

Ian was deadliest US storm this year, with at least 144 dead. Why are predictable storms still killing so many people?

November 30 2022, by Dinah Voyles Pulver



Credit: Pixabay/CC0 Public Domain

Even though the 2022 Atlantic hurricane season officially ends Nov. 30, its repercussions will linger long into the future.

The season wound up near normal despite forecasts for above-average

activity, but it was notable for the death and destruction wrought by Hurricanes Fiona, Ian and Nicole.

In Puerto Rico, Fiona dealt a blow to the long-term recovery efforts from Hurricane Maria five years ago, knocking out electricity to the entire island.

On Florida's east coast, residents are working to prevent battered beachfront properties from collapsing into the ocean after first Ian, then Nicole ripped away mountains of sand and seawalls.

This was the seventh [hurricane season](#) in a row to produce a deadly landfalling [hurricane](#) on the U.S mainland. No other span in the record books has as many storms listed among the nation's 50 deadliest hurricanes.

For years, researchers have warned of a dangerous increase in risk and vulnerability with a growing—and aging—population at the coast and [climate change](#) bringing more hazardous impacts. Ian's grim death toll in the U.S.—144 and counting—prompts researchers to ask anew what, if anything, else can be done to limit deaths and injuries.

'What the heck is going on?'

As Ian roared toward Florida, Andrea Schumacher was in a better position than most to plead with her uncle to evacuate rather than trying to ride out the storm in his home on the state's southwest coast.

Schumacher, a meteorologist and hurricane researcher, spends her days working on ways to convince people to make better choices when their lives are at stake. She was among thousands trying to convince family members to flee Ian's ferocious winds and water.

After the storm slammed ashore with a surge up to 15 feet above ground, drenching much of the state with flooding rain, it quickly became clear that too many made the wrong choice.

Officials attribute at least 139 deaths to Ian in Florida, five in North Carolina and Virginia, and three in Cuba, according to data compiled and analyzed by *U.S. TODAY*.

The analysis found that despite thousands of rescues, up to 60 people drowned in Florida, and at least 30 died partially as a result of existing medical conditions. At least 85 victims were 65 or older.

The National Hurricane Center may adjust the total number of deaths in its final report on Ian, but the hurricane could wind up among the 25 deadliest storms ever to strike the mainland.

Too many people still die in hurricanes, even after vast improvements in forecasting and communication, said Amber Silver, a disaster researcher and assistant professor at the University at Albany in New York: "We are not seeing a reduction in deaths or economic damages in tune with our improved understanding of atmospheric science."

"Why are we still seeing death tolls and economic losses in record breaker after record breaker?" Silver asked. "We have more information being shared in more formats, it's customizable, it's interactive. ... So if the science is improving, and our ability to communicate that information is improving, what the heck is going on?"

Even though people have more advance notice than ever before, more than a quarter of the 40 deadliest hurricanes on the mainland since the 1800s have occurred over the past 21 years. Many deaths are blamed on the same factors: [storm surge](#), rainfall, flooding, failure to evacuate, generators and electrical outages.

Experts told *U.S. TODAY* that in addition to the personal choices of those who live in harm's way, a combination of factors are to blame, despite decades of efforts to improve forecasting and reduce deaths.

Increasing urban development on the coast, an [aging population](#) and the warming climate all factor in, said Mathew Hauer, an assistant professor of sociology at Florida State University.

And he expects it to get worse.

As the climate changes, experts say more rain is falling, hurricanes experience rapid increases in intensity more often and the seven to eight inch increase in sea level adds to the impacts of storm surge.

By 2100, Hauer said, the percentage of the population over age 65 in coastal counties is projected to shift from 16% to 37%. Over the past 20 years, the percentage of Florida residents aged 65 and older has increased from 17.6% to 21%.

This complicates disaster planning and adds additional burdens to agencies responsible for providing care. Hauer said it can also further exacerbate disparities.

Understanding more about these vulnerabilities and how people perceive their risks, then tailoring messages and guidelines to help them understand the risks and heed evacuations when necessary are the keys to reducing hurricane deaths, Silver said.

"We have to look at things like policy and policy failures because the reality is when you have [vulnerable people](#) living in vulnerable regions, in vulnerable infrastructure being exposed to these storms, you're going to continue to have these shocking [death](#) counts, particularly among the most vulnerable," she said. "Until we address this challenge at a

systemic, societal level, it's not going to get better."

'Not just a forecasting problem'

The National Weather Service, hurricane center and others have worked for years to reduce deaths, said Bill Read, a retired hurricane center director and consultant. Besides outliers such as Katrina and Maria, the vast majority of today's deadly hurricanes do not come close to the thousands of deaths reported in storms of the late 1800s and early 1900s.

Decades of advances in satellite technology, storm dynamics and communications give people more advance notice than ever. The weather service has worked with social scientists to develop new graphics to define and warn of storm surge, the leading cause of deaths historically, and continues working on new solutions, Read and others said.

Schumacher, who works at the National Center for Atmospheric Research and Colorado State University, is among a large group of researchers studying hurricane hazards, risk perception and evacuation behavior to help improve communication.

"This is not just a forecasting problem," she said. "This is an understanding people problem. It's unfortunate human decisions combined with the vulnerabilities of people living along the coast."

She and colleagues at NCAR and at Stanford University are in the third year of a groundbreaking project they hope will provide a more clear look at how people in harm's way perceive their risks. The researchers wanted to know if surveying people in the path of a storm could reveal how they evaluate their situations, get their information and make decisions as the hurricane moves closer.

The researchers conducted their first surveys in 2020 as Laura and Marco were in the Gulf of Mexico. They did another set of surveys as Henri advanced in 2021. A third survey took place as Ian intensified and approached Florida. Schumacher said they surveyed 1,000 residents inside and outside the areas of maximum risk, asking questions about risk perception, information and decision-making.

Collecting such data about changing risk perception in real time could help the hurricane center and others gauge what people are understanding, measure the effectiveness of messaging and refocus if necessary as a storm approaches, researchers said.

"There are a million reasons people do/don't do things, and I don't think we can anticipate all of them," Schumacher said. "But I think we can do the work to find out what can help people make their own best decisions and make that better, whatever it entails."

Deciding to stay or go

Ordering evacuations is always a tough decision with complex scenarios, Read said. They have to be done far ahead, when the forecast uncertainty is greater, and evacuations come with their own risks, including traffic accidents and other fatalities.

"It's impossible to be 100% perfect with a forecast and give everyone adequate warning," Read said. "I'm not sure how much more accuracy we can milk out of the (short-term) forecast."

With error margins at 24-hours now averaging only 25-30 miles, he said it will be hard to get better.

On densely populated coasts in Florida and Texas, he said, when too many people are ordered to leave, the roads are jammed with traffic,

increasing the risks.

"You can't order an entire region in Florida to evacuate," he said. It's just not practical."

Historically, the state hasn't had as high a compliance rate with evacuations as some other states.

Choosing to evacuate is also a tough decision, Read said. On Florida's skinny peninsula, it can be difficult choosing which direction to go. On the Texas coast, everyone has to drive through Houston, he said. "A lot of people would rather roll the dice and risk their chances at home."

Many can't afford to go, social scientists said. Many are afraid to leave.

Even with 100% evacuation compliance, it's unlikely hurricane deaths would ever be completely eliminated, said Brian McNoldy, a senior research associate at the University of Miami: "Assuming everyone successfully leaves who is told to leave, there are still dangerous conditions in a hurricane that occur outside of a mandatory evacuation zone."

Trees can still fall on houses, people can still get electrocuted by downed power lines or misuse generators, he said: "A hurricane is a natural disaster with some man-made disaster elements added on."

Schumacher said she thinks there's "more work to do" to understand why people who were under a storm surge threat didn't evacuate:

"Was it an inability to leave due to lack of resources? Was it waiting for more forecasts to feel more confident of the risk, but then realizing it was too late? Was it seeing your neighbor decide to stay put and then deciding you'd stay, too?"

Seniors more vulnerable

Senior citizens tend to be even less likely to evacuate or heed warnings, said Elizabeth Andrade, an assistant professor of prevention and community health at The George Washington University.

It's important to recognize these tendencies, and also that older adults with chronic health conditions are the most at risk during and after disasters, said Andrade, who with colleagues conducted a comprehensive study of deaths after Hurricane Maria.

Every person who died in Hurricane Michael's fierce storm surge along Florida's northern Gulf Coast in 2018 was over the age of 60, and all of the deaths were inside storm surge evacuation zones.

The median age of Ian's victims was 72 in Florida, a haven for retirees. More than 61% of the victims whose ages are known were 65 or over. Nearly half had medical conditions that contributed to their deaths.

Existing guidelines and messages provided to older adults are "inadequate" for major storms with the highest winds and storm surges, Andrade said, especially for those who depend on electricity and life-saving medical devices.

Power outages are particularly deadly for [older adults](#), she said. After Hurricane Maria, people could not operate respirators and had difficulty accessing kidney dialysis, she said. Similar electrical issues were blamed for more than a half-dozen deaths after Ian.

Andrade and others said more money to help address challenges faced by seniors and economically disadvantaged residents would reduce deaths and increase preparation.

After Hurricane Irma in 2017, Jo Ann Kleier, a South Florida nurse and a nursing instructor at Nova University, led a study with students talking to people aged 55 and older about their disaster decision-making. They asked where people were getting their information and how prepared they were at home for hurricanes.

The study concluded people are prepared to stay home for a few days, but ill-prepared if their home is damaged or if they have to evacuate. Many said their closest family members were out of state.

"As you get older, all this movement is more difficult," said Kleier, now retired. "You have more trappings you have to take with you. ...Transportation is a big deal. And some people are just never going to understand their vulnerability."

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Citation: Ian was deadliest US storm this year, with at least 144 dead. Why are predictable storms still killing so many people? (2022, November 30) retrieved 2 April 2023 from <https://phys.org/news/2022-11-ian-deadliest-storm-year-dead.html>

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