

Asthma and the Environment

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The Community Outreach and Education Core (COEC) increases awareness and understanding of environmental health research.

Stakeholder Advisory Board members include:

- Community Health and Social Services Center, Inc.
- Detroit Department of Health and Wellness Promotion
- Detroit Hispanic Development Corporation
- Detroiters Working for Environmental Justice
- Green Door Initiative
- Henry Ford Health System
- Imagine Creative Opportunities Now
- Michigan Department of Community Health
- Michigan Department of Environmental Quality
- University of Michigan School of Public Health
- Warren-Conner Development Coalition

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Why is Asthma an Important Issue in Southeast Michigan?

Asthma is a serious health problem in Southeast Michigan. Compared to the State of Michigan, the City of Detroit, Wayne County, Washtenaw County, and St. Clair County have higher asthma percentages and rates of preventable hospitalizations. Chances are that in almost every household someone is affected by asthma or knows a person that is affected by asthma.

Area	Ever Told Asthma (%) 2008-2010 ¹	Hospitalization Per 10,000 2005-2009 ²	Hospitalization Per 10,000 2010 ²
State of Michigan	15.6%	16.3 ± 0.1	15.7 ± 0.2
City of Detroit	19.1%	52.0 ± 0.7	49.0 ± 1.6
Wayne County	17.2%	16.7 ± 0.3	17.6 ± 0.8
Washtenaw County	18.0%	12.3 ± 0.5	11.7 ± 1.1
St. Clair County	18.0%	17.0 ± 0.9	15.7 ± 0.2

What Triggers Asthma?

There are many triggers that can induce an asthmatic reaction, and some research suggests that some of these may also increase risk of asthma. These include:

- Air pollution
- Second-hand and third-hand cigarette smoke
- Dust mites
- Molds
- Pests (including cockroaches and mice)
- Pet dander

Some triggers cannot be avoided by individual behavior changes, for example triggers in the environment, such as air pollution cannot be avoided.



How do Environmental Triggers Cause Asthma?

There is evidence to suggest that **oxidative stress and epigenetic changes** may play a role in the development of asthma. **Oxidative stress** occurs when there is an imbalance leading to more free radicals than healthy anti-oxidants in our cells. Some environmental free radicals include cigarette smoking and air pollution. **Epigenetics** is the study of our epigenome, which sits on top of our DNA. The epigenome acts like the volume control making some genes louder (expressed more) than others. Our environmental exposure to air pollutants, which include oxidative stressors, can have an effect on our epigenome.³

Epigenetics, Oxidative Stress and Asthma

Both epigenetics and oxidative stress have linkages to asthma. They are story of two separate pathways that can lead to the same result of higher incidence of asthma. **Epigenetics:** Researchers studied pregnant women in low-income areas of New York City. They found that women exposed to high levels of pollution were more likely to have a child that developed asthma by age five, and that many of these children had changes in their epigenomes due to the high levels of traffic pollution.⁴ **Oxidative Stress:** Researchers have found that exposure during pregnancy to environmental pollutants in the air including tobacco and industrial/traffic-related pollutants increase the risk of asthma in their offspring.^{5,6} They concluded that the pollution caused **oxidative stress** increasing the risk of asthma. Women who ate foods rich in antioxidants protect against the negative effects of these exposures were less likely to have children that developed asthma.

What Does this Mean for Me and My Community?

People that live or work near higher levels of environmental air pollutants, can take individual and community steps to reduce their harm thus reducing the chance that their offspring will develop asthma. Here are some steps you can take to reduce asthma-inducing pollutants from impacting you:



- Work with others to advocate for regulations that decrease exposure to air pollution from cars and trucks, as well as industrial sources
- Work with others to promote access to healthy, affordable anti-oxidant rich foods
- Consume more foods that are rich in antioxidants, such as fruits and vegetables
- When possible avoid exposure to cigarette smoke & other environmental pollutants

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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