



Air Pollution and Early Development

The M-LEEd Center's Community Engagement Core (CEC) increases awareness and understanding of environmental health research.

Stakeholder Advocacy Board members include:

- Community Health and Social Services
- Detroit Department of Public Health
- Detroit Hispanic Development Corporation
- Detroiters Working for Environmental Justice
- Eastside Community Network
- Ecology Center
- Henry Ford Health System
- Michigan Environmental Justice Coalition
- We the People of Detroit

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Why is Air Pollution an Important Issue?

Air pollution is a significant problem in Detroit and southeast Michigan. This pollution comes from many sources, such as cars, trucks, industrial factories and power plants.¹ In the Detroit metropolitan area, poor neighborhoods and neighborhoods with larger proportions of non-Hispanic Black (NHB) and Hispanic/Latinx residents are more likely to be closer to industrial sources of pollution and have heavy traffic on roads through their neighborhoods, creating higher levels of air pollution.²

There is substantial evidence linking women's exposure to air pollution during pregnancy to harmful health effects for the child before and after birth, as well as during childhood. This is because pregnancy and early childhood are particularly vulnerable times. A growing fetus is very sensitive to its mother's environment, and children are particularly vulnerable to environmental exposures.^{3 4}

It is possible that air pollution plays a role in Detroit's high infant mortality rate. With almost 11 deaths per 1,000 live births in 2019, the city has one of the highest infant mortality rates in the country.⁵

How is Air Pollution Linked to Early Life Outcomes?

Before Birth: Exposure to air pollution during pregnancy has been linked to

- Small fetus relative to its gestational age.⁶
- Increased risk of birth defects, such as heart deformities.⁷
- Increased mother's risk of high blood pressure during pregnancy (pre-eclampsia), which can make the pregnancy more dangerous for both mother and child.⁸



At Birth: Exposure to air pollution during pregnancy has been linked to

- Preterm birth, where the infant is born at least three weeks early (at less than 37 weeks). This is an important health concern, as some babies who are born early will not survive, and others may experience health problems during childhood or later in life.^{9 10}
- Increased chance that the child will have low birth weight and smaller head size (which has been linked with developmental problems).^{11 20}





Infancy and Early Childhood?

Exposure to air pollution in the womb has been linked to:

- Developmental problems, such as a lower intelligence quotient (IQ), anxiety, depression and attention problems.^{12 13}
- Infant death from respiratory problems and Sudden Infant Death Syndrome (SIDS).¹⁴
- Greater risk of childhood asthma.¹⁵
- Greater risk of high blood pressure and heart disease in adulthood^{16 17}

Why is this Happening?

Scientists are still researching how air pollution leads to problems during and after pregnancy. Some think that air pollution prevents oxygen and nutrients from getting to the fetus. Others think that air pollution particles or effects may reach the womb and change the activity of cells in the fetus as it develops.¹⁸

There are many types of air pollutants and most of us are exposed to a mixture of them that includes metals (such as chromium, lead and arsenic), organic compounds (such as benzene and formaldehyde), gases (such as ozone and sulfur dioxide), and particulate matter. While many of these chemicals are known to be toxic and cause cancer, their exact role in early development and childhood is complex.¹⁸

What Does this Mean for Me and My Community?

Researchers continue to study the association between air pollution and poor birth outcomes to better understand these connections. While causal mechanisms are not entirely clear, given the existing evidence of associations with poor birth outcomes as well as the substantial body of evidence linking air pollution with other adverse health outcomes such as asthma, it makes good sense to reduce levels of air pollution when possible.

What action steps can we take?

We can work together to reduce air pollution in our communities so that pregnant women – and all of us – can breathe cleaner air. For example, we can:

- Advocate that new sources of pollution, such as bridges and highways, are located further away from people's homes and schools.
- Work with community groups to promote alternatives to sources of air pollution (such as solar or wind energy instead of coal burning power plants).
- Advocate for stricter air pollution standards, such as regulations to limit levels of harmful ozone and particulate matter.
- Require technologies that reduce air pollution, such as diesel engine retrofits and electric energy for rail and industry.
- Educate and advocate for eliminating and reducing indoor pollution, including tobacco smoke.
- Demand more research to study ways to reduce the negative effects of air pollution on health in Detroit, southeast Michigan, and other communities.¹⁹

For additional information on actions you can take, please visit ehscc.umich.edu.

Please see http://mleead.umich.edu/Coec_Fact_Sheets.php for the citations included in this factsheet.

The University of Michigan Lifestage Environmental Exposures and Disease Center (M-LEED) Community Engagement Core (CEC) promotes collaboration among UM environmental health researchers and communities to advance knowledge of environmental health issues that affect community members in Detroit and Southeast Michigan.

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