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A Spatial Evaluation of Nursing Home Vulnerability in the Southeastern United States

Older adults are inherently vulnerable to the impacts of geophysical hazards due to their frailty, frequency of comorbidity and need for assistance with daily activities. During Hurricane Harvey, institutionalized older adults were trapped in waist-deep flood waters while emergency services responded to other locations. Consequently, the disproportionate harm experienced by older adults following hazardous climate-sensitive events has recently emerged into public discourse. To mitigate this harm, an understanding of the potential hazards impacting each nursing home location is necessary. The spatial vulnerability of nursing homes located in the Southeastern United States was assessed using a social-ecological approach of vulnerability theory and GIScience. Principal components analysis (PCA) was conducted to reduce multicollinearity between 21 socioeconomic and 13 geophysical variables. Federal quality metrics were used to create a nursing home factors index to understand institution level vulnerability. Component scores were combined at the tract level and mapped to identify the spatial distribution of vulnerability at all three levels of analysis. The identification of vulnerable locations allows for further investigation into the quantifiable resiliency of each institution to socioeconomic and geophysical factors as well as the development of plausible risk-management strategies. Computational validation techniques were implemented to objectively verify the multiple indices and composite results. Results to date, demonstrate significant variability across the southeastern US with vulnerability greatest in coastal communities.