



A PUBLIC HEALTH PERSPECTIVE:
WHAT YOU SHOULD KNOW ABOUT CLIMATE CHANGE
Fact Sheet

What is climate change?

Climate change is any major change in measures of climate (temperature, precipitation, rainfall, snow, wind) lasting for a long period of time (decades or longer). It can become warmer or colder, and annual amounts of rainfall or snowfall can increase or decrease.

What is causing the climate to change?

- ✦ Natural factors, such as changes in the sun's energy or slow changes in the Earth's orbit around the sun;
- ✦ Natural processes within the climate system, such as changes in ocean circulation;
- ✦ Human activities that change the atmosphere's make-up through burning fossil fuels, cutting down trees, planting trees, building developments in cities and suburbs, and;
- ✦ An increase in the world's population. As the world's population grows, there are more people who need food, livestock, and energy. This increased demand leads to increased emissions of greenhouse gases.



What is the greenhouse effect?

The Earth is surrounded by a layer of gases that act to trap heat. These 'greenhouse gases' help regulate the temperature and sustain life on Earth. As people cause more greenhouse gases to be released into the atmosphere, the greenhouse effect becomes stronger. More heat is trapped and the Earth's climate begins to change unnaturally.

What are greenhouse gases?

Some greenhouse gases such as carbon dioxide are emitted to the atmosphere through natural processes such as emissions from forest fires and volcanoes. Other greenhouse gases (e.g., fluorinated gases) are created and emitted solely through human activities such as burning fossil fuels. **The principal greenhouse gases that enter the atmosphere because of human activities are:**

- ✦ **Carbon Dioxide (CO₂):** Enters the atmosphere through the burning of fossil fuels (oil, natural gas, and coal), solid waste, trees and wood products, and also as a result of some chemical reactions (e.g., manufacture of cement).
- ✦ **Methane (CH₄):** Emitted during the production and transport of coal, natural gas, and oil. Methane emissions also result from livestock and other agricultural practices and by the decay of organic waste in municipal solid waste landfills.
- ✦ **Nitrous Oxide (N₂O):** Emitted during agricultural and industrial activities, as well as during combustion of fossil fuels and solid waste.
- ✦ **Fluorinated Gases:** Hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride are synthetic, powerful greenhouse gases that are emitted from a variety of industrial processes. Fluorinated gases are sometimes used as substitutes for ozone-depleting substances (i.e., CFCs, HCFCs, and halons). These gases are typically emitted in smaller quantities, but because they are potent greenhouse gases, they are sometimes referred to as High Global Warming Potential gases ("High GWP gases").

Why is climate change a concern?

If human activities continue to release greenhouse gases at or above the current rate, we will continue to have increased average temperatures around the globe. Increases in global temperatures will most likely change our planet's climate in ways that will have significant long-term effects on people and the environment. **Rising temperatures will lead to:**



- ✦ More frequent and severe storms of all kinds
- ✦ Decreases in cold weather
- ✦ More frequent and severe storms of all kinds
- ✦ Decreases in cold weather
- ✦ Increased risk of drought
- ✦ Increases in heavy precipitation which leads to risk of flooding
- ✦ More intense hurricanes
- ✦ Reduction in the size and extent of the polar ice sheets which would contribute to sea level rise
- ✦ More pollen and insect pests
- ✦ Increases in heat waves

What is being done in Michigan?

In 2009, the Michigan Department of Community Health (MDCH) was awarded a one-year planning grant from the Centers for Disease Control (CDC) to develop a strategic plan for responding to public health effects of climate change in Michigan. The planning process involved Michigan's local health departments, the University of Michigan, Wayne State University, Michigan State University, along with several other state agencies and nonprofit organizations. The finalized strategic plan focused on three priority areas for implementing climate change public health adaptations: Heat events, air quality, and water quality and quantity.

In 2010, MDCH received a three year grant from the CDC to implement the strategic plan and participate in building a national "climate-ready states and cities" program focused on health effects. Part of the implementation plan is working with partners to educate the public about health effects of climate change and to get human health issues considered in other state activities around climate change. MDCH is working with partners and local health departments to incorporate climate change considerations into public health activities such as **emergency planning, communicable disease control, and healthy communities**. Another important part of this project is to develop methods to quantify health effects attributable to climate change, and to design population vulnerability assessments.

What are expected and possible health and environmental impacts from climate change in Michigan?

Regional and Michigan-specific assessments of climate change impacts have been done. The changes specifically for Michigan include:

- ✦ A generally warmer and drier climate, however with increased number (by up to 100%) and severity of heavy rain and lake-effect snow storms with resulting injury and power loss.
- ✦ Heat related illnesses and injuries because of more frequent extreme heat events, which are projected to double or triple in number for Detroit to about 30-50 days per year where temperatures exceed 90°F and 25-50 days above 97 °F.
- ✦ More flooding and water pollution due to heavy rainstorms resulting in increased waterborne diseases and outbreaks.
- ✦ Declining water levels resulting in poorer water quality and increased accumulations of mercury and other contaminants in sport fish, a major food source for some groups in Michigan.
- ✦ Drought leading to increased numbers of forest fires adding to particulate air pollution and its adverse respiratory effects.
- ✦ Deposition of atmospheric nitrogen in water adding to drinking water degradation.
- ✦ Warmer climate leading to increases in Lyme Disease, West Nile Encephalitis, and other insect-borne infectious diseases.

Why is MDCH targeting heat related impacts of climate change?

Exposure to excessive heat is a serious public health problem and is the leading cause of weather-related fatalities.

Northern cities in the U.S. that are unaccustomed to high temperatures will face additional challenges to prepare residents and equip buildings for increasingly frequent record-breaking heat events each year. **Extreme heat** is defined as weather conditions that are significantly hotter and/or more humid than average in a given location during a given time of year.

Heat exposure health effects include:

- ✦ Aggravation of chronic diseases, including cardiovascular and respiratory disease.
- ✦ Increased severity of respiratory diseases such as asthma and chronic obstructive pulmonary disease.
- ✦ Mild heat rashes to deadly heat stroke.

Segments of the population such as those with heart problems or asthma, other lung/breathing problems, the elderly, the very young, and low-income individuals are especially vulnerable, as they are less able to cope with the impact of extreme heat.

What can public health do?

- ✦ Develop policies and plans that incorporate climate change adaptation especially for vulnerable subgroups.
- ✦ Educate colleagues about climate change as an emerging public health issue.
- ✦ Consider your agency's existing activities and assess how current efforts could respond to specific challenges of climate change.
- ✦ Encourage "green" practices in your home and workplace.
- ✦ Raise public awareness.
- ✦ Assess your community's ability to deliver services during heat waves and other extreme weather events.

Michigan Department of Community Health Division of Environmental Health

Materials adapted from:

- ✦ Ready for Change: Preparing Public Health Agencies for the Impacts of Climate Change, A Climate Masters Guide for the Public Section, May 2010
- ✦ Frequently Asked Questions About Global Warming and Climate Change: Back to Basics, U.S. Environmental Protection Agency
- ✦ Confronting Climate Change in the U.S. Midwest, Union of Concerned Scientist, July 2009.
- ✦ Centers for Disease Control: www.cdc.gov/climatechange
- ✦ NASA: <http://climate.nasa.gov/evidence>
- ✦ Michigan Department of Community Health: www.michigan.gov/climateandhealth