

Abstract

Introduction: Floods and other severe weather events are anticipated to increase as a result of global climate change. Floods can lead to outbreaks of gastroenteritis and other infectious diseases due to disruption of sewage and water infrastructure and impacts on sanitation and hygiene. Floods have also been indirectly associated with outbreaks through population displacement and crowding.

Methods: We conducted a case-crossover study to investigate the association between flooding and emergency room visits for gastrointestinal illness (ER-GI) in Massachusetts for the years 2003 through 2007. We obtained ER-GI visits from the State of Massachusetts and records of floods from the National Oceanic and Atmospheric Association's Storm Events Database. ER-GI visits were considered exposed if a flood occurred in the town of residence within three hazard periods of the visit: 0–4 days; 5–9 days; and 10–14 days. A time-stratified bi-directional design was used for control selection, matching on day of the week with two weeks lead or lag time from the ER-GI visit. Fixed effect logistic regression models were used to estimate the risk of ER-GI visits following the flood.

Results and Conclusions: A total of 270,457 ER-GI visits and 129 floods occurred in Massachusetts over the study period. Across all counties, flooding was associated with an increased risk for ER-GI in the 0–4 day period after flooding (Odds Ratio: 1.08; 95% Confidence Interval: 1.03–1.12); but not the 5–9 days (Odds Ratio: 0.995; 95% Confidence Interval: 0.955–1.04) or the 10–14 days after (Odds Ratio: 0.966, 95% Confidence Interval: 0.927–1.01). Similar results were observed for different definitions of ER-GI. The effect differed across counties, suggesting local differences in the risk and impact of flooding. Statewide, across the study period, an estimated 7% of ER-GI visits in the 0–4 days after a flood event were attributable to flooding.