



Diabetes and the Environment

The M-LEEaD 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 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

Alison Walding
Project Manager
Community Engagement Core
walison@umich.edu

How is Diabetes linked to the Environment?

Diabetes is a chronic disease that changes the body's ability to make and use insulin, and can lead to heart disease, blindness, and kidney failure.^{1 2} Wayne County and the City of Detroit both have a greater percentage of residents with diabetes compared to the state average.³ The risk of diabetes is affected by many environmental factors, including exposure to chemicals, air pollution, and the availability of healthy foods, all of which affect residents of Southeast Michigan.⁴ Diabetes prevention and management are often focused on changing individual behaviors, such as diet or exercise. However, with increasing evidence that environmental exposures can shape the risk of diabetes, there are important opportunities to reduce diabetes by reducing risks in the environment.

Chemical Exposure

Endocrine disrupting chemicals (EDCs) are released into the environment through industrial activity and food production, and are found in many household products. EDCs are associated with metabolic diseases such as diabetes, hyperlipidemia, and nonalcoholic fatty liver disease.^{5 6 7 8 9} Some common EDCs which may be linked to diabetes are:

BPA

Found in many commonly used products, including some plastic food and drink containers, and the lining of certain food cans. One study found BPA in 95% of people who were tested, and it has been found in fetal and placental fluids, as well as breast milk. BPA can affect the stability of glucose, which may lead to diabetes.

^{9 10}

Dioxins

Classified as highly toxic persistent organic pollutants, dioxins are released into the air from combustion occurring as a part of industrial processes, or from burning waste. Many studies have found positive associations between dioxins and Type II diabetes.^{11 12 13}

Phthalates

These chemicals are used to make plastic stronger, and are found in many products including cosmetics and hygiene products. The CDC found that in the U.S., phthalate exposure is widespread and more common among women and non-Hispanic Blacks. A number of studies have found phthalate exposure to be associated with diabetes and insulin resistance.¹⁴

^{15 16}





Ambient Air Pollution & Oxidative Stress

Researchers have found associations between air pollution, oxidative stress, and diabetes.¹⁷ Ambient air pollution is widespread and in most areas comes from multiple sources. It consists of many pollutants, including particulate matter (PM₁₀, PM_{2.5}), ozone (O₃), nitrous oxides (NO_x) and sulfur oxides (SO_x), and black carbon. Of these, PM_{2.5} from fossil fuel combustion has been strongly linked to oxidative stress, which can lead to inflammation in the body, resulting in metabolic diseases such as diabetes.¹⁸ Michigan produces a significant amount of its energy through fossil fuel combustion, and the Detroit metro area has a large network of highways and roads, on which millions of vehicles contribute to PM_{2.5} concentrations daily.^{19 20}



Food Availability

One of the most effective ways to manage and prevent Type II diabetes, as well as oxidative stress, is to eat a variety of nutrient dense foods, such as different kinds of vegetables, fruit, beans, and nuts.²¹ Research has shown a decrease in cardiovascular disease and diabetes related to air pollution in people who consume more fruit.²² However, it is not always easy to find and buy nutritious food. More than 20% of census tracts in Detroit are food insecure, meaning they do not have consistent access to enough food to live an active and healthy life.²³ The Detroit-Warren-Dearborn metro area also experiences almost half of all the food scarcity in Michigan.²⁴ Food scarcity refers to adults in households where there was either sometimes or often not enough to eat in the last 7 days. Poor access to nutritious food can make it harder to overcome or live with health challenges such as diabetes, and can limit the body's natural ability to protect itself from pollutants in the environment.^{25 26}

What Does this Mean for Me and My Community?

Although our individual health behaviors are important in managing and preventing a number of diseases, it is important to look at the context in which we can make healthy decisions. Does our environment make the management and prevention of diabetes easy, or does it contribute to the growing numbers of diabetes statewide?

What action steps can we take?

Contact your representatives and ask them to

1. Regulate the release of EDCs into the environment and their use in common products
2. Advocate for reducing ambient air pollution, particularly from fossil fuels
3. Use air purifiers in homes and schools to reduce the air pollution we breathe in every day
4. Address food insecurity in SE Michigan so that all residents have access to nutritious, antioxidant-rich food

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.

Support for this research was provided by grant P30ES017885 from the National Institute of Environmental Health Sciences, National Institutes of Health. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health.



SCHOOL OF PUBLIC HEALTH
LIFESTAGE ENVIRONMENTAL EXPOSURES AND DISEASE CENTER
UNIVERSITY OF MICHIGAN

LIFESTAGE ENVIRONMENTAL EXPOSURES AND DISEASE CENTER