Title: Evidence of association between flooding during and following Hurricane Harvey and reported illness*

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Background: The Centers for Disease Control and Prevention Social Vulnerability Index (CDC SVI) has been used to identify census tracts that may be particularly vulnerable during and following disasters. Earth observations captured during or immediately after flooding may be useful in determining exposure risk. This study examines the association between self-reported illness, flooding extent, and the CDC-SVI in the greater Houston area during and following Hurricane Harvey.

Methods: Data on reported illnesses were derived from the Hurricane Harvey Registry (now known as the Texas Flood Registry), a project that collects health, location, and exposure information from people affected by major storms. Survey responses from 14981 respondents, aggregated over 961 census tracts were included in the present analysis (https://doi.org/10.25612/837.EZX989NOXG51). Census tracts were categorized into no/minimally flooded or flooded areas using Dartmouth Flood Observatory remotely sensed flooding, captured at a resolution of 100m. Poisson regression models were used to characterize the association between proportion of respondents that reported illness in each tract, with flooding and CDC-SVI of the tract.

Results: On average, respondents whose homes or neighborhood was flooded were 1.77 times (CI: 1.32-2.38 for home flooded and CI: 1.27-2.45 for neighborhood flooded) more likely to report illness than those whose homes or neighborhood weren’t flooded. Reported illness by respondents are also positively associated with remotely sensed flooding at the census tract level, with reported illness increasing by 12% (95% CI: 2.8%-22%) on average in flooded versus no/minimally flooded tracts. The proportion of respondents that reported illness increased in the most socially vulnerable census tracts (third and fourth quartile) compared to the least (first quartile) by 20% (95% CI: 5.7%-36%) and 81% (95% CI: 59%-104%), respectively.

Conclusions: Earth observations along with the CDC-SVI may be useful for identifying populations with increased health risks during flooding events.

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