Natural Disasters on the Coast: The Interplay Between Environment and Health in the Gulf of Mexico

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The Gulf of Mexico region, which includes Texas, Louisiana, Mississippi, Alabama, and Florida, is especially vulnerable to hurricanes due to its geographic location and climate conditions (Manley, 2020; Sandifer et al., 2017). These storms pose serious risks to public health and safety, and understanding their impact is essential for developing effective preparedness and response strategies.

Hurricanes do more than just cause physical destruction. In addition to immediate injuries and fatalities, they are linked to long-term health consequences that often persist well beyond the storm's landfall. Research has shown that cardiovascular issues such as hypertension, heart attacks, and strokes can increase in the aftermath of a hurricane (Ghosh et al., 2022). Mental health challenges, including post-traumatic stress disorder (PTSD), depression, and anxiety, are also common, especially in communities that experienced displacement or loss (Ngatuvai et al., 2024; Waddell et al., 2021). One study found that these effects often peak within six months of the event but can continue for years, depending on individual and community-level recovery (Zahran et al., 2011).

Hurricanes can also severely disrupt healthcare systems. Flooding, power outages, and damage to facilities can delay treatment and limit access to medication, especially for people with chronic illnesses. These disruptions can worsen existing conditions and prevent timely care during emergencies (CDC, n.d.; Mathews, Smith, & Madrigano, 2025). In areas where healthcare access is already limited, the consequences are even more severe.

The health effects of hurricanes are often worse in communities already facing socioeconomic disadvantages. People with limited financial resources, unstable housing, or underlying health conditions are less likely to have the means to evacuate or access post-disaster care. Structural barriers such as systemic racism and underinvestment in infrastructure make some populations more vulnerable to both the immediate and long-term effects of storms (Mathews et al., 2025; National Academies of Sciences, Engineering, and Medicine, 2022).

Methods: We ran an ordinal logistic regression to examine how hurricane exposure (number of hurricanes experienced) predicts self-rated health. All analyses were conducted in R (R Core Team, 2022).

Results: Results indicate that hurricane exposure does not significantly predict self-rated health. Specifically, for each additional hurricane experienced, there is only a 0.0236 increase in self-reported health, which is a very small effect size. The results are not statistically significant (p = 0.696), meaning there is no strong evidence that experiencing more hurricanes affects self-rated health.

Overall, these results suggest that while hurricanes may cause short-term disruptions, they do not have a strong long-term impact on self-rated health in this population. Future research may explore whether income, access to healthcare, or mental health factors moderate this relationship.

Coefficient	Value	Std. Error	t-value	p-value
num_hurricanes	0.0236	0.0604	0.3904	0.696

4 3 (Excellent to Very Good)	-2.1575	0.1278	-16.88	5.96E-64
3 2 (Very Good to Good)	-0.2382	0.0844	-2.82	0.0048
2 1 (Good to Fair)	1.1657	0.0954	12.21	2.62E-34
1 0 (Fair to Poor)	2.626	0.1514	17.34	2.34E-67



This stacked bar chart shows the proportion of individuals in each self-rated health category (0– 4) across different levels of hurricane exposure (number of hurricanes experienced). Each bar adds up to 100%, allowing for an easier comparison of how the distribution of health changes as hurricane exposure increases.

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