

## *Study Title*

PROJECT NAME: Kalamazoo County Healthy Babies-Healthy Start

TITLE OF REPORT: Differential Pathways to Infant Health by Race and by Income

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### Section I: Introduction

The United States has a high rate of infant mortality relative to other developed nations. Approximately 23,440 infants died in the year 2013 in the U.S., at a rate of 6 deaths per 1,000 live births (Centers for Disease Control and Prevention, 2015; The World Bank, 2015). This rate is higher than that of most other developed nations, and the US is ranked 26<sup>th</sup> out of 34 countries who are members of the Organization for Economic Co-operation and Development (which includes several European countries, Mexico, Japan, Korea, and Israel; (MacDorman, Mathews, Mohangoo, & Zeitlin, 2014).

Race is linked to risk for infant mortality. Racial disparity reflects, on a national level, disproportionate infant mortality between black and white infants. Black infants are approximately two times more likely to die before the age of 1 than are white infants. Death rates related to preterm birth were three times higher among African American infants than among White infants. In addition, deaths from maternal pregnancy complications, SIDS, and unintentional were at least twice as high among African American infants as they were among White infants (Matthews & MacDorman, 2013).

Within Kalamazoo County, as across the United States, white infants die at markedly lower rates than infants of color. This statistic is particularly significant in Kalamazoo County compared to other counties and states.

FIMR (Fetal Infant Mortality Review) case reviews have identified risk clusters that act as contributors to infant mortality. The present study is conducted on behalf of Kalamazoo Healthy Babies-Healthy Start as part of program evaluation efforts, with the broad purpose of identifying system-level gaps that are contributing to infant mortality and to the racial disparities in infant mortality in Kalamazoo County. Knowing these risk clusters, we could examine the interaction of socioeconomic status and race in predicting poor birth outcomes and infant mortality; describe the prevalence and contribution of institutionalized racism upon birth outcomes and infant mortality, relative to other key medical and demographic contributors

Interestingly, we noticed that not only do black and white infants die at different rates, but they die from different causes: leading cause of death among higher-income white infants is congenital

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anomalies compared to prematurity, which is the leading cause of death among higher-income infants of color. The analysis of whether infants from different racial and socioeconomic groups have different factors which impact prenatal health, birth outcomes and infant survival make this study unique.

### *Key Questions:*

The goal of the current study was to examine whether variations in infant health by race and by income were associated with different sets of predictors, including maternal demographics, health behaviors, obstetric history, maternal health condition, prenatal care.

### Section II: Process / Methodology:

#### *Study Design:*

Retrospective review using population-based cross-sectional study using secondary analysis of infant birth and death records.

#### *Population & Study Sample:*

Kalamazoo County residents during the study period, 2008 through 2014 (N=21,858)

#### *Data Collection & Measurement:*

Database used contains administrative records from Vital Statistics and from Kalamazoo County Prosecuting Attorney Administrative Records (PAAM). The quantitative portion of the study will involve linkage and secondary analyses of the following data sets:

1. Kalamazoo County birth records dataset (2006-2015), with identifiers
2. Kalamazoo County linked birth-death dataset (2006-2015), with identifiers
3. Kalamazoo County infant death certificates (2016-2017), and matched birth certificates
4. Kalamazoo County Prosecuting Attorney Adult Case Tracking administrative database of charging requests (2005-2017)

In a separate analysis, summary descriptive analysis will be conducted using a deidentified dataset of Kalamazoo Fetal Infant Mortality Review (FIMR) team case reviews, exported from the NFIMR national database.

#### *Statistical Analysis:*

Study outcome was defined as infant health: full-term gestation (>37 weeks), adequate birthweight (>2,500 grams) and infant survival to first birthday. Predictors included maternal demographics, health factors and prenatal care. Generalized estimating equation models, stratified by race (of color, white) and income (Medicaid, private insurance), were conducted with two-sided statistical significance set at  $\alpha < .05$ . Each predictor was tested through Baron and Kenny's process of mediation.

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### Section III: Findings

#### Results:

Eighty seven percent (87.2%, 18,783 of 21,858 births) resulted in a full term, adequate weight infant who survived its first year. Regarding health risk and protective factors, white infants were 3.97 times more likely to be higher-income than infants of color. Higher-income women lower prevalence of the following risk factors: adolescent pregnancy, prior poor birth outcome, chronic disease, late prenatal care, STI, prenatal smoking. Stratification revealed important differences regarding determinants of infant health based upon race and income. To begin with, higher income status was protective for white infants but not for infants of color (income: white aOR 1.39 (1.21, 1.60) / of color aOR 0.88 (0.69, 1.12). This is true for education, no fertility treatment, appropriate BMI, and no tobacco use. Additionally:

- Having a **prior poor birth outcome**, the greatest risk to infant health overall, was more prevalent and was associated with greater risk to infants of color and to low-income infants
- **First trimester prenatal care**, a protective factor, was more prevalent and brought significant health gains to white infants and to higher income infants but not to infants of color or low-income infants

Multivariable generalized estimating equations confirmed that, even after accounting for key contributors, race and income were significant independent predictors of infant health: white infants and higher-income infants had better health than infants of color and lower-income infants (race aOR 1.40 (1.26, 1.56) and income aOR 1.33 (1.18, 1.50)). A race-by-income interaction was tested, but did not improve model's prediction of infant health. Living in Kalamazoo County as a white person, and being part of a higher income group significantly increases one's chance of good birth outcome.

#### Conclusions:

Infants of color face different health risks than white infants; risks that vary not just in magnitude but in the character. The same is true for low- and high-income infants. This points to the need for tailored approaches to risk assessment, clinical care and public health interventions; such as patient centered clinical care models at the individual level and targeted population-level interventions which structure resources to meet the nature and degree of risk specific to a group. A singular preventive care model would not fit all.

#### Recommendations & Resources

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