Cold-weather accounts for almost all temperature-related deaths

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Lee Friedman is the associate professor of environmental and occupational health sciences in the UIC School of Public Health and corresponding author on the paper. Credit: UIC/Roberta Dupuis-Devlin

With the number of extreme weather days rising around the globe in recent years due to global warming, it is no surprise that there has been an upward trend in hospital visits and admissions for injuries caused by high heat over the last several years. But cold temperatures are responsible for almost all temperature-related deaths, according to a new study published in the journal *Environmental Research*.

According to the new study by researchers at the University of Illinois Chicago, patients who died because of cold temperatures were responsible for 94% of temperature-related deaths, even though hypothermia was responsible for only 27% of temperature-related hospital visits.

"With the decrease in the number of cold weather days over the last several decades, we still see more deaths due to cold weather as opposed to hot weather," said Lee Friedman, associate professor of environmental and occupational health sciences in the UIC School of Public Health and corresponding author on the paper. "This is in part due to the body's poorer ability to thermoregulate once hypothermia sets in, as well as since there are fewer cold weather days overall, people don't have time to acclimate to cold when those rarer cold days do occur."

Hypothermia, or a drop in the body's core temperature, doesn't require sub-arctic temps. Even mildly cool temperatures can initiate hypothermia, defined as a drop in body temperature from the normal 98.7 degrees to 95 degrees Fahrenheit. When this occurs, organs and systems begin to shut down in an effort to preserve the brain. The process, once started, can be very difficult to get under control; however, people who are more regularly exposed to lower temperatures are better able to resist hypothermia.

"People who were experiencing homelessness in the records we looked at were less likely to die from temperature-related injury," Friedman

said. "Because they have greater outdoor exposure, they acclimate better to both heat and cold."

Heat-related issues are more likely to self-resolve by getting to a cooler place or by hydrating, Friedman said.

The researchers looked at inpatient and outpatient heat- and cold-related injuries that required a hospital visit in Illinois between 2011 and 2018. They identified 23,834 cold-related cases and 24,233 heat-related cases. Among these patients, there were 1,935 cold-related deaths and 70 heat-related deaths.

Friedman said government data systems that track temperature-related deaths significantly undercount these deaths.

"We found five to 10 times more temperature-related deaths by linking the hospital data to data from the National Weather Service and medical examiner's data," he said. "There are a lot more people dying from temperature-related injuries than is generally reported."

Friedman and his colleagues also found that cumulative costs associated with temperature-related hospital visits were approximately $1 billion between 2011 and 2018 in Illinois.

Adults older than age 65 and Black people were almost twice as likely to be hospitalized due to temperature-related injuries. Individuals who visited a hospital due to cold temperatures also commonly had multiple health issues, including electrolyte disorders, cardiovascular disease and kidney failure.

"Currently, the public health community focuses almost exclusively on heat injury. Our data demonstrate that improved awareness and education are needed around the risk for cold injuries, especially since

there are fewer but more severe cold weather days—leaving less chance for acclimation, which can be protective against hypothermia," Friedman said.

More information: Lee S. Friedman et al, Clinical outcomes of temperature related injuries treated in the hospital setting, 2011–2018, *Environmental Research* (2020). DOI: 10.1016/j.envres.2020.109882

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