

# Infant Mortality in Ohio

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Infant mortality is the rate at which babies die within their first year of life. Infant mortality is a measure that can be used to gauge the trends in women and child health, the quality and availability of medical care, public health practices, and the economy overall.



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***Black infants are twice as likely to die in Ohio during their first year of life compared to white infants***

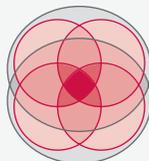
Ohio lags the nation in our infant mortality rates.<sup>1</sup> In 2010, Ohio had the 4th highest infant mortality rate in the nation, the 14th highest rate for White infants and the 2nd highest rate for black infants. While infant mortality rates have declined 12% nationally between 2005 and 2011, Ohio's infant mortality rate has remained relatively stagnant.

Within the state of Ohio there are health disparities in infant mortality rates. Black infants are twice as likely to die in Ohio during their first year of life compared to white infants—2012 rates of infant mortality were 13.98 per 1,000 live births among black infants and 6.37 per 1,000 live births among white infants.<sup>2</sup>

Health disparities have also been observed among adolescents who give birth between the ages of 15 and 17 years among all races and ethnicities and also among those who reside in Ohio's Appalachian counties.<sup>3</sup>

## Socio-Ecological Model

The health of an individual is determined by more than their genetic makeup and the lifestyle choices that they make. While both play a role in health outcomes, there are also structural and social forces in a person's life, which they may have little control over, that impact health outcomes. Infant mortality rates are impacted by each level of society. Each of these levels is described in the **Socio-Ecological Model** and include public policy, community, organizational, interpersonal and individual. This model helps to provide a framework to understand how disparities impact infant mortality rates in Ohio.



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## Individual Level: The Infant

### Prematurity

- According to the CDC, preterm birth affects 1 in every 9 infants born in the U.S. and is the leading cause of infant death, representing 35% of causes of infant deaths in 2008<sup>4</sup>
- In 2010, Ohio ranked 15th among states with the highest rate of preterm deliveries at a rate of 12.7%, a rate higher than the goal of 11.4 set by the Healthy People 2020 objective<sup>5</sup>

### Low Birth Weight (LBW)

- LBW is defined as weighing less than 2,500 grams at birth. The risk factors for LBW include birth defects, maternal chronic health issues, alcohol or tobacco use, socioeconomic status, and being of African American race<sup>5</sup>
- In Ohio, 8.6% of all births in 2011 were low birth weight and there are racial disparities among these rates.<sup>5</sup>
- In Ohio, 13.6% of births among non-Hispanic blacks are low birth rate compared to 7.3% among non-Hispanic whites and 7.4% among Hispanics.<sup>5</sup>

### Sudden Unexpected Infant Death Syndrome (SUID)

- SUID is defined as deaths among infants within their first year of life that occur suddenly and unexpectedly and whose cause of death is not immediately obvious prior to investigation.
- Some of the causes of SUID include poisoning or overdose, inborn errors of metabolism, infections, accidental suffocation, SIDS, and unknown causes<sup>6</sup>
- SIDS is defined as the sudden death that cannot be explained after a thorough investi-

gation is conducted which includes a complete autopsy, examination of the death scene, and review of the clinical history of the infant<sup>6</sup>

- According to the 2009 IM Task Force Report, the largest number of infant deaths was attributed to sudden infant death syndrome (SIDS). The risk factors for SIDS include smoking, lack of breastfeeding and lack of safe sleeping environment.<sup>3</sup>
- In a study that examine cases of SIDS to discover maternal and infant social risk factors, researchers found that SIDS was more significantly common among mothers who were not in a relationship, if the infant was not the first born child, and when the mother resided in a socioeconomically disadvantaged area<sup>7</sup>

## Individual Level: The Mother

### Age

- Infants born to teens and older women have an increased risk of death within their first year of life.<sup>8</sup>
- In a study that examined maternal and perinatal risk factors for SIDS, a lower maternal age was found to be a significant risk factor for SIDS.<sup>7</sup>

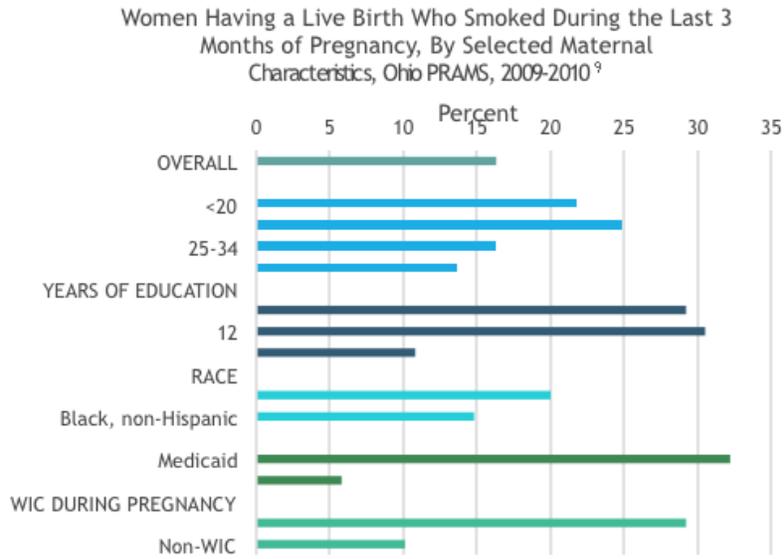
### Maternal Stress

- Maternal Stress during pregnancy has been associated with increased rates of preterm delivery and it is suggested that it is a cause for the racial and ethnic disparities in preterm deliveries.<sup>9</sup> This is because stress may affect Black women at a higher rate given the stress caused by chronic racism, poverty, and discrimination that many Black women face.<sup>8</sup>
- Researchers have looked at life satisfaction data retrieved from the 2005–2008 BRFSS surveys and compared the data for the 50 states and Washington D.C. to the infant mortality rates for those years. What they found was a state's life satisfaction was correlated with its infant and neonatal mortality rates. Those states who's residents reported higher levels of life satisfaction had lower rates in infant mortality. In that study, Ohio ranks 43rd in life satisfaction and has the 11th highest rate of infant mortality.<sup>10</sup>

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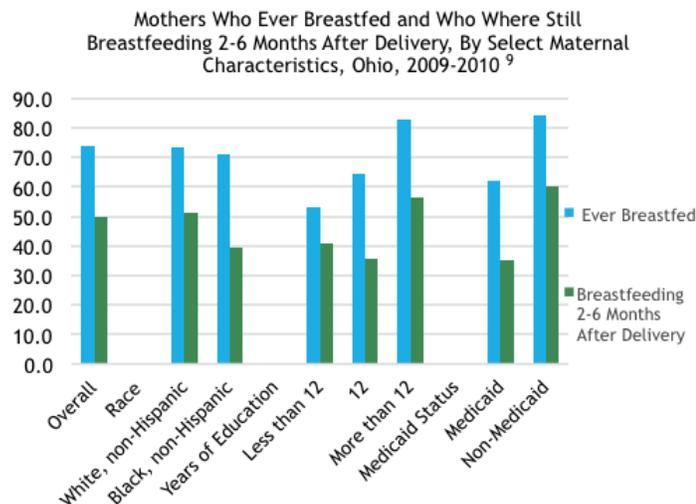
### Smoking Status

- Smoking during pregnancy and smoke in the infant's environment after birth has been shown to be a major risk factor for SIDS.<sup>11</sup>
- Smokers have consistently shown to have worse birth outcomes when compared with non-smokers. However, Black women who did not smoke during pregnancy had worse birth outcomes than white pregnant women who did smoke.<sup>8</sup>



**Breastfeeding**

- Breastfeeding is associated with a reduced risk for SIDS.<sup>11</sup> Research has shown that breastfed infants have a 20% lower risk of dying between 28 days and one year after their birth compared to infants who are not breastfed.<sup>13</sup>
- In the CDC’s Breastfeeding Report Card 2012, Ohio ranked 6th in the lower rates of mothers who reported ever breastfeeding their infants. 62.3% of Ohio mothers reported breastfeeding their infants in comparison to 76.9% nationally.<sup>14</sup>
- In Ohio, black mothers, those with less education, and women receiving WIC benefits have been shown to be less likely to continue breastfeeding 2–6 months after giving birth.<sup>13</sup>



## Sleep environment

- Sleep-related infant deaths are those that occur unexpectedly and suddenly in a sleep environment and represent one of the leading causes of infant death. In Ohio, more than 3 infant deaths each week are sleep related.
- It is recommended by the American Academy of Pediatrics that infants sleep on their backs for every sleep.<sup>11</sup> However, at least one third of infants sleep in the non-recommended prone position most of the time.<sup>3</sup> According to the Ohio Department Health, 72% of mothers report placing their infants on their backs when they sleep.<sup>3</sup>
- A study of infant mortality in Chicago found that the majority of the predominately black cohort in the study placed their babies in the prone position, a finding that was consistent with previous work showing that blacks are less likely to place infants in the recommended sleep position.<sup>15</sup>
- These racial disparities among infants whom sleep on their backs also exist in Ohio. In 2009–2010, only 53.2% of black women having a live birth reported putting their infant on their backs when they sleep compared to 76.4% of white non-Hispanic mothers.<sup>13</sup>

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OHIO HAS THE

**11<sup>th</sup>**

highest rate of  
infant mortality

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## Individual Level Recommendations

- While preventing preterm birth is still challenging due to numerous, complex and poorly understood causes, there are steps that can be taken to reduce the risk of preterm birth. These measures include avoiding smoking, alcohol and illicit drugs, receiving prenatal care throughout the pregnancy, and seeking medical care when experiencing signs of early labor.
- AAP recommends that a firm sleep surface is used and that infants do not share a bed with someone.<sup>11</sup> However, approximately 1 in 5 infants in Ohio share a sleep surface with someone else which can be a hazard.<sup>3</sup> Research shows that adhering to this recommendation can lead to as much as a 50% decrease in the risk for SIDS.<sup>11</sup>
- Because breastfeeding has been proven to reduce the risk for SIDS as well as provide the infant with other health benefits, exclusive breastfeeding is recommended for 6 months, followed by continued breastfeeding as complementary foods are introduced to the infant. A continuation of breastfeeding for one year or longer as mutually desired by mother and infant is also recommended.<sup>13</sup>
- Knowing that the young age of the mother can impact the survival rate of the infant, efforts to decrease teen pregnancies should be made. Lower teen birth rates have been associated with states who have more women political participation (i.e. more women who vote and/or hold political offices), women have increased employment and earning, and states with higher economic and social autonomy for women.<sup>16</sup>
- By improving these factors in the state of Ohio, teen pregnancies rates can potentially be lowered.



## Interpersonal Level

### Family Structure

- Women with the fathers' names or demographics partially or completely missing from the birth certificate have an increased risk for preterm birth, low birth weight and infant mortality. This missing data is an indicator that suggests little paternal involvement.<sup>17</sup>
- Infants born to single mothers have more adverse outcomes than infants born to married mothers across races.<sup>8</sup> This may be due to lack of a supportive male partner which can equate to a lack of a buffer against stress.
- This disparity may also be due to the fact that single woman households tend to be impoverished more often and for longer periods of time than married or coupled households. Black single mothers have the highest crude mortality rates.<sup>8</sup>
- Women who are victims of intimate partner violence have a higher risk for giving birth prematurely, having a low birth weight baby, and infant mortality compared to women who have not experience intimate partner violence.<sup>8</sup>

### Perceptions of Discrimination and Equity

- Internalized racism is the acceptance of stigma and negative messages about self-worth which translates to embracing self-devaluation and helplessness.



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- Internalized racism has been shown to have an impact on infant mortality. Black women who had poorer birth outcomes reported racism at a higher level than those who did not report racism from the same providers.<sup>8</sup>
- Internalized racism can impact the stress level of the mothers which can increase the likelihood of a preterm birth.



## Organizational Level

### Health Care

- Overall, infant mortality rates have been decreasing over the past few decades. Apart of this decline is due to both the technological and pharmaceutical advances that have been made that can help improve the care than newborns receive.<sup>3</sup>
- Lower risk of SIDS has been linked in many epidemiological studies with obtaining regular prenatal care.<sup>11</sup> However, in 2007, 17% of mothers in the state of Ohio did not receive prenatal care within their first trimester.<sup>3</sup>
- Obtaining early prenatal care seems to be beneficial for all women in terms of better birth outcomes but receiving prenatal care or not does not explain the racial disparities between Blacks and Whites.<sup>8</sup> This was proven in a study that even after controlling for demographics and complication, racial disparities still experienced higher levels of infant mortality even when given access to early prenatal care.<sup>8</sup>
- Though policies such as the State Children's Health Insurance Program have improved access for Black mothers and their infants, the quality of care that they receive has not improved nor has it improved the gap in the racial health disparities.<sup>8</sup>



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### Education

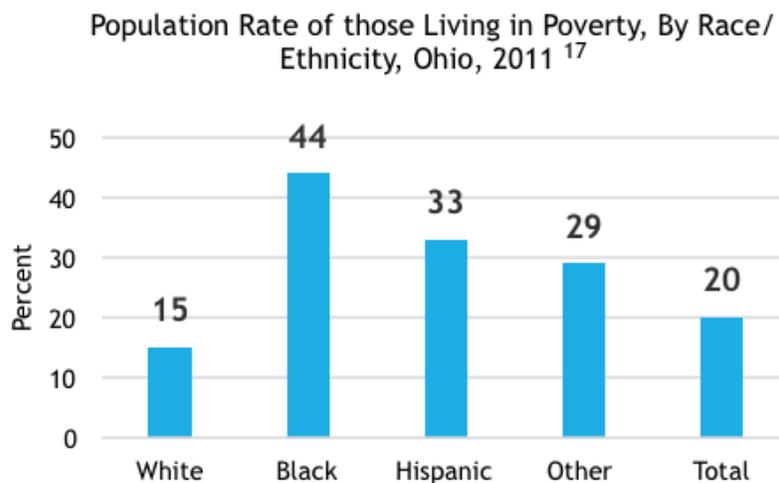
- In the US, the states with a greater proportion of women who have attended college have lower rates of infant mortality.<sup>16</sup>
- The racial disparity between non-Hispanic Blacks and Whites in infant mortality rates increases with maternal education—the high-education population has a larger racial difference both in absolute difference in the death rates and in the relative risk.<sup>18</sup>
- In Ohio, an infant born to a black mother who has five or more years of college education will still have a greater chance of dying when compared to an infant born to a white mother with a high school education or less.<sup>7</sup>
- A study In Illinois found that African American women at the highest education level had higher rates of low-birth rate babies than women of any other ethnicity at a lower strata of education.<sup>19</sup> This demonstrates that education attainment for Black women is not a protective risk factor for adverse birth outcomes.

### Employment Status

- A study examining women's status across the 50 states found that in states where there was a greater proportion of women employed in managerial or professional occupations, there were lower rates of infant mortality.<sup>16</sup>

## Poverty

- Research has shown that states in the U.S. with a smaller proportion of women living in poverty have a lower rate of infant mortality.<sup>16</sup>
- Poverty places a population at risk for many factors that can contribute to infant mortality rates. These factors include the economic and psychosocial factors related to place of residence, and the environmental, social, and behavioral correlates of poverty.<sup>20</sup>
- In Ohio, minority populations are more likely to live in poverty, with non-Hispanic Blacks at a rate that is almost 2.5 times the rate of non-Hispanic Whites.<sup>21</sup> Given the rates that are seen among non-Hispanic Whites and non-Hispanics Blacks for those living in poverty, this disparity can be one of the many causes of the health disparities in infant mortality that are seen today.
- A study of the impact of income and income inequality in the US on infant health outcomes found a significant relationship. The study found that as median family income decreased, rates of preterm birth rate, low birth weight rate, very low birth weight rate and infant mortality rate increased.<sup>22</sup>
- In that same study, income inequality in the population was measured and it was found to be positively associated with preterm birth rate, low birth weight rate, very low birth weight rate and infant mortality rate. As the income inequalities increased in the population, so did the rate of the 4 infant health outcomes.<sup>22</sup> Though this data shows that disparities in income impact infant health, the data shows that infant health outcomes are more impacted by absolute wealth rather than relative wealth.





## Community Level

### Quality of Housing

- In an analysis of 38 large metropolitan areas from 1982 through 1986, researchers found that an index of residential segregation among Blacks and Whites was the best predictor of infant mortality rates after controlling for median family income, poverty rate, and the proportion of families headed by a female.<sup>23</sup>
- Historically, in the US, Blacks have resided in neighborhoods that are generally poorer than those inhabited by other racial/ethnic groups. As of 2000, blacks were still over 3 times as likely to reside in extremely poor neighborhoods compared to whites.<sup>23</sup>
- After controlling for economic and other factors, minority neighborhoods continue to maintain higher rates of adult morbidity and mortality than White neighborhoods.<sup>8</sup>
- Residential segregation leads to differential experiences of community stress, exposure to pollutants, and access to community resources.<sup>8</sup>
- A study found a significant association between neighborhood deprivation and risk of preterm birth. However, another study found that Black infants born to mothers who reside in both impoverished and non-impoverished neighborhoods are at a high risk for post-neonatal mortality.<sup>8</sup> This study supports the notion that race is a risk factor because despite the neighborhood environment, Black infants are still having worse health outcomes.

***blacks were still over 3 times as likely to reside in extremely poor neighborhood compared to whites***

### Environmental Conditions

- A study of air pollution in US counties from 1999–2002 found that there was a significant association between particulate matter air pollution and the risk for respiratory-related

post-neonatal mortality. These finding suggests that the ozone may be associated with cases of SIDS in the United States.<sup>24</sup>

- Though air pollution has been shown in research to increase infant mortality rates, the air quality in Columbus does not warrant any suspicion that air pollution is an issue among infants.<sup>25</sup>

### Access to Healthy Foods

- Optimal birth outcomes are dependent upon the intake of sufficient nutrients for both mother and child. Inadequate intake of energy, protein and micronutrients can lead to poor fetal growth which can lead to adverse health outcomes.<sup>26</sup>
- A study of middle and low-income women in their third trimester of pregnancy found that the women had lower than required intakes of vitamin D, phosphorus, folate, calcium, and iron while having higher than required intakes of fat and sodium. This sort of diet predisposes these women to various adverse birth outcomes including preterm birth and birth injuries for the neonates.<sup>27</sup>
- A study among low-income women in the US found that participation in a nutrition intervention resulted in lower incidences of preterm and low birth weight births.<sup>26</sup>



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## Public Policy Level

### Public Health Spending

- Research examining public health spending found that a 10% increase in a state's budget dedicated to public health can lead to a 6.9% decrease in the rates of infant mortality.<sup>28</sup>
- While Ohio has increased public health spending per resident since 2009, Ohio still lags behind other states, ranking 7th among the states that spend the least per capita.<sup>29</sup>

### Model Used in Public Health

- Along with an increase in funding, a reform in the models used in public health initiatives/ interventions could improve infant mortality rates. The “Life Course” perspective is a new model for thinking about maternal health that incorporates social determinant factors and focuses on life course factors throughout a mother's lifespan which will influence infant health rather than just prenatal and postnatal health.<sup>30</sup>
- This model interprets poor infant health outcomes as not only the result of events during pregnancy, but the result of a lifetime of experiences and exposures which impact health.<sup>31</sup>
- The “Life Course” model seeks to lower infant mortality through increasing health care access, improving health care quality, addressing wellness and improving family and community conditions.<sup>31</sup>



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## Public Policy Level Recommendation

### The Northern Manhattan Perinatal Partnership

- The Northern Manhattan Perinatal Partnership (often referred to as the Harlem Better Baby Zone) applies aspects of the Life Course model, focusing on comprehensive community strategies in Central Harlem to support maternal and infant health.
- The initiative involves a multi-sector collaborative approach of aligning programming and investments to improve access to care, but also improving the built environment to support community health. These community improvement strategies have included air quality improvements through better transit planning, job development initiatives for young women and mothers, \$300 million in community revitalization efforts to improve housing, access to fresh food and economic development. The initiative also organizes stakeholders to advocate for policy reform such as regionalization of perinatal care and new hospital investments.<sup>32</sup>
- Since the program's inception, infant mortality rates in Central Harlem have dropped from 27.7 infant deaths per 1,000 live births to less than 10 infant deaths per 1,000 live births.<sup>32</sup>
- Similar programs modeled after the Northern Manhattan Perinatal Partnership are being established in Milwaukee, WI and Oakland, CA. Implementing such a program in Ohio has the potential to strengthen efforts to decrease infant mortality rates across the state.<sup>32</sup>

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## Overall Recommendations

- Infant mortality rates are impacted at various levels of society and by factors that impact the mother prior to her pregnancy. In order to effectively address infant mortality, there is a need to address these factors at these various levels. Efforts to address infant mortality should not only include pregnant women and new mothers, but children and youth as well. This strategy will seek to alter negative "life course" factors influencing health prior to pregnancy.
- A statewide sustained commitment to address social determinants of health to improve health equity is essential to reducing infant mortality. These are efforts that have to come from more than just the public health and medicine sectors. The issue of infant mortality requires actions from national, state, community, family and individual levels and should include both public and private partnerships.
- By maximizing the potential for partnerships and collaboration across disciplines and organizations, innovation, technology, expertise, community assets and other resources can be shared to help eliminate disparities and reduce infant mortality.

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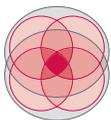
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