

Assessing Exposure to Tropical Cyclones for Epidemiological Research

Existing Resources and Future Needs

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## [1] "Timestamp"
## [2] "Username"
## [3] "What health outcomes are you exploring as potentially 1
## [4] "If you checked \"Other\" in the previous question, plea
## [5] "Are you focusing on a specific population or studying a
## [6] "If you checked the last box for the previous, please pr
## [7] "Listed below are several physical hazards that a tropic
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Colorado State University 2020 Atlantic seasonal forecast

ATLANTIC SEASONAL HURRICANE ACTIVITY

Forecast for 2020 Hurricane Activity (as of August 5, 2020)

Forecast Parameters	CSU Forecast for 2020*	Average for 1981-2010
Named Storms	24	12.1
Named Storm Days	100	59.4
Hurricanes	12	6.4
Hurricane Days	45	24.2
Major Hurricanes	5	2.7
Major Hurricane Days	11	6.2
Accumulated Cyclone Energy+	200	106

*Total forecast includes Arthur, Bertha, Cristobal, Dolly, Edouard, Fay, Gonzalo, Hanna and Isaias which have formed in the Atlantic as of August 4th.

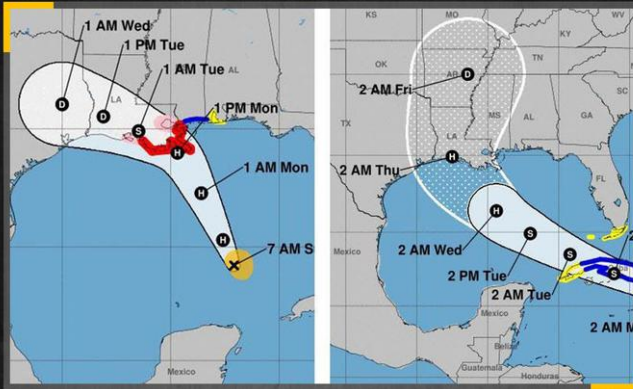
+A measure of a named storm's potential for wind and storm surge destruction defined as the sum of the square of a named storm's maximum wind speed (in 10^4 knots²) for each 6-hour period of its existence.

2020 storm names



Source: 12 News Now

Marco and Laura



Source: The Texas Tribune

Survey for epidemiology workshop on assessing exposure to tropical cyclones

This survey will be used to inform and drive our discussion for the workshop on "Assessing Exposure to Tropical Cyclones for Epidemiological Research: Existing Resources and Future Needs" at the 32nd Annual Conference of the International Society for Environmental Epidemiology.

Tell us about your approaches and challenges in assessing exposure to tropical cyclones:

<https://forms.gle/bCRnDnMTKKyufj9M8>

Respondents: Twelve

Papers: 1 published, 3 submitted/under review, 2 in preparation

> [Environ Int.](#) 2020 Jul;140:105825. doi: 10.1016/j.envint.2020.105825. Epub 2020 May 30.

Tropical cyclones and risk of preterm birth: A retrospective analysis of 20 million births across 378 US counties

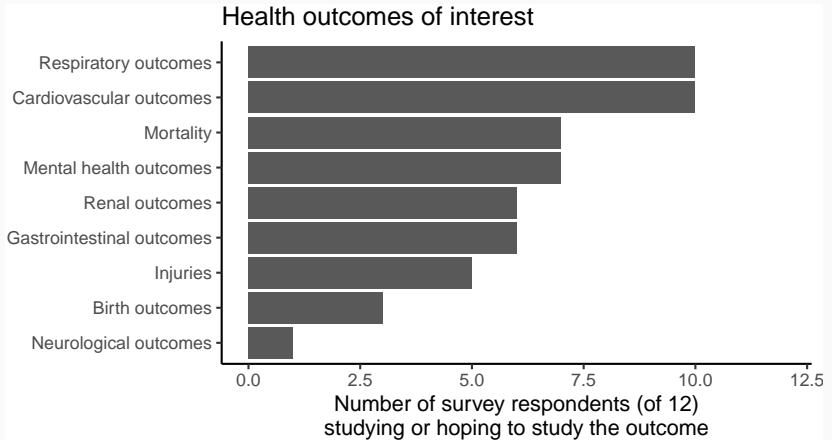
Shengzhi Sun ¹, Kate R Weinberger ², Meilin Yan ³, G Brooke Anderson ⁴, Gregory A Wellenius ⁵

Affiliations + expand

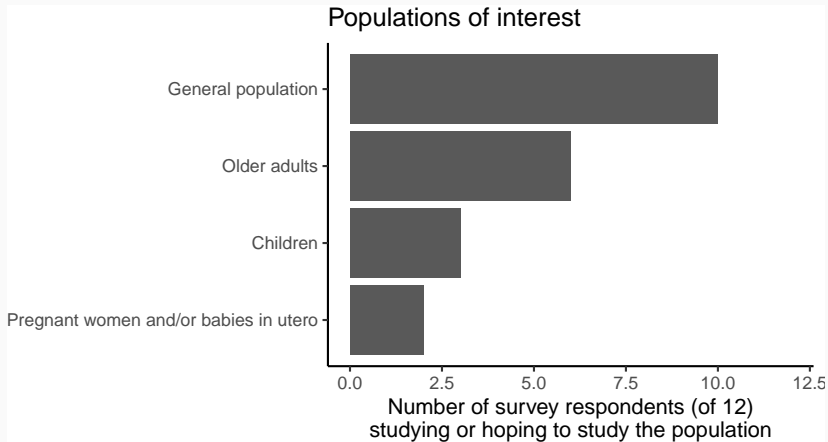
PMID: 32485474 DOI: [10.1016/j.envint.2020.105825](#)

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Survey overview



Survey overview



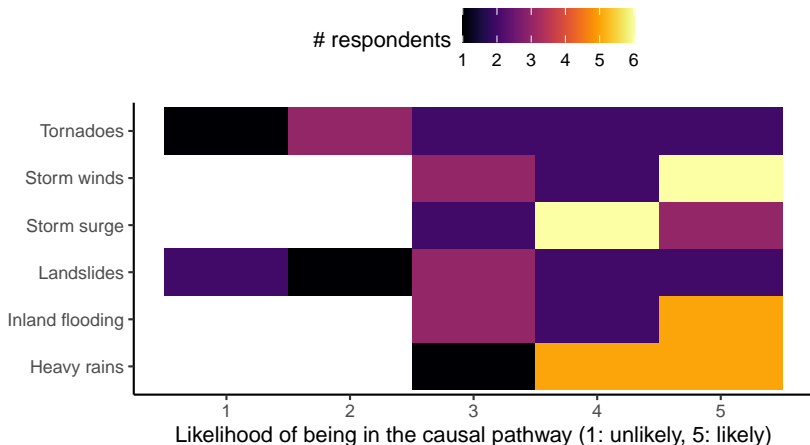
Challenges for single-storm versus multi-storm studies

Continuous versus binary exposure assessment

Assessing exposure to storm-associated winds

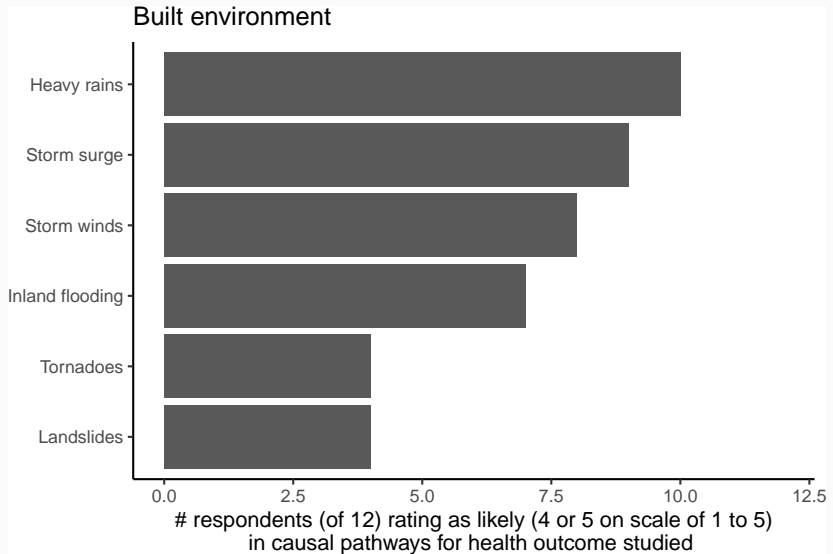
Assessing exposure to multiple hazards

Physical hazards



Survey question: Rate each physical hazard terms of how likely you think they are to be in the causal pathway linking tropical cyclones exposure to a change in the risk of the health outcome you are studying.

Assessing exposure to multiple hazards



Assessing exposure to multiple hazards

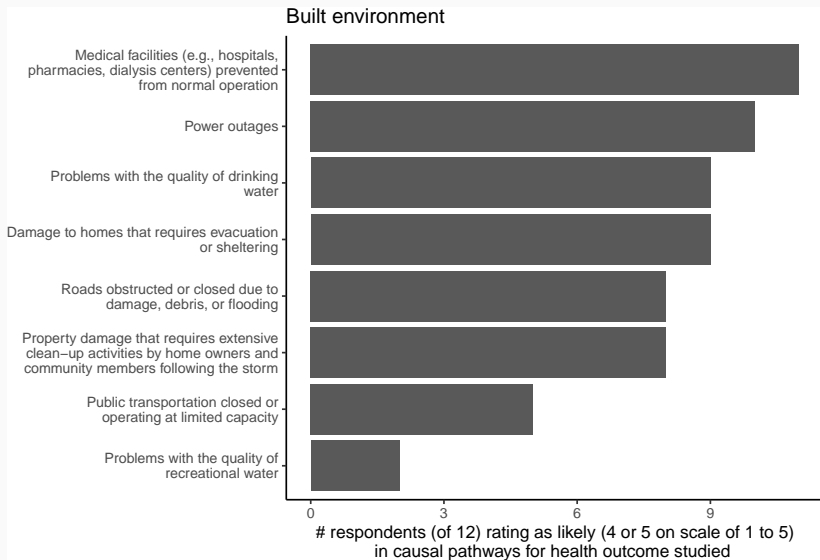
Are there any physical hazards from the storm that you think are plausibly in the causal pathway for your study?

*“This is pretty speculative, but I’ve wondered whether **changes in atmospheric pressure** play a role”*

Survey question:

“Listed below are several ways that the physical hazards of a tropical cyclone can impact the built environment and so increase risk of adverse health outcomes. Please rank how likely you think each is as a factor in causal pathways for the health exposure(s) you are studying or planning to study.”

Pathways for indirect effects



Pathways for indirect effects

Other potential pathways through the built environment:

*“**Communication infrastructure outages** (beyond power outages as it might be to do with internet cables cut etc.)”*

*“**Damage to personal vehicles**, reducing capacity to evacuate or reach a hospital in an emergency situation”*

Pathways for indirect effects

Aggregating data spatially

Assessing exposure during evacuation/moving

Thank you

- Kate Burrows
- Jacob Hochard
- Tiantian Li
- Rachel Nethery
- Balaji Ramesh
- Robbie Parks
- Arbor Quist
- Darren Sun
- Kate Weinberger
- Meilin Yan