

LOCAL, STATE & REGION

Study: Smoke harms more people in the Eastern U.S.

BY KASHA PATEL

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A curious haze blanketed the sky across the eastern half of the United States on July 20.

Sunsets appeared redder than normal; the atmosphere looked gray and dense; and air quality plummeted. People from Washington, D.C., to Pittsburgh to New York snapped pictures of the abnormal hues — only to learn that the cause originated from wildfires nearly 3,000 miles away.

As large fires smolder in the West, the smoke can travel across the country, blanketing large population centers. Now, a recent study shows that smoke, from both Western wildfires and local sources, may be more harmful to residents in the Eastern U.S. than many think.

Over most of the past decade, researchers found that about three-quarters of all smoke-related cases of asthma visits to emergency departments and deaths occurred east of the Rocky Mountains, due to higher population densities. Incidences of asthma-related hospital visits were the highest from April to August.

“Smoke is not just a Western problem. We think there might be a lack of awareness in the East because you’re not in proximity to these large wildfires, and they don’t really impact your day-to-day,” said Katelyn O’Dell, lead author of the study and postdoctoral research scientist at George Washington University.

Fires emit a mix of pollutants that negatively affect people’s health when inhaled. The researchers looked at the effects of a pollutant called PM2.5, or particulate matter with diameters smaller than 2.5 microns. These tiny particles can enter lungs and exacerbate or lead to numerous health problems, from respiratory illnesses to heart disease.

“We have decades of research and have shown air pollution wreaks havoc on our bodies. I think we should be worried about breathing in wildfire smoke and the effects on our overall health, including cardiopulmo-



In this July 20 photo, the Met Life and Chrysler buildings glow through a thick haze hanging over Manhattan, in New York. Wildfires in the American West, including an Oregon fire that was the largest in the U.S., created hazy skies as far away as New York.

nary adverse health effects,” said Erin Landguth, who studies the effects of wildfire smoke on respiratory health at University of Montana and was not involved in the study.

The perils of wildfire smoke are relatively well-explored in the West, where skies are regularly shrouded in a haze during fire season. Landguth’s research found that smoke from wildfires in Montana can increase influenza cases months later in the state. Another recent study showed that fine particulate matter in wildfire smoke was linked to an increase in COVID-19 cases in California and Washington state.

As Western fire seasons have intensified in recent decades, the eastern half of the country has increasingly felt their effects too.

On July 20, major cities including Washington, Baltimore, Boston and New York were affected by the massive billowing plumes stretching across the country. New York endured its worst air quality in 14 years.

“We project that smoke or its fires are going to be the dominant source of these [PM2.5] particles in the United States by the end of the 21st century,” said O’Dell. “We have this increasing threat to our air quality and health of these wildfires and smoke, and so we wanted to try and understand and quantify the burden that smoke poses to health in the United States.”

O’Dell and colleagues at Colorado State University analyzed smoke and health data from 2006 to 2018. They used observations from satellites and ground instruments to obtain daily local estimates of PM2.5 as well as track the location of smoke in the atmosphere. Using existing data on asthma emergency department visits, they compared the number of people who went to the hospital for asthma on smoky days vs. nonsmoky days.

The team found that the West, which contained higher smoke and particulate matter concentrations since they were closer to fires, showed

a larger percentage of asthma-related emergency room visits on smoky days. In some years, smoke-related visits constituted more than 1% of annual asthma visits.

In the East, the percent of annual asthma-related hospital visits tied to smoke were a smaller percentage — about 0.3 to 0.6%. However, due to larger population centers in the East, the total number of asthma-related hospital visits tied to smoke was higher, even though smoke particle concentrations were lower on average.

The exceptions were 2017 and 2018, when the majority of smoke-related asthma cases occurred in the West as fires affected some of its major cities. Projections indicate that wildfire seasons such as 2018, the deadliest and most destructive on record in California, may be more common in the future.

The health effects of long-term smoke exposure were also greater in the East. The team found that about 6,300 extra deaths occurred each year,

with the most cases occurring in the most populated states. Less than a third — about 1,700 — of the deaths occurred in the West.

“This is not surprising at all,” said Rodney Weber, an atmospheric chemist at the Georgia Institute of Technology who was not involved in the study. “A lot of the smoke disperses out where it’s not very easily detectable.”

Weber said people tend to only notice smoke-induced pollution in the East when skies are hazy or the sun is red, but smoke particles can remain in the background at lower levels and pose a danger.

Weber also noted that wildfire smoke can carry potentially harmful organic molecules, which could influence health. Studies show organic molecules become more toxic as they linger in the air and age. The molecules become oxidized and dissolve more readily in human bodies, including inside the lungs.

“This smoke could be much more insidious because it could spread over much greater areas eventually [and] expose large populations to a source that’s quite toxic, and the exposure could be for quite a while,” said Weber.

O’Dell and her colleagues looked at a handful of hazardous air pollutants contained in smoke in their study, but the team said further research is needed with additional species for a fuller understanding.

Overall, researchers agreed that people should pay closer attention to the air quality index from the Environmental Protection Agency and local authorities and take personal measures to protect themselves from smoke pollutants, such as wearing N95 masks and fortifying air filtration systems.

“We have to start thinking about what we’re breathing inside our homes, not only outside, which means we need to start thinking about air quality filters — all of this public awareness around our air quality,” said Landguth. “Maybe some of these studies will just help incrementally add to that talk.”

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