

**Environmental Health Policy Fact Sheet**

Air Pollution, Oxidative Stress, & Antioxidants

November 2013

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
- Institute for Population Health
- Green Door Initiative
- Henry Ford Health System
- Eastside Community Network
- Michigan Department of Community Health
- University of Michigan School of Public Health

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Air Pollution, Oxidative Stress, & Antioxidants

Air pollution comes from a variety of sources. In Detroit, the Michigan Department of Environmental Quality tracks air pollution at nearly 60 industrial facilities— including an oil refinery, steel mills, wastewater treatment plant, a waste incinerator and many manufacturing sites. Also, as the largest land border crossing in the U.S., Detroit has a network of border plazas, highways, railways, and intermodal sites to support transport of goods on ships, trucks, and trains. These industrial facilities and this transportation network generate pollutants such as carbon dioxide, nitrogen oxides, sulfur dioxide, and particulate matter. *This air pollution increases oxidative stress in the human body.*



Oxidative stress occurs when there is an imbalance in our cells due to either an *increase* in free radicals and/or a *decrease* in antioxidants. Pollution from industrial and transportation sources may increase the amount of free radicals in the body. Over time this disruption in the balance between free radicals and antioxidants can injure our tissues. Oxidative stress has been linked to a number of illnesses, including some forms of cancer, cardiovascular disease, obesity, diabetes, Alzheimer's disease, eye diseases, and lupus. *Intake of antioxidants may help to prevent or reduce oxidative stress in the human body.*

Antioxidants are a class of substances, including Vitamin C, E, and beta-carotene, that have the ability to counter free radicals. Foods rich in antioxidants include many berries, nuts, beans, and vegetables. Research is underway to determine if and how antioxidant supplement pills counter oxidative stress. *Most experts agree that eating foods rich in antioxidants is an effective way to prevent or reduce oxidative stress.*



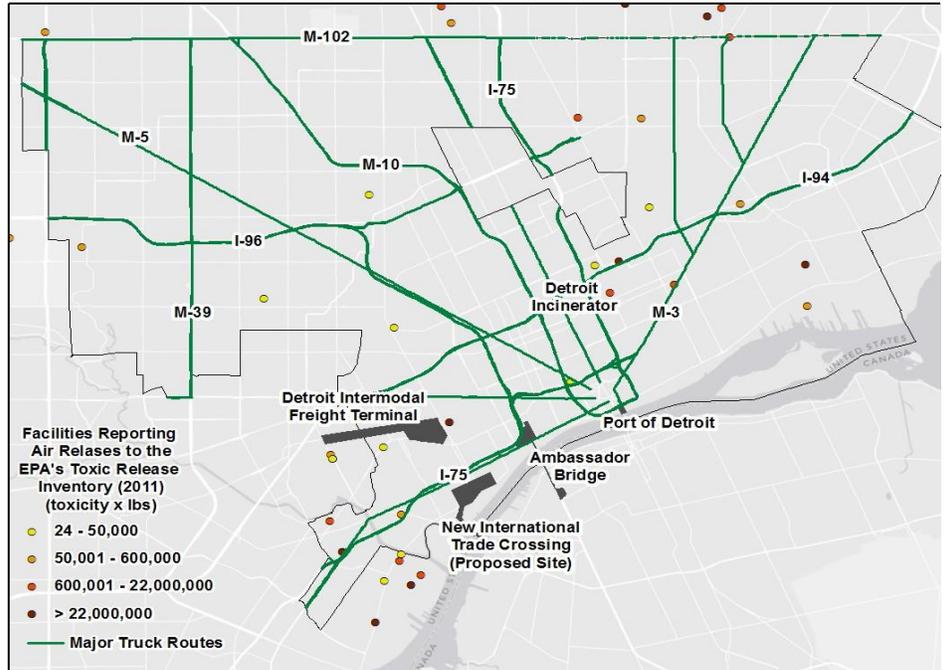
Why is Policy Change Important?

Policymakers play a key role in supporting environments that allow us to be healthy. The policy goals on the next page help to create environments that are safe for everyone to work, play and live. Based on research findings from scholars at the University of Michigan and elsewhere, the following policies could help to reduce oxidative stress and its related health effects in Detroit and Southeast Michigan.

Decrease exposure to air pollution from industrial and transportation sources to reduce oxidative stress:

- Develop and enforce truck routes that avoid residential neighborhoods;
- Require and incentivize “green buffers” or spaces with trees and other vegetation that reduce pollution near highways and industrial facilities;
- Develop zoning regulations to ensure industry and high traffic areas are not developed near homes, schools, parks, day care centers, and residential neighborhoods;
- Retrofit diesel engines, reduce idling, and implement other strategies to reduce traffic emissions;
- Develop and enforce regulations that limit bus and car idling outside of schools.

Major Industrial & Transportation-Related Air Pollution Sources in Detroit, Michigan

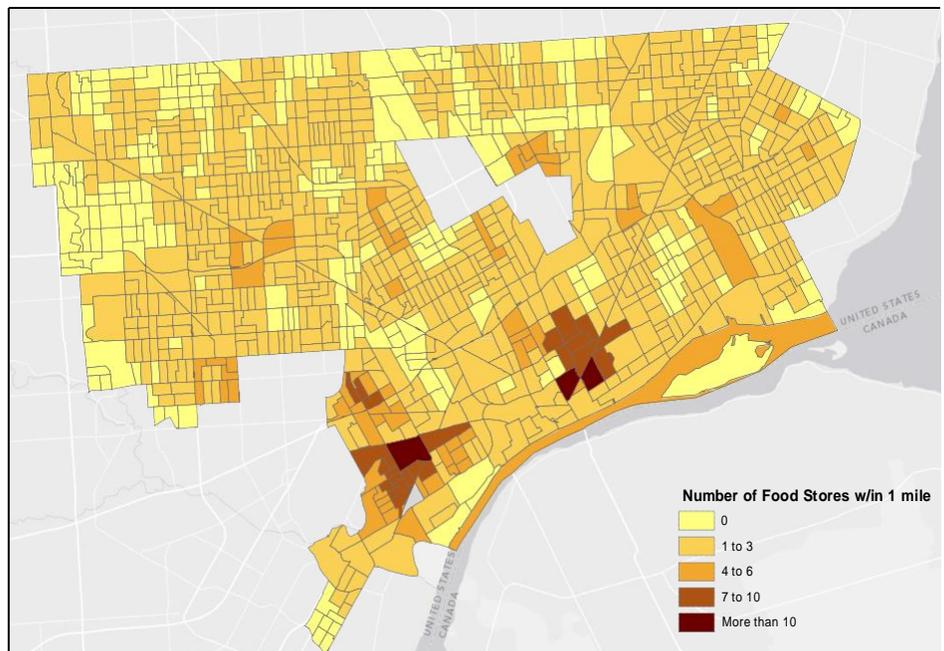


Source: U.S. Environmental Protections Agency, Toxic Release Inventory, 2011

Increase availability of antioxidants to counter air pollution’s effects on oxidative stress:

- Provide financial incentives to full service grocers to locate in regions with poor food access and poor air quality;
- Provide financial incentives for small grocers and markets to carry foods rich in antioxidants and participate in food assistance programs (e.g., SNAP);
- Support urban gardening initiatives, providing education and resources for soil testing and remediation;
- Develop school policies that require healthy food options for breakfast, lunch, and after school programs;
- Fund agencies involved in nutrition education, food assistance, and food delivery programs, to increase access to, and knowledge of, antioxidants.

Food Store Density by Census Tract in Detroit, Michigan



Source: Michigan Department of Agriculture, 2012

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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