

Tropical cyclone exposure linked to rise in hospitalizations from many causes for older adults

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An increase in overall hospitalizations was reported for older adults in the week following exposure to a tropical cyclone, according to a new

study by researchers at Columbia University Mailman School of Public Health, Columbia University's Earth Institute and colleagues at Colorado State University and Harvard T. H. Chan School of Public Health.

The researchers used data over 16 years on 70 million Medicare hospitalizations and a comprehensive database of county-level local winds associated with tropical cyclones to examine how tropical [cyclone](#) wind exposures affect hospitalizations from 13 mutually exclusive, clinically meaningful causes, along with over 100 sub-causes. This study is the first comprehensive investigation of the impact of hurricanes and other tropical cyclones on all major causes and sub-causes of hospitalizations. The findings are published in *Nature Communications*.

Over 16,000 additional hospitalizations were associated with tropical cyclones over a ten-year average exposure. Analyses showed a 14 percent average rise in [respiratory diseases](#) in the week after exposure. The day after tropical cyclones with hurricane-force winds respiratory disease hospitalizations doubled. Also reported was an average 4 percent rise in infectious and parasitic diseases and 9 percent uptick in injuries. Hospitalizations from [chronic obstructive pulmonary disease](#) (COPD) surged 45 percent the week following tropical cyclone exposure compared to weeks without exposure.

This rise in hospitalizations was driven primarily by increases in emergency hospitalizations. The researchers point out that there may have been cases where exposure to the cyclones prevented normal medical care, compelling people to go to the hospital to access services that they might otherwise get outside a [hospital setting](#) without the storm. For example, if those with respiratory issues experienced loss of power—often a result from tropical cyclone winds—they may have turned to hospitals if they needed power for medical equipment that a hospital could furnish.

However, for certain causes, such as certain cancers, the authors also reported decreases in hospitalizations. These decreases were driven by non-emergency hospitalizations, indicating that people possibly cancelled scheduled hospitalizations because of the storm, which may have longer-term impacts on [health](#).

"We know that hurricanes and other tropical cyclones have devastating effects on society, particularly on the poorest and most vulnerable" said Robbie M. Parks, Ph.D., Earth Institute post-doctoral fellow at the Columbia University Mailman School of Public Health and first author. "But until now only limited previous studies have calculated their impacts on health outcomes. Current weather trends also indicate that we can expect tropical cyclone exposure to remain a danger to human health and wellbeing, and could cause devastation to many more communities, now and into the future. There is no doubt that extreme weather events, such as tropical cyclones, are a great threat to human health in the U.S. and many other places in the world—now and with climate change in the future. Our study is a major first step in understanding how tropical cyclone exposure impacts many different adverse health outcomes."

The researchers anticipate that adequate forecasting of tropical cyclones might help, for example, in the planning of setting up shelters to provide electricity and common medications and creating easy ways for [vulnerable people](#) with certain chronic conditions to find and use those resources outside of the hospital.

One of the main impediments for research in this field has been the difficulty in readily accessing data for exposure assessment. This research was greatly facilitated by the work of G. Brooke Anderson, Ph.D., associate professor at Colorado State University, who curated an open-source dataset to easily assess exposure to tropical cyclones for epidemiologic studies. The authors coupled the exposure data with comprehensive hospitalization data among Medicare enrollees. "The

development of environmental health data research platforms that provide a one-point access to data, like the one we used for this study, can be a very powerful tool allowing research in directions that were not possible before," said Francesca Dominici, Ph.D., professor of biostatistics at the Harvard Chan School and co-author.

"While serious gaps in knowledge remain, we gained valuable insights into the timing of hospitalizations relative to exposure and how cause-specific hospitalizations can be impacted by [tropical cyclones](#)," said Marianthi-Anna Kioumourtzoglou, ScD, assistant professor of environmental health sciences at Columbia Mailman School, and senior author. "These important discoveries will be key for preparedness planning, including [hospital](#) and physician preparedness. Our study is just a first step in this process."

More information: *Nature Communications* (2021). [DOI: 10.1038/s41467-021-21777-1](https://doi.org/10.1038/s41467-021-21777-1)

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