

**Environmental Health Policy Brief**

# Infant Mortality and Air Pollution

April 2014

**Key Points**

- Infant mortality rates are disproportionately high among African Americans in Michigan.
- Research finds air pollution is linked to infant mortality, as well as low birth weight and preterm birth - both of which contribute to infant mortality risk.
- Strengthening and enforcing policies to prevent air pollution may represent a new strategy for moving the needle on infant mortality.
- This issue is highly relevant in Detroit and southeast Michigan, where many communities - particularly communities of color - experience poor birth outcomes and poor air quality.
- Policies to protect populations from air pollution include creating a greener infrastructure, advocating for technology that reduces pollution, creating stricter air quality standards and enforcing existing standards, and increasing environmental education.

**A Call for Better Air Quality Policies to Improve Birth Outcomes in Michigan**

There is substantial evidence that improvements in air quality can play a role in reducing adverse birth outcomes, including infant mortality, preterm birth, and low birth weight. Women of color and low-income women and mothers experience higher exposures to air pollution, and thus may be at greater risk of poor birth outcomes.<sup>1,2</sup> For example, African American mothers are twice as likely as White mothers to live in the most polluted counties in the United States.<sup>3</sup>

In Detroit, which is 83% African American and 7% Hispanic, babies are twice as likely to die during the first year of life as in the nation as a whole. Detroit has the highest levels of air pollutants in the state, primarily from industrial facilities and emissions from trucks that travel through the community daily en route to Canada.<sup>4,5</sup>

Strong environmental policies are needed to protect the public from air pollution and its associated health risks, including adverse birth outcomes. These policies should focus on reducing primary sources of emissions, such as heavily trafficked roadways, diesel bus depots, waste incinerators, and industrial facilities.<sup>6</sup> They should also target the many types of air pollutants that have been linked with poor birth outcomes, including carbon monoxide, nitrogen dioxide, ozone, sulfur dioxide, polycyclic aromatic hydrocarbons, and particulate matter (PM<sub>10</sub>, and PM<sub>2.5</sub>).<sup>7</sup>

Given the widespread nature of air pollution, even small improvements can significantly affect the incidence of poor birth outcomes.<sup>8</sup> For example, Chay and Greenstone (2003) estimate that a 1% decline in total suspended particulates results in a 0.5% decline in the infant mortality rate. Moreover, efforts to improve air quality are not only important in order to improve health in early life, but also to reduce associated morbidities during childhood<sup>9,10</sup> and adulthood.<sup>11</sup>

## Current Initiatives to Reduce Infant Mortality in Michigan

Recent initiatives have brought much needed attention to inequities in infant mortality in Michigan. At 14.2 infant deaths per 1,000 live births, as compared to 5.5 among Whites, African American infants in Michigan are more than twice as likely as White infants not to survive.<sup>12</sup> These infant mortality rates are closely intertwined with rates of low birth weight and preterm birth, as both can elevate infant mortality risk.<sup>13</sup>

A number of statewide efforts are underway to address the excess rates of infant death in Michigan. For example, in 2012, Michigan's Governor Snyder and the Michigan Department of Community Health (MDCH) released an Infant Mortality Reduction Plan that details strategies to improve infant health statewide.<sup>14</sup> MDCH also oversees the Practices to Reduce Infant Mortality through Equity (PRIME) project - part of a national federal initiative to reduce infant mortality.<sup>15</sup> Michigan's participation is critical, as Region V (which includes Michigan) has the highest infant mortality disparity among all Regions nationwide. Michigan Public Radio's State of Opportunity program has reported on several statewide efforts to address infant mortality (see [stateofopportunity.michiganradio.org](http://stateofopportunity.michiganradio.org)).<sup>16</sup>

Many efforts are underway locally as well. For example, the Detroit Regional Infant Mortality Reduction Task Force spearheaded the Sew up the Safety Net Program in which major Detroit health systems have joined with public health, academic and community partners to improve birth outcomes.<sup>17</sup> As part of Place Matters, a national initiative to identify and improve environmental and other conditions that influence health, the Wayne County Place Matters Team is working to reduce infant mortality.<sup>18</sup> The Institute for Population Health's Healthy Start program bolsters health and well-being among women, infants and families.<sup>19</sup> Additionally, this year Detroit's Mayor Duggan is starting a campaign to improve infant health in the city.<sup>20</sup> These are just a few examples of ongoing efforts.

*Despite the attention that these important initiatives have brought to bear on infant mortality in Detroit and across Michigan, few have drawn attention to the links between air pollution and birth outcomes. **Improving the quality of the air we breathe in Michigan is an important strategy for improving birth outcomes, particularly among women of color and low-income women who are more likely to live near sources of air pollution.***

## Implications and Recommendations

The patterns are clear. Air pollution is linked to poor birth outcomes, and low-income women and women of color are disproportionately affected. Policies that protect women and their children from the adverse health effects of air pollution are an important component of efforts to improve birth outcomes in Michigan. Public health principles call for *universal* protections from toxins that threaten the fundamental right to clean air, regardless of race, ethnicity or socioeconomic status.<sup>21</sup>

There are many ways in which policy makers can work to reduce air pollution and improve birth outcomes in Detroit and southeast Michigan. They can:

**Create a greener infrastructure**

- Locate new sources of pollution, such as bridges and highways, at a distance from homes and schools, particularly those that are already located near pollution sources. This preventive action could help to reduce exposures, particularly among those already experiencing high levels of exposure.
- Improve cycling and pedestrian infrastructure (e.g., sidewalks, bike lanes). Research in the upper Midwestern U.S. indicates that if 50% of short trips were made by bicycle or on foot, the region could reduce particulate matter and ozone and significantly improve health outcomes.<sup>22</sup>
- Increase local greenery, which removes pollution from the air.<sup>23</sup> Vegetative buffers can act as barriers between the source of air pollution and local communities.<sup>24</sup>

**Advocate for technology that reduces pollution**

- Reduce traffic congestion and idling. Traffic is a significant risk to fetal health. Women living near roadways with high traffic pollution face a 10-20% increased risk of preterm birth and low birth weight.<sup>25</sup> Reductions in traffic congestion and idling, for example, installation of E-Z passes on toll roads, have been shown to have positive effects on birth outcomes.<sup>26</sup>
- Promote cleaner sources of energy, such as solar or wind energy to replace coal burning power plants.
- Require technologies that reduce emissions from transportation, such as diesel engine retrofits and electric energy for rail and industry.

**Advocate for stricter air pollution standards and enforcement of existing standards**

- Advocate for review of air pollution standards to determine whether they adequately protect developing fetuses, infants and children. The California Environmental Protection Agency, for example, conducted such an assessment and determined that the current PM<sub>10</sub> standards are inadequate to protect against low birth weight and premature birth.<sup>27</sup>
- Advocate for adequate enforcement of new and existing standards.

**Increase Environmental Education**

- Increase awareness of associations between environmental factors and reproductive health among program staff implementing infant mortality reduction initiatives, and among local residents.

For information on adverse birth outcomes and health problems associated with exposure of the developing fetus to air pollution, visit <http://ehscc.umich.edu/wp-content/uploads/Air-Pollution-and-Early-Development-Fact-Sheet.pdf>.

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The Community Outreach and Engagement Core (COEC) increases awareness and understanding of environmental health research. Stakeholder Advisory Board members include:

- Community Health and Social Services Center, Inc.
- Detroit Hispanic Development Corporation
- Detroiters Working for Environmental Justice
- Green Door Initiative
- Henry Ford Health System
- Institute for Population Health
- Michigan Department of Community Health
- University of Michigan School of Public Health
- Eastside Community Network

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*The University of Michigan Environmental Health Science Center of Excellence promotes collaboration among UM environmental health researchers and communities. Researchers work together to advance knowledge of environmental health issues that affect community members in Detroit and Southeast Michigan.*

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## Citations

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