

Climate and Health in Ohio

Climate change is affecting human health in a variety of ways right in our backyards. People in the Buckeye State are vulnerable to climate-related health threats from worsening air quality, extreme heat, extreme precipitation and flooding, and greater exposure to dangerous diseases. We must take action now to ensure a healthy climate for our children and grandchildren.

Last year the U.S. Environmental Protection Agency (EPA) proposed the Clean Power Plan, a common-sense approach to protecting public health by limiting, for the first time, the carbon pollution emitted by existing power plants—the largest driver of climate change. The plan deserves strong support as one of the biggest steps forward to tackle climate change and reduce its associated health risks.

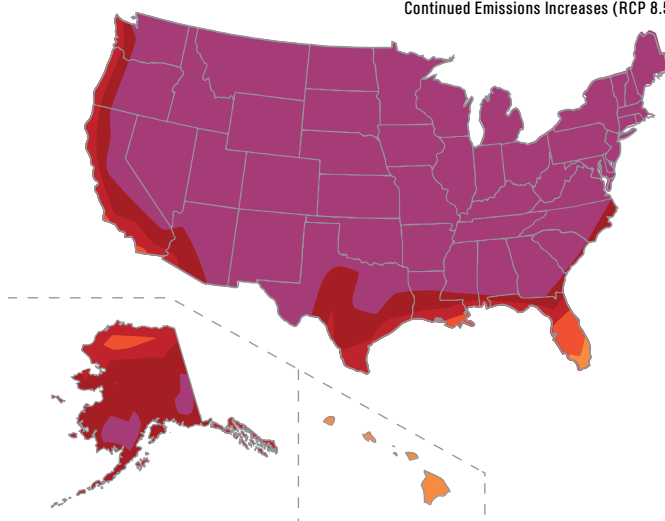
Climate change is expected to affect the health of Ohioans in the following ways:

1. Extreme Heat and Heat Waves Lead to Increased Illness and Death

As temperatures reach more frequent as well as hotter highs, death and illnesses occurring from heat stress, heatstroke, cardiovascular disease, kidney disease, and other causes often increase.¹

- Nationally, heat extremes are projected to become more common, with summer highs that ranked among the hottest 5 percent in 1950–1979 rising to at least 70 percent of the time by 2035–2064.² Yesterday's extreme temperatures could become tomorrow's normal temperatures, with even worse extremes.
- Ohio can expect to see heat waves like the one in 1988 become the new normal.³ During the 1988 heat wave there were 21 days in Cuyahoga County over 90°F; under a scenario in which carbon pollution increases, an annual total of 46 such days are projected for the 2080s.
- Ohio's four most populous cities could see heat-related deaths increase by 70 percent to 120 percent by the 2080s.⁴

Continued Emissions Increases (RCP 8.5)



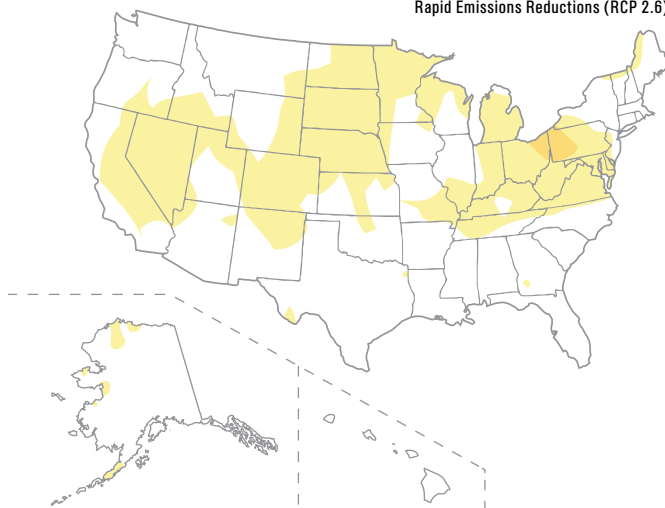
PROJECTED CHANGE IN TEMPERATURE (F°)

≤2 3 4 5 6 7 8 9 10 ≥11


The maps show projected increases in the average temperature on the hottest days by late this century (2081-2100) relative to 1986-2005 under a scenario that assumes a rapid reduction in heat-trapping gases (RCP 2.6) and a scenario that assumes continued increases in these gases (RCP 8.5). The hottest days are those so hot they occur only once in 20 years. Across most of the continental United States, those days will be about 10 F to 15 F hotter in the future under the higher emissions scenario. (Figure source: NOAA NCDC / CIRES-NC)

Adapted from: Luber, G., et al. Human Health: Climate Change Impacts in the United States: The Third National Climate Assessment. J.M. Melillo, Terse (T.C.) Richmond, and G. W. Yohe, Eds. U.S. Global Change Research Program, (2014). 220-256, <http://nca2014.globalchange.gov/report/sectors/human-health>

Rapid Emissions Reductions (RCP 2.6)



For more
information,
please
contact:

Aliya Haq
ahaq@nrdc.org
 switchboard.nrdc.org/
blogs/ahaq

www.nrdc.org/policy
www.facebook.com/nrdc.org
www.twitter.com/nrdc

2. Climate Change Worsens Air Pollution That Threatens Our Health

Rising temperatures, along with more air stagnation and other climate effects, increase ground-level ozone smog.⁵

- Increasing levels of ozone smog can harm the health of more than 1.9 million people with asthma or chronic respiratory disease in Ohio, making it harder for them to breathe.⁶
- Currently, 19 counties in the areas of Cleveland, Cincinnati, and Columbus all have ozone levels that exceed EPA standards.⁷
- Current models indicate that areas with high ozone today are at risk of even greater ozone pollution due to climate change, and Columbus in particular may experience unhealthy red Air Quality Index levels of ozone by the 2050s.^{8,9}
- A Harvard analysis shows that the health benefits from reducing particles and smog could save 2,800 lives and prevent 760 hospitalizations in Ohio from 2020-2030, and at the same time reduce carbon pollution to limit longer-term climate change.¹⁰

3. Allergen Risks Rise

Elevated carbon dioxide and higher temperatures associated with climate change are already altering the range of plants' occurrence and the timing of bloom, leaf, fruit and pollen production.¹¹

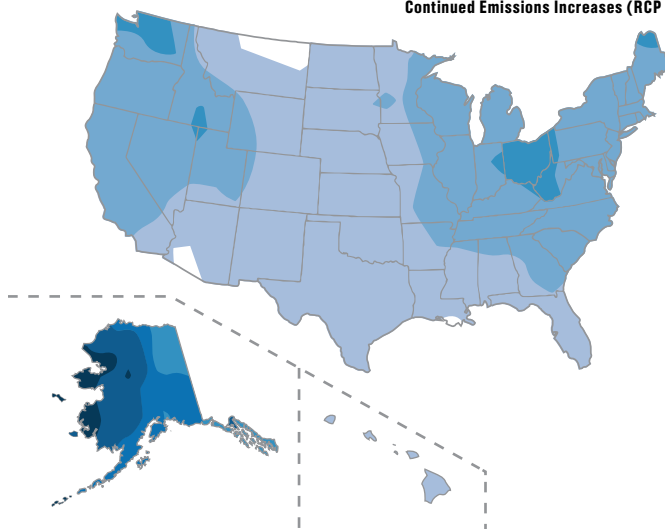
- More pollen produced over longer pollen seasons, especially when combined with other air pollution, can worsen allergenic symptoms and trigger asthma attacks.¹²
- Within the Midwest, extended pollen-production seasons may lead to greater allergy and asthma risks, particularly for ragweed.¹³

4. Extreme Storms and Floods Proliferate

Heavy-precipitation events are already on the rise in the United States, and their frequency and magnitude are expected to increase in the years to come.¹⁴

- Extreme rainfall events have become 49 percent more frequent in Ohio over the past 60 years.¹⁵ These heavy rains not only increase the risk of flooding, the second-deadliest of all weather-related hazards in the nation, but can also lead to drinking water contamination and disease outbreaks.^{16,17}
- This heavy precipitation, flooding, and subsequent nutrient pollution runoff can also lead to more harmful algal blooms.¹⁸ People in the Toledo area experienced this firsthand in August 2014, when the public water system issued a "do not drink" advisory from August 2 to August 4, affecting some 500,000 citizens.¹⁹

Continued Emissions Increases (RCP 8.5)



PROJECTED CHANGE IN HEAVY PRECIPITATION

Future Change Multiplier 1 2 3 4 5 6 7

Maps show the increase in frequency of extreme daily precipitation events (a daily amount that now occurs just once in 20 years) by the later part of this century (2081-2100) compared to the latter part of the last century (1981-2000). Such extreme events are projected to occur more frequently everywhere in the United States. Under a rapid emissions reduction scenario (RCP 2.6), these events would occur nearly twice as often. For a scenario assuming continued increases in emissions (RCP 8.5), these events would occur up to five times as often.

(Figure source: NOAA NCDC / CIACSNC)

Adapted from: Luber, G., et al. Human Health: Climate Change Impacts in the United States: The Third National Climate Assessment. J.M. Melillo, Terse (T.C.) Richmond, and G. W. Yohe, Eds. U.S. Global Change Research Program, (2014). 220-256, <http://nca2014.globalchange.gov/report/sectors/human-health>

Rapid Emissions Reductions (RCP 2.6)



5. Insect-Borne Infectious Diseases Spread

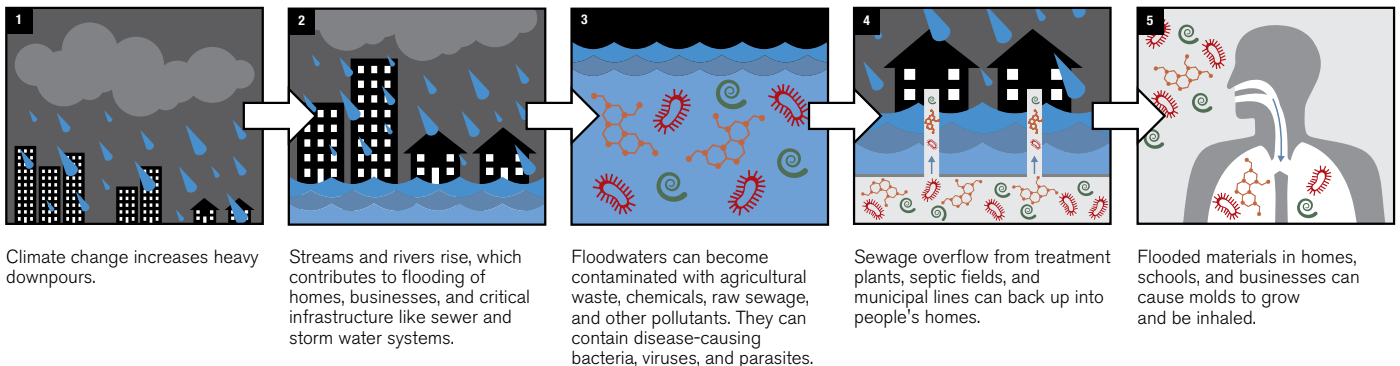
Climate change is among the factors affecting the health risks from disease-carrying insects. Short- and long-term climate changes such as increasing temperature and humidity and shifting rainfall patterns can expand the range of these insects.²⁰

- Since 2004 Ohio has reported 332 cases of West Nile virus from mosquitoes and 455 cases of Lyme disease from ticks.²¹
- Parts of Ohio have been identified by a climate-based model as potential future expansion areas for the deer tick, a major path of transmission for Lyme and other diseases.²²

6. Elderly, Young, and Low-Income Populations Are Especially Vulnerable

The elderly, children, and people in economically disadvantaged communities face particularly acute risks from these climate-related health threats. Today the state has more than 1.7 million people 65 years old and older, as well as more than 2.6 million children and 1.8 million people of low income.²³

HEAVY DOWNPOURS INCREASE DISEASE EXPOSURE



Adapted from Luber, G., et al. Human Health. Climate Change Impacts in the United States: The Third National Climate Assessment. J.M. Melillo, Terse (T.C.) Richmond, and G. W. Yohe, Eds. U.S. Global Change Research Program, (2014): 220-256, <http://nca2014.globalchange.gov/report/sectors/human-health>

ACTING ON CLIMATE

NRDC strongly supports the EPA's Clean Power Plan, which will reduce the biggest source of carbon pollution driving climate change by at least 30 percent by 2030. It is important for each state to create a State Implementation Plan that puts the goals of the Clean Power Plan into action. The states have the flexibility to design pollution-curbing strategies that work best for them, based on their current energy mix and opportunities to develop energy efficiency and clean renewable power. States should demonstrate leadership by moving ahead with those implementation plans.

We are running out of time to address this great environmental challenge of our day, but we are not out of solutions. We need to act on them now. We have an obligation to our children—and our children's children—to tackle climate change now.

ENDNOTES

- 1 Walsh, J., et al. "Our Changing Climate," chapter 2 in *Climate Change Impacts in the United States: The Third National Climate Assessment*, J.M. Melillo, T.C. Richmond, and G.W. Yohe, eds. U.S. Global Change Research Program, 2014, 19-68, nca2014.globalchange.gov/report#section-1946.
Knowlton, Kim, et al. "The 2006 California Heat Wave: impacts on Hospitalizations and Emergency Department Visits." *Environ Health Perspect* 117.1 (2009): 61-67.
- 2 Duffy, P.B., and C. Tebaldi. "Increasing Prevalence of Extreme Summer Temperatures in the U.S." *Climate Change* 111 (2012): 487-495.
- 3 Based on a comparison of historical and future projected days over 90 (under a high-emissions A2 scenario) across all Ohio counties, using data from the Centers for Disease Control and Prevention, "Tracking Climate Change," ephtracking.cdc.gov/showClimateChangeTracking.action.
- 4 Petkova, E.P., et al. "Heat-Related Mortality in a Warming Climate: Projections for 12 U.S. Cities." *Int. J. Environ. Res. Public Health* 11 (2014): 11371-11383.
- 5 Bell, M.L., et al. "Climate Change, Ambient Ozone, and Health in 50 U.S. Cities." *Climatic Change* 82 (2007): 61-67.
- 6 American Lung Association. "State of the Air 2014, Report Card: Ohio," www.stateoftheair.org/2014/states/ohio/.
- 7 Environmental Protection Agency, "The Green Book Nonattainment Areas for Criteria Pollutants," 2014, www.epa.gov/airquality/greenbook/hnacs.html#OHIO.
- 8 Jacob, D.J., and D.A. Winner. "Effect of Climate Change on Air Quality." *Atmospheric Environment* 43 (2009): 51-63, nrs.harvard.edu/urn-3:HUL.InstRepos:3553961.
- 9 Bell, M.L., et al. "Climate Change, Ambient Ozone, and Health."
- 10 Schwartz, Joel, et al. "Health Co-benefits of Carbon Standards for Existing Power Plants." Harvard School of Public Health, Syracuse University, Boston University, 2014. <http://www.chgeharvard.org/resource/health-co-benefits-carbon-standards-existing-power-plants>.
- 11 Reid, C.E., and J.L. Gamble. "Aeroallergens, Allergic Disease, and Climate Change: Impacts and Adaptation." *Ecohealth* 6 (2009): 458-470.
- 12 Staudt, A., et al. "Extreme Allergies and Global Warming." National Wildlife Federation and Asthma and Allergy Foundation of America, 2010, www.nwf.org/~media/PDFs/Global-Warming/Reports/NWF_AllergiesFinal.ashx.
- 13 Staudt, A., et al. "Extreme Allergies and Global Warming." Ziska, L., et al. "Recent Warming by Latitude Associated with Increased Length of Ragweed Pollen Season in Central North America." *Proceedings of the National Academy of Sciences* 108 (2011): 4248-4251, www.pnas.org/content/108/10/4248.long.
- 14 Intergovernmental Panel on Climate Change. *Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation. A Special Report of Working Groups I and II of the Intergovernmental Panel on Climate Change*. C.B. Field, et al., eds. (New York; Cambridge University Press, 2012), ipcc-wg2.gov/SREX/images/uploads/SREX-AII_FINAL.pdf.
- 15 Extreme rainfall is classified by identifying the 64 largest 1-day precipitation totals during the 64-year period of analysis. Madsen, T., and N. Willcox. *When It Rains It Pours: Global Warming and the Increase in Extreme Precipitation from 1948 to 2011*. Environment America Research & Policy Center, 2012.
- 16 Curriero, F.C., et al. "The Association Between Extreme Precipitation and Waterborne Disease Outbreaks in the United States, 1948–1994." *American Journal of Public Health* 91 (2001): 1194-1199.
- 17 Ashley, S.T., and W.S. Ashley. "Flood Fatalities in the United States." *Journal of Applied Meteorology and Climatology* 47 (2008): 805-818, journals.ametsoc.org/doi/pdf/10.1175/2007JAMC1611.1.
- 18 Luber, G., et al. "Human Health," chapter 9 in *Climate Change Impacts in the United States: The Third National Climate Assessment*, J.M. Melillo, T.C. Richmond, and G. W. Yohe, eds. U.S. Global Change Research Program, 2014, nca2014.globalchange.gov/report/sectors/human-health.
- 19 Troy, Tom. Mayor Collins Speaks on Toledo Water Crisis at Great Lakes Gathering," *Toledo Blade*, September 24, 2014, www.toledoblade.com/local/2014/09/24/Mayor-Collins-speaks-on-Toledo-water-crisis-at-Great-Lakes-gathering.html.
- 20 Lafferty, K.D. "The Ecology of Climate Change and Infectious Diseases." *Ecology* 90 (2009): 888-900.
- 21 Centers for Disease Control and Prevention, "Reported Cases of Lyme Disease by State or Locality, 2004–2013," www.cdc.gov/lyme/stats/chartstables/reportedcases_statelocality.html. Centers for Disease Control and Prevention, "West Nile Virus Disease Cases Reported to CDC by State, 1999–2013," www.cdc.gov/westnile/resources/pdfs/cummulative/99_2013_cummulativeHumanCases.pdf.
- 22 Diuk-Wasser, M.A., et al. "Field and Climate-based Model for Predicting the Density of Host-seeking Nymphal *Ixodes scapularis*, an Important Vector of Tick-Borne Disease Agents in the Eastern United States." *Global Ecology and Biogeography* 19 (2010): 504-514.
- 23 American Lung Association, "State of the Air 2014, Report Card: Ohio," 2014, www.stateoftheair.org/2014/states/ohio/.