

New dashboard estimates mortality risk of wildfire smoke

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Credit: Unsplash/CC0 Public Domain

Cornell researchers have created a web tool that estimates county-by-

county mortality from wildfire smoke in real time, to help local emergency managers assess the magnitude of the danger.

The new [Mortality Estimation Tool](#) blends federal data from several sources and then maps out the estimated, smoke-attributed mortality statistics in near-real time, as a collaboration between the Department of Public and Ecosystem Health in the College of Veterinary Medicine and Cornell's Northeast Regional Climate Center in the College of Agriculture and Life Sciences (CALS).

"Last June, the air quality in the U.S. was heavily degraded by smoke from Canadian wildfires—it was substantially harmful to human health," said Alistair Hayden, assistant professor of practice in the Department of Public and Ecosystem Health (CVM), a co-principal investigator of the dashboard.

Unlike floods, tornadoes and earthquakes, wildfire smoke and summer heat waves have never been declared as federal natural disasters that qualify for financial resources in adverse circumstances.

"There is difficulty in measuring smoke impacts in real time," said Hayden, a faculty fellow at the Cornell Atkinson Center for Sustainability. "Historically, deaths from wildfire smoke events get reported months later. Our new dashboard acts promptly and provides emergency managers a way to estimate deaths and impact—giving them enough time to act."

The dashboard estimates mortality numbers only due to smoke, not for a factor like wildfire.

Hayden collaborated on the dashboard with Art DeGaetano, professor of Earth and Atmospheric Sciences (CALS) and director of the Northeast Regional Climate Center, and Ben Eck, web developer at the Northeast

Regional Climate Center,.

The group assembled a model that incorporated air-quality sensor data from the U.S. Environmental Protection Agency's AirNow website, merged fire hazard and smoke-plume satellite information from the National Oceanic and Atmospheric Administration, added mortality rates from the Centers for Disease Control and population estimates from the U.S. Census Bureau.

"Our model makes a determination of lowered air quality and elevated [particulate matter](#) from sensors detecting wildfire smoke," said DeGaetano, a Cornell Atkinson faculty fellow. The model outlines the smoke plume and plots it with [air quality](#) sensors. The new dashboard can resolve the likelihood—county-by-county—of decreased health circumstances and presents predicted mortality, he said.

In summer 2023, particulate matter originating from the smoke caused by wildfires in Canada draped the upper Midwest and the Northeast. New York and eastern Pennsylvania in particular experienced high concentrations of smoke-carried matter.

Assessing available statistics, Hayden estimates that six states—Pennsylvania, New York, Michigan, Ohio, Illinois and Wisconsin—likely experienced more than 100 smoke-related deaths each during the June 2023 episode. Based on his analysis, he said that Pennsylvania probably had around 200 deaths and New York had around 175.

For most people the smoke causes itchy eyes, coughing and discomfort, but it can prompt asthma attacks and shortness of breath, and can be fatal for vulnerable populations. "These particles are so small that they can go through your lungs and blood stream and then they affect your organs," he said.

One current hot spot on the Mortality Estimation Tool is Los Angeles County, California, where the Lake Fire has burned 26,985 acres north of the city since July 5, according to the California Department of Forestry and Fire Protection. The wildfire is 16% contained, as of July 10. The dashboard model reflects 10 predicted deaths related to smoke in Los Angeles County and two in Orange County.

"Now that the dashboard is live, we want to see how it performs with real-time events," Hayden said. "Given the increasing calls for wildfire smoke to be treated as a disaster, numbers can help determine when such an event is escalating into a smoke disaster that requires a major response."

The nature of particle-laden smoke suggests that municipalities should be prepared. "Smoke from wildfire can travel hundreds of miles across borders," Hayden said. "This dashboard helps show the magnitude of [wildfire](#) smoke, even for areas not considered prone to fire. Nevertheless, it is a critical public health concern."

More information: [Mortality Estimation Tool](#)

Provided by Cornell University

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