



# Asthma and the Environment

The M-LEEaD Center's Community Engagement Core (CEC) increases awareness and understanding of environmental impacts on human health.

Stakeholder Advocacy Board members include:

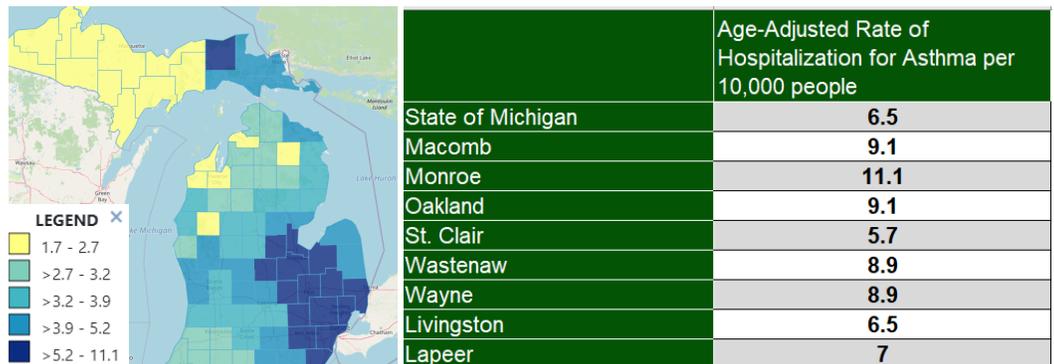
- Community Health and Social Services
- Detroit Health Department
- Detroit Hispanic Development Corporation
- Detroiters Working for Environmental Justice
- Eastside Community Network
- Ecology Center
- Henry Ford Health System
- Michigan Environmental Justice Coalition
- We the People of Detroit

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## Why is asthma important to Southeast Michigan?

Asthma is a serious health problem which affects people's breathing. Compared to the average for Michigan, people in most areas of Southeast Michigan are more likely to have asthma, and more likely to be hospitalized with complications of asthma (see Figure 1). Southeast Michigan also has some of the highest levels of air pollutants in the state, with levels of sulfur dioxide and ozone that are above the federal health standard levels. <sup>1 2 3</sup>

Age-Adjusted Asthma Hospitalization Rates in Michigan Counties per 10,000 people (2017)<sup>3</sup>



## What triggers asthma?

There are many triggers that can bring on an asthmatic reaction, and research suggests that some of these may also increase the risk of developing asthma. <sup>4 5</sup> These include:

- Air pollution
- Smoking
- Second hand smoke exposure
- Vaping
- Dust mites
- Molds
- Pests (including cockroaches and mice)
- Pollen
- Pet dander

Some triggers cannot be avoided by individual behavior changes. These include triggers in the environment such as air pollution.





## How does Air Pollution Influence Asthma?

There is evidence that exposure to pollution leads to oxidative stress and changes in our epigenomes, and that this may play a role in the development of asthma.

### Oxidative Stress

Oxidative stress occurs when there are too many free radicals and not enough healthy anti-oxidants in our bodies. Air pollution, cigarette smoking, and other environmental exposures can increase the number of free radicals in our cells.<sup>6</sup>

Researchers found that children who consumed a greater variety fruits and vegetables in one day had a lower chance of airway inflammation and lower rates of self-reported asthma. Fruits and vegetables contain antioxidants which can reduce the effects of oxidative stress such as airway inflammation.<sup>7</sup>

### Epigenome

The epigenome acts like a volume control for our genes, making some genes louder (expressed more) than others. Exposure to air pollutants can affect our epigenomes, and this may contribute to development of disease.<sup>8 9 10</sup>

Researchers studied the effects of air pollution on children in Fresno, California. Some epigenome changes are known to be associated with asthma. The researchers found that these epigenome changes were more common among children who were exposed to higher levels of air pollution.<sup>11</sup>

## 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 exposure thus reducing the chance that their children 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 a variety of fruits and vegetables
- When possible avoid exposure to cigarette smoke & other environmental pollutants

*Please see [http://mleead.umich.edu/Coec\\_Fact\\_Sheets.php](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-LEEaD) 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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