



Environmental Health Fact Sheet

Diabetes and the Environment

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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

Project Coordinator:
 Carol Gray, MPH
 ccbgray@umich.edu
 734-764-8632
 ehsc.umich.edu

Why is Diabetes an Important Issue?

Diabetes is a serious disease that can lead to many health problems, including heart disease, blindness, and kidney failure. The number of people in the U.S. with diabetes more than tripled between 1980 and 2008. Michigan has a reported adult diabetes rate of 9.5% and Detroit has an even higher rate at 14.4%. This is the highest rate in the state and a significant health concern.

How is Diabetes Linked to the Environment?

Diabetes is often linked to diet and exercise. There is also growing evidence that **chemicals** in the environment may be associated with type 2 diabetes. Formerly called adult-onset diabetes, this is the most common form of diabetes and can develop at any age.⁴ Chemicals that may be linked to diabetes include Bisphenol A, pesticides, and persistent organic pollutants.

Diabetes and Bisphenol A (BPA)

Data from animal and *in vitro* studies suggest that a chemical called Bisphenol A (BPA) may contribute to diabetes. BPA is found in many commonly used products, including some plastic food and drink containers, some baby bottles, the lining of certain food cans, and dental sealants. It is so common, in fact, that one study found BPA in 95% of people who were tested for it and it has been found in fetal and placental fluids, as well as breast milk.

Scientists believe that BPA may affect several processes in the body that are linked to diabetes:

Diabetes and Pesticides	
<ul style="list-style-type: none"> • The stability of glucose levels • The signals sent by cells in the pancreas that produce insulin 	<ul style="list-style-type: none"> • The release of insulin in the body • The production of body fat

Studies in animals also suggest a possible link between pesticides and diabetes. Pesticides, and particularly insecticides, may affect parts of the nervous system that help to regulate the pancreas. The pancreas produces insulin, which in turn regulates glucose levels. Therefore, pesticides that interfere with the pancreas can make glucose levels unstable, thus increasing the risk of developing diabetes.

Diabetes and Persistent Organic Pollutants (POPs)

Scientists think that certain persistent organic pollutants (POPs) may be associated with diabetes. "Persistent" refers to the fact that these pollutants, used in agriculture, disease control, manufacturing and industry, stay in the environment for a long time instead of breaking down and becoming inactive.



There is some research to suggest that POPs may be linked to diabetes by increasing insulin resistance, and that those who are more obese and are exposed to certain POPs may be more likely to develop insulin resistance and diabetes.⁸ While the U.S. and many other countries have stopped using some POPs, we can still be exposed to those persisting in the environment or transported to the U.S, for example, by wind or water. POPs that are strongly associated with diabetes include:



- DDT - an insecticide previously used to control malaria and protect crops from insects. DDT was banned for agricultural use worldwide, but not disease vector control (e.g., killing insects that carry disease in order to prevent them from spreading it).
- Dioxins - chemicals produced by burning, such as waste and trash incineration. The Detroit incinerator is one of the world's largest, burning about 800,000 tons of trash every year.

What Does this Mean for Me and My Community?

Caution! It is important to note that:

- Studies carried out in animals *do not tell us* if the effect will be the same in humans. Therefore, we cannot say for certain that BPA and pesticides cause diabetes in humans. More research is needed to make this conclusion. The fact that 95% of people have BPA in their bodies makes this an important area for further investigation.
- Association *does not* prove causation. Therefore, the link between POPs and diabetes does not tell us that POPs cause diabetes. Here too, more research is needed.

What action steps can we take?

While we do not know for certain if BPA, pesticides, and POPs cause diabetes, until we know more it may be safest to err on the side of caution. We can work with others to advocate for regulations that decrease exposure to chemicals that may be associated with diabetes, and in the meantime, avoid food and other products with BPA or pesticides. For additional information on actions you can take, please visit ehscc.umich.edu.



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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