center for Child Health & Policy at Rainbow Case Western Reserve University
• Recommendations for Standard Evaluations of Maternal Infant Health Projects.
University Hospitals Case Medical Center, Rainbow Babies & Children’s Hospital

- University Affiliation: Case Western Reserve University (CWRU)
- Departments:
  - Department of Pediatrics at UH Rainbow and CWRU, Center for Child Health & Policy
- University Collaborations:
  - Weatherhead School of Management
  - CWRU School of Law
  - Mandel School of Applied Social Sciences (MSASS)
  - Department of Epidemiology & Biostatistics
  - Prevention Research Center
  - Frances Payne Bolton School of Nursing
- External Partnerships
  - Ohio Perinatal Quality Collaborative
  - First Year Cleveland
  - Health Leads
Overarching Strategic Vision for the Center for Child Health and Policy at Rainbow
The March of Dimes Prematurity Campaign aims to reduce preterm birth rates across the United States. Premature Birth Report Card grades are assigned by comparing the 2014 preterm birth rate in a state or locality to the March of Dimes goal of 8.1 percent by 2020. The Report Card also provides city or county and race/ethnicity data to highlight areas of increased burden and elevated risks of prematurity.

CITIES

Cities with the greatest number of births are graded based on their 2013 preterm birth rates. The status indicator shows whether the 2013 city rate is higher (●), lower (●), or the same (●) as the 2013 state rate (10.3%).

<table>
<thead>
<tr>
<th>City</th>
<th>Preterm birth rate</th>
<th>Grade</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Columbus</td>
<td>11.6%</td>
<td>F</td>
<td>●</td>
</tr>
<tr>
<td>Cleveland</td>
<td>13.7%</td>
<td>F</td>
<td>●</td>
</tr>
<tr>
<td>Cincinnati</td>
<td>11.8%</td>
<td>F</td>
<td>●</td>
</tr>
<tr>
<td>Toledo</td>
<td>10.4%</td>
<td>D</td>
<td>●</td>
</tr>
<tr>
<td>Akron</td>
<td>11.6%</td>
<td>F</td>
<td>●</td>
</tr>
<tr>
<td>Dayton</td>
<td>11.9%</td>
<td>F</td>
<td>●</td>
</tr>
</tbody>
</table>
An infant death occurs within the first year of life. ** Suppressed due to missing data or insufficient numbers.

Cleveland: High Infant Mortality Rate

Infant death rate per 1,000 live births
- 6 - 10
- 11 - 13
- 14 - 22
- 23 - 27
- Institutions

Infant Mortality
Greater University Circle
Oct 13, 2014

Center on Urban Poverty and Community Development
povertycenter.case.edu • neocando.case.edu
5 Leading Causes of Infant Mortality

Prematurity
Sudden Infant Death Syndrome
Maternal Health Complications
Severe Birth Defects
Unintentional Injury

Deaths Before 1 year of age.

Top 5 Causes
Prematurity Drives Infant Mortality

Figure 6
The Impact of Prematurity on Child Deaths in 2014

Infant Mortality Rate (IMR) per 1,000 Live Births

Cuyahoga County Data
Protecting our Future 2014
Factors Associated with Prematurity

• **Social:** high or low age; low income; black race

• **Medical:** prior preterm, twins- triplets, infection, Maternal health, high blood pressure

• **Behavioral:** Late prenatal care; chronic stress, tobacco, alcohol, substance use
Social Determinants of Health
Prevent Prematurity

Ohio Perinatal Quality Collaborative-

- Reduced deliveries before 39 weeks
- Progesterone

A baby’s brain at 35 weeks weighs only two-thirds of what it will weigh at 39 to 40 weeks.
OPQC Impact
Ohio Birth Certificate Data
January 2006 – July 2014

Births induced at 37-38 weeks with no apparent medical indication for early delivery,
by month, 2006-2014
Aggregate of Ohio maternity hospitals

Source: Ohio Department of Health, Vital Statistics

- Monthly Percent
- Baseline Average Percent
- Control Limits
Effects of the OPQC- 39 Week Birth Project
September 2008 → July 2014

Percent distribution of Ohio births, by gestational age and month
January 2006 to September 2014

Since OPQC inception, 46,350 expected births <39 weeks have shifted to ≥39

Baseline averages were calculated from the initial 24 months, January 2006 to December
OPQC Initiative: Progesterone

- Recent studies have shown that a hormone supplement of progesterone in the second and third trimesters of pregnancy can reduce preterm birth in women who have experienced a previous preterm birth.
- Progesterone helps the uterus grow and prevents it from contracting, which could lead to miscarriage or premature birth.
OPQC Progesterone Project 2014 - 2016

Significant Reductions In Birth Before < 37 W and < 32 W In Women With A Prior History Of Preterm Birth

Monthly Data
January 2012 – December 2015

Percent

40
35
30
25

10% ↓

Percent

12
10
8
6
4
2

20% ↓

Monthly Data
January 2012 – December 2015
5 Leading Causes of Infant Mortality

Prematurity
Sleep related deaths
Unintentional Injury
Maternal Health Complications
Severe Birth Defects

Top 5 Causes

Deaths Before 1 year of age.
Unsafe sleep environments place healthy infants at risk of SIDS.- no cribs, or not used. Suffocation is the leading injury related cause of death before 1 year of age. 3 infants in Ohio die every day of sleep related causes.
Distribution of Poverty and Sleep Related Infant Fatalities
Cuyahoga County, Ohio (2005-2014)

Sleep Related Fatalities
- SIDS (11)
- Accidental Suffocation (45)
- SUID/Undetermined (142)

Percentage of Persons Below Federal Poverty Guideline*
- 0.0 - 5.0
- 5.1 - 11.4
- 11.5 - 22.5
- 22.6 - 38.4
- 38.5 - 87.1

Municipal Border

Data obtained from the 2008-2012 American Community Survey, US Census Bureau.
Percentage of poverty was calculated at the 2010 census tract level.
Model of an Effective Program
Cleveland Mom’s First

Source: Cleveland Dept of Health, Report to City Council, rev Oct 2014
5 Leading Causes of Infant Mortality

Prematurity
Sleep related deaths
Unintentional Injury
Maternal Health Complications
Severe Birth Defects

Top 5 Causes

Deaths Before 1 year of age.
Preconception Folate Supplementation

- Planned Conception
- Good Prenatal Care
- Folate supplements begun 1 month before conception decreases NTD 26%.
Canadian Study on Folic Acid & Neural Tube Defects

Children born in low income areas had significantly higher rates of NTD (RR = 1.29, CI: 1.15–1.34) compared to high income areas.

Vertical line indicates the onset of food fortification with folic acid.
Potential Role for Statewide Data

• Merging the multiple data sources from Vital Stats, ODH, birth defect surveillance along with data on ground and water pollutants could be informative.

• Target impoverished areas for specific nutritional education and additional Folate supplementation

• Combat Food Deserts

• Additional Pollutants?
Lead Poisoning

Children Under 6 Estimated Lead-poisoned in "Hot" Census Tract Areas in Cleveland and Northern Cuyahoga County

Children Under 6 Lead-poisoned (Estimated)
- 12.2% - 15.0%
- 15.1% - 18.8%
- 18.9% - 23.4%
- 23.5% - 27.3%
- 27.4% - 30.6%
- 30.7% - 35.0%
- 35.1% - 45.0%
- 45.1% - 49.7%

Source: Ohio Healthy Homes and Lead Poisoning Prevention Program, Ohio Department of Health. ODH defines a "hot" census tract as one where the estimated percentage of children lead-poisoned (5 ug/dL blood) is 12% or greater. Map by The Kirwan Institute.
Portfolio – Areas of Expertise, Ongoing Work: Improved Access to Care

• Rainbow Care Connection- Pediatric ACO
• Centering Pregnancy- making quality prenatal care accessible
• Safe Sleep
• Progesterone (mentioned in previous slides)-
Portfolio – Areas of Expertise, Ongoing Work: Spatial GIS Modeling for Identifying High-Risk Communities

• Reducing Rehospitalizations in the First Year of Life

  Aim: Comprehensive view of rehospitalizations during the first year of life in children in Ohio’s Medicaid
  • Reviewed extent, cost, and causes of rehospitalization
  • Specific impact of contributing factors:
    • geographic location,
    • low birth weight,
    • gestational age,
    • maternal characteristics
Portfolio – Spatial GIS Modeling for Identifying High-Risk Communities

• Reducing Rehospitalizations in the First Year of Life

Rehospitalization for Jaundice, Dehydration or Feeding of within 30 days of birth

Rehospitalization of Medicaid infants in first 30 days of life

Rehospitalization of Medicaid infants in first year of life

Mothers without recorded prenatal visits (%)
Portfolio – Areas of Expertise, Evaluation of Impact of Home Visiting Programs

- Ohio’s Home Visiting Programs for Pregnant Women and Children 0-5 Years
  - In partnership with the Center for Child Health and Policy at Rainbow, MSASS at CWRU and the Ohio Department of Health
  - Defined the rates of risk factors and poor outcomes for pregnant women and young children in Ohio and its counties
  - Identified subpopulations at particularly high risk for poor health outcomes, including social factors/domains

Cuttler et al; Sept 2010
Portfolio – Areas of Expertise, Ongoing Work
Evaluation of Maternal and Infant Projects in Ohio

• **Goal**: to assess the degree to which three pilot MIH projects have improved the health of Medicaid and Medicaid-eligible mothers and infants.

• The Center for Child Health and Policy at Rainbow is exploring the quality, cost-effectiveness and impact on improving health outcomes of the projects by:
  - Measuring success of enrollment of high risk women
  - Assessing quality (access to care, utilization, patient satisfaction)
    – Documenting health outcomes for mothers and babies
    – Evaluating cost-effectiveness of model

• Unique methods with both **Quantitative** (linked Vital Statistics & Medicaid Claims Data) and **Qualitative** (Structured Interviews)
Portfolio – Areas of Expertise, Ongoing Work: CAPQuaM

• Expertise in measure development for pediatrics, hosting a CHIPRA Center of Excellence (CAPQuaM)
• The Collaboration for Advancing Pediatric Quality Measures
  – one of seven Centers of Excellence
  – funded by the Agency for Health Care Research and Quality (AHRQ) and CMS
  – Collaborates with leading institutions and organizations
  – Variety of experts provide expertise to develop and enhance pediatric quality care measures
  – Example measures:
    • Hypothermia of low birthweight neonates
    • Care capability of Site of delivery of high risk pregnancies
Portfolio – Areas of Expertise, Ongoing Work:

Infant Mortality

Ohio Commission on Minority Health

Medical Expert Panel:

White Paper

Achieving Equity and Eliminating Infant Mortality Disparities within Racial and Ethnic Populations: From Data to Action

Release Date: September 18, 2015

Medical Expert Panel White Paper Series Volume 1 – Infant Mortality

Infant Mortality

Expert says infant mortality rate near University Circle exceeds that of some Third World countries: PolitiFact Ohio

Wednesday, January 6, 2016 at 9:00 am

Download

Of every thousand births in Cleveland, 13 babies die in infancy, twice the national average. And black infants here are more than twice as likely to die before their first birthday as white babies. Cleveland City Council President Kevin Kelley called it appalling and unacceptable. Time is in the sound of their details on what government and health care leaders throughout the region plan to do about it.

Dr. Michele Walsh, MD, MSE, UH Rainbow Babies and Children’s Hospital, Case Western Reserve University
Data Sources Experience

- Medicaid Claims Data
- Vital Statistics
- Area Resource File (ARF)
- Healthcare Cost and Utilization Project (HCUP) – Agency for Healthcare Research and Quality (AHRQ)
- The Ohio Department of Health Vital Records and Lead Surveillance Program
- Bureau of Labor Statistics
- Ohio Family Health Survey (OFHS 2008)
- Annie E. Casey Foundation (http://www.aecf.org/)
- Substance Abuse and Mental Health Services Administration (SAMHSA)
- The Supreme Court of Ohio and the Ohio Judicial System
- The Ohio Department of Public Safety
- The Ohio Department of Youth Services