

Climate Change and Noncommunicable Disease Risk

Laura Sands

RCCN Workshop:
Climate Change and Aging

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Climate change has led to significant increases in the number the number and severity of tropical storms. There have been 10 hurricanes in 2024, four were category 3 or higher including Debby, Helene and Milton in Florida.

Hurricane Helene's northern route resulted in devastating floods, land slides, tornados and strong winds, resulting in 200 deaths, 200,000 displaced from their homes in North Carolina, and lack of access to safe drinking water, utilities, telecommunications, and healthcare.

The immediate impact on many older adults' mental and physical health has been profound.

Post Disasters Stress

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New York Times, Oct. 29, 2024 Reporting
on Asheville Residents

“Many residents are also experiencing the psychological stress of grief, loss and trauma, with the death toll at nearly 100 in the state. Even the constant sound of helicopters overhead, many of which are delivering aid, has made people anxious. One doctor described an uptick in anxiety stemming from the financial toll the storm took on many residents, after it snatched away homes,” cars and jobs.”



Prior studies provide evidence that many older adults have symptoms of stress after exposure to disasters:

Half of persons exposed to the 2004 Florida hurricanes reported they experienced significant fear of injury or death in the months after the hurricane (Acerno et al, Am J Public Health, 2007)

A quarter of older adults exposed to Hurricane Ike reported they had unmet psychological needs months after the disaster. (Pietrzak et al. J Affect Disord, 2012)

Disaster related stress is associated with health care utilization in the years after the disaster

Compared to older adults who did not experience disaster related stress, older adults who reported experiencing a lot of disaster related stress had significantly greater outpatient and Emergency Department utilization in the three years after the Hurricane (Sands et al. Soc Sci & Med, 2022).

Disaster related stress is associated with declines in older adults' physical functioning in the years after a disaster:

Older Floridians exposed to Hurricane Irma in 2017 and Hurricane Michael in 2018 who experienced disaster related stress had poorer functional outcomes compared to older Floridians who did not experience disaster related stress. (Garfin et al. JAMA Open, 2022)

For many older adults declines in physical functioning, are attributable to the onset of chronic diseases

To assess whether onset of chronic conditions after Hurricane Sandy was associated with disaster related stress, we linked survey data from a representative sample of New Jersey residents with their Medicare data.

Post-disaster Stress and Onset of Chronic Diseases

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Survey data included demographic and physiologic data (e.g. BMI), an assessment of disaster related stress from Hurricane Sandy, and FEMA determined proximity to the areas hardest hit by the hurricanes. In addition, respondents were asked if they were distressed or fearful during Hurricane Sandy. Responses were “no” (coded 0), “a little” (coded 0) versus “a lot” (coded 1); the latter category reflected significant peritraumatic stress.

Medicare Data provided the number and type of chronic conditions prior to and after the hurricane. We focused on onset of four chronic conditions: 1) COPD or asthma, 2) diabetes, 3) arthritis, and 4) cardiovascular disease.

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Separate Cox Proportional models were computed to determine time to new onset of each of the four types chronic conditions.

The models included the following covariates: age, sex, education, marital status, pre-disaster diagnosis of depression, number of co-morbidities prior to the hurricane, pre-disaster obesity, and high hurricane exposure.

We compared time to onset for those who stated they experienced no, or a little fear and distress from the hurricane versus those who experienced a lot of fear and distress during the hurricane.

Time to onset was set as the time between the day the hurricane landed and the date of the first diagnosis of the chronic condition. Four separate models were run for 1) COPD or asthma, 2) diabetes, 3) arthritis, and 4) cardiovascular disease.

Post-disaster Stress and Onset of Chronic Diseases

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Chronic Condition	COPD or Asthma	Diabetes	Arthritis	CVD
Risk of developing a new chronic condition for those who experienced a lot of fear and distress compared to those who experiences with little or no fear and distress	2.29 (1.21 – 4.33)*	2.96 (1.50-5.84)**	2.02 (1.13 – 3.62)*	1.41 (0.68 – 2.92)

*= p<0.05, **p<0.01

1. Five percent of older adults reported experiencing 'a lot of fear and distress' during the Hurricane. Those who experienced a lot of fear and distress were at greater risk for new onset of chronic conditions. The findings suggest that mental and physical health should be monitored soon after a disaster with the goal of identifying those who would benefit from interventions that address the mental and physical health consequences of a disaster.
2. Assessment of inflammatory biomarkers would inform physiological mechanisms underlying disaster related stress and onset of chronic conditions.