

*GEH Global Environmental Health Chat*

## **Global Health Impacts of Tropical Cyclones**

**Interviewee:** Robbie Parks, Ph.D., Columbia University

**Narrator:** This is the Global Environmental Health Chat, the podcast that explores environmental health issues that transcend national boundaries. This podcast is produced by the National Institute of Environmental Health Sciences.

**Narrator:** About a tenth of the global population lives in low-lying coastal areas less than 33 feet above sea level. Weather systems called tropical cyclones, which include hurricanes and typhoons, particularly threaten lives and livelihoods in these regions. As the climate warms, scientists project that intensifying rainfall and storm surge associated with tropical cyclones will raise the likelihood of coastal flooding.

**Narrator:** In this episode, we speak with Dr. Robbie M. Parks, an NIEHS grantee and assistant professor of environmental health sciences at Columbia University's Mailman School of Public Health. First, we'll discuss the nature of tropical cyclones. Then we'll delve into how these storms affect health and discuss the implications for community recovery and resilience.

**Robbie Parks:** A tropical cyclone is a huge rotating storm defined by low pressure and high wind speeds that is formed over warm water. You can include gale-force winds — so, wind strong enough to have twigs breaking off trees — all the way up to hurricane.”

**RP:** Just to be clear, a hurricane is a particularly strong tropical cyclone. ‘Tropical cyclone’ is kind of the catchall terminology for these different names and also different strengths of storms.

**Narrator:** As part of his research, Dr. Parks studies the various ways that tropical cyclones can affect health over time.

**RP:** Tropical cyclones can impact public health in lots of different ways. I mean, of course, you've got the short-term impact. So, like, during the storm you've got the deadly risk of flash floods. And that can result in injuries and deaths from injuries, in fact, from drowning, from being caught in your car. And then there's the week to months afterwards, the indirect impacts, which can include power cuts, which may last for a decent amount of time, such that they become dangerous to people who rely on say, breathing apparatus or other kinds of electricity-powered health devices to survive.

**RP:** There are also very long-term impacts of tropical cyclones on public health. So, for example, a bad hurricane hitting an area can have impacts which may actually change permanently the nature of the neighborhoods that people live in, they may never recover. And in that sense, that can decrease the quality of life.

**Narrator:** Certain populations are also more susceptible to the short- and long-term health impacts of tropical cyclones, says Dr. Parks.

**RP:** There are many exceptions, but as a whole, one would regard the very young and the very oldest as particularly vulnerable, in terms of susceptibility.

**RP:** There are also people who have existing health vulnerabilities and conditions, such as living with cardiovascular disease, and perhaps they're over-exerting themselves in the aftermath of a storm.

**RP:** That can cause all sorts of strains on the body and circulatory system, which may unfortunately require, you know, a visit to the hospital or mean an early death for people living with those kinds of conditions. And then people living with Alzheimer's and other neurological conditions, neuropsychiatric conditions. They are particularly vulnerable in the weeks and months afterwards, because often they're not independent. And so, they rely on other people taking care of them, and if that's disrupted, that can put their lives and well-being in jeopardy.

**RP:** But in terms of the way that society makes people vulnerable, both in a direct and indirect sense is, people who are historically disadvantaged and neglected and overburdened, such as people of color, the money that goes to recovery after a hurricane is inequitably distributed. That really goes along racial lines historically in the United States. And, of course, that is really a social justice issue and an environmental justice issue.

**Narrator:** In 2021, Dr. Parks led a study exploring the *short-term* effects of tropical cyclones on the health of older people in the United States.

**Narrator:** Specifically, his team looked at associations between tropical cyclones and hospitalization rates for 13 major causes. They analyzed Medicare claims data spanning the years 1999 to 2014 for U.S. counties that experienced tropical cyclones.

**Narrator:** The scope of the study was unique, says Dr. Parks.

**RP:** Prior to this, lots of really good work had been done with regards to particular case studies, say Hurricane Katrina, Hurricane Maria, Hurricane Sandy, in the United States. But really this study, which was focused in the United States on all 65-years-old and older communities, ~~so it~~ was exhaustive for everyone who experienced a tropical cyclone.

**RP:** What we did was to collect all hospital visits from every single Medicare-eligible person, looking at the exact health impacts with regards to cause of hospital visits over several recent decades.

**Narrator:** Using that data, the team analyzed daily hospitalization rates for a week following tropical cyclone exposure.

**Narrator:** Among their findings, they observed increases in the overall number of hospitalizations. Hospital visits related to respiratory diseases and injuries rose the most, starting the day the storm passed through a county. Meanwhile, visits for several other causes, such as cardiovascular disease, fell the day of the storm, then peaked a day or so later.

**Narrator:** Dr. Parks did not expect hospitalization rates to rise for so many different causes.

**RP:** One of the surprises is how prevalent the association or effect of tropical cyclones was across the spectrum of causes outside of injuries.”

**Narrator:** Further analysis showed that the rise in hospitalizations was driven by emergency room visits rather than scheduled hospital visits.

**RP:** The reasons that people visit a hospital based on whether it’s an emergency or not are usually different. So, you don’t really begin the day, assuming that you’re going to be in the hospital if it’s an emergency. But for electives for routine operations, but also important operations, such as cancer treatment, those were canceled in situations where the storm posed more immediate risk than avoiding the operation.

**Narrator:** The team also found that hurricanes magnified the overall trends they were seeing. In other words, both stronger and weaker storms had *short-term* health effects, says Dr. Parks.

**RP:** Weaker tropical cyclones, such as the ones that were gale-force and above, but not quite hurricane-scale, they were also dangerous to health. So, they really do warrant attention.”

**Narrator:** In 2022, Dr. Parks published a follow-up study looking at the *long-term* effects of tropical cyclones on health. The team analyzed mortality data on U.S. adults over a 20-year period, from 1988 to 2018.

**RP:** We really wanted to understand, does the long-term — up to six months — impact of tropical cyclones have any relationship with death rates?”

**Narrator:** Overall, they found that greater exposure to tropical cyclones was associated with modestly higher death rates in the following months for several causes. Those included injuries, infectious and parasitic diseases, cardiovascular diseases, neuropsychiatric conditions, and respiratory diseases.

**RP:** The novelty of the study is that we looked at many different causes of death. And our suspicions were confirmed that tropical cyclones, are not good for you. They are deadly. And they can continue to be deadly for many different causes, for many months after, and in fact, probably decades.

**Narrator:** Taken together, the studies illuminate a need to better understand how tropical cyclones and other climate-related disasters affect health in ways that might not be obvious, according to Dr. Parks.

**RP:** When people think of climate change, they think of people dying from heat waves, and maybe from floods and rising, rising water and things like that, which are super, super critical, important, and drivers and levers for trying to stimulate policy change. But really, there’s a hidden burden, I think worth constantly highlighting. And that is on the way that climate change impacts people after disasters, both in the short to long term, for their physical and mental health.

**RP:** Of course it, it should be noted that tropical cyclones are essentially stochastic events; they hit randomly. So, the kinds of people there are living in those places that are hit, the kinds of health conditions they have, obviously, and the level of resources they have all vary. But also, the kind of

hazards that tropical cyclones bring can also vary. So, they may be a high wind, but low rain, or it might be not so high wind, but huge coastal floods. That's the kind of question which needs more granularity with regards to storm preparedness."

**Narrator:** By gaining a better understanding of how tropical cyclones impact the health of different populations, scientists can identify more equitable recovery and resilience strategies to protect vulnerable groups.

**RP:** Though tropical cyclones are randomly generated, they impact areas which tend to be poor, or sometimes as a result of a hurricane hitting, they become poorer over the long term. And so really, — it's not just about money, it's about the way that we treat people who look different from us after a storm and how that has implications for racial justice and environmental justice. Providing the means for everyone to recover in the way that they need to, I think is very important to focus on in the next iteration of the way we think about tropical cyclones and public health."

**Narrator:** The National Institute of Environmental Health Sciences funds research to better understand the health effects of climate change. You can learn more about the institute's research by visiting our website at [www.niehs.nih.gov/GEH](http://www.niehs.nih.gov/GEH). Thanks again to Dr. Robbie M. Parks for joining us today. You've been listening to Environmental Health Chat, brought to you by the Global Environmental Health program at the National Institute of Environmental Health Sciences.