DATA BRIEF

Household Preparedness for Severe Storms, Flooding, and Power Outages Among U.S. Adults

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Issue Brief

Background

Severe weather events are those that can cause damage to life and personal property (1). They include localized events such as thunderstorms with high winds or hail, tornadoes, and flash floods, or regional events such as hurricanes and winter storms (1,2). In the U.S., approximately 10,000 severe thunderstorms (3) and 1,200 tornadoes (4) occur each year, or an average of 27 severe thunderstorms and 3 tornadoes each day across the country. Flash flooding can result from these storms, sometimes developing within minutes (5).

Events such as these put people at risk for both injury and death, as well as damage to personal property. Flash flooding is the leading cause of death resulting from thunderstorms and kills about 140 people in the U.S. per year (3). Tornadoes form in severe thunderstorms and cause a nationwide average of 80 deaths and 1,500 injuries per year. That means every month, on average, more than 18 people are killed from these incidents. Populations that are especially vulnerable to experiencing adverse effects of severe storms and flooding include racial minorities, those with low income, (6) and elderly populations (7).

The incidence and aftermath of severe weather events in the U.S. underscore the necessity of household preparedness for such occurrences. There is a need to understand current levels of preparedness, identify populations who are most vulnerable to severe weather events, and identify barriers to readiness in order to inform preparedness efforts across the country. To achieve these goals, we conducted a national survey of 6,223 U.S. adults in May 2024 to assess household preparedness for emergencies. Our survey focused on preparedness for severe storms, flooding, and extended power outages.

Findings

Across four U.S. regions (Northeast, Midwest, South and West), 25%-36% of adults said they had experienced flooding over the past 3 years, and even higher percentages reported experiencing power outages (45%-58%) or severe storms (51%-79%, Figure 1). Higher percentages of adults living in the Midwest (77%) or South (79%) said they had experienced severe storms, compared to other regions, though at least half of adults across all regions reported experiencing severe storms. Adults in the South were also more likely to say they had experienced power outages (58% of adults) compared to other regions. Moreover, adults were more likely to report experiencing flooding in the South than adults in the Midwest or West. Overall, approximately 80% of adults nationwide said they had experienced at least one of these events (severe storms, flooding, or power outages) over the past 3 years.

Figure 1: Percentage of U.S. adults by region who reported experiencing severe storms in the past 3 years

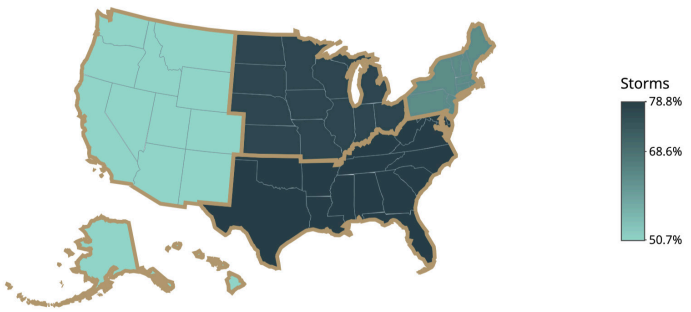

Figure Note: Estimates represent the percentage of adults who said they had experienced severe storms between January 2021 and May 2024.

In the Midwestern, Northeastern, and Southern regions, higher percentages of Hispanic adults reported expe-

riencing flooding when compared to Non-Hispanic White adults. In the South, higher percentages of Non-Hispanic Black/African American adults reported experiencing power outages when compared to Non-Hispanic White adults.

Within each of the U.S. regions, fewer adults reported being prepared for flooding (37-44%) than for severe storms (48-58%) or power outages (57-60%, Figure 2). Adults living in the West (37%) had similar preparedness for flooding as the Midwest (38%), but were much less likely to be prepared for flooding when compared to the Northeast (44%) and South (42%). In addition, fewer adults living in the West (48%) reported being prepared for severe storms when compared to all other regions (57-58%). Preparedness for power outages was similar across all four regions.

Figure 2: Percentage of U.S. adults by region who said their household is prepared for severe storms, flooding, or power outages

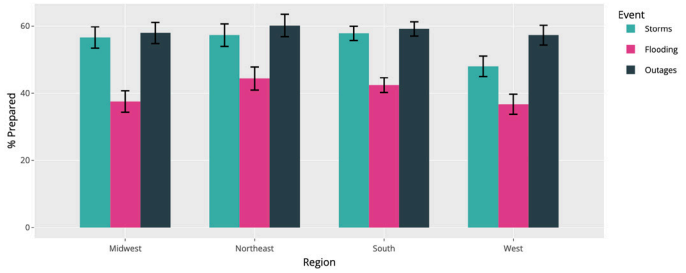

Figure Note: Participants who responded that they were "4" (somewhat prepared) or "5" (very prepared) on a 5-point Likert scale assessing preparedness for events were categorized as being prepared. Error bars represent the 95% confidence interval for the reported percentage.

Adults reported different levels of preparedness for extreme climate events depending on age, gender identity, household income, and race and ethnicity (Figure 3). We observed higher levels of perceived preparedness for severe storms among older adults, with adults ages 65 and older reporting the highest levels of preparedness and adults ages 18-29 reporting the lowest levels of preparedness. Males were more likely to report being prepared for severe storms, flooding, and power outages when compared to females; non-binary adults reported the lowest levels of self-perceived preparedness for all three events (though estimates were not statistically different and should be interpreted with caution due to a very small sample size for this group). Adults with an annual household income ≥$100,000 reported the highest levels of preparedness for all three emergency events, compared to adults in lower-income households. Higher percentages of adults identifying as non-Hispanic White said they were prepared for severe storms (61%), power outages (63%), and flooding (42%) when compared to adults identifying as Hispanic/Latino (45%, 49%, and 35%, respectively). Adults who identified as non-Hispanic White were more likely to report being prepared for severe storms and power outages when compared to adults identifying as Black/African American (51% prepared for severe storms; 55% prepared for power outages). Due to small sample sizes, we were unable to estimate reliable measures of preparedness for other racial groups, and those estimates should be interpreted with caution.

Figure 3: Percentage of U.S. adults by age group who said their household is prepared for severe storms, flooding, or power outages

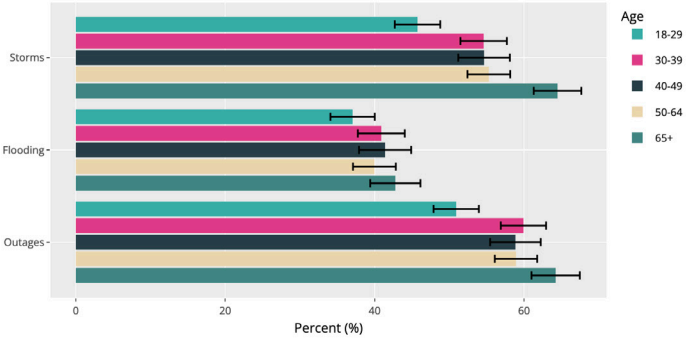

Figure Note: Participants who responded that they were "4" (somewhat prepared) or "5" (very prepared) on a 5-point Likert scale assessing preparedness for events were categorized as being prepared. Error bars represent the 95% confidence interval for the reported percentage.

An additional factor associated with preparedness was direct experience with the event itself—i.e. whether or not survey respondents had encountered these extreme climate events during the past 3 years. Adults who had experienced these respective events were 1.5 (1.3-1.7) times as likely to be prepared for severe storms, 1.8 (1.6-2.1) times as likely to be prepared for flooding, and 1.8 (1.6-2.0) times as likely to be prepared for power outages. These estimates were calculated after adjusting for demographic factors (age, gender, education, household income, race and ethnicity, and region of the country in which the survey respondent resided).

Fewer than half of U.S. adults said that they have looked up recommended actions to take during severe storms (43%), flooding (31%), or power outages (41%) in the place where they currently live. The most commonly reported preparedness action taken by adults (66%) was signing up for severe weather alerts. Approximately half of adults said they have taken other measures to prepare, such as storing important documents in a waterproof container or making an emergency kit.

Approximately 1 in 4 adults said that they don't have enough information to prepare for storms or power outages, and that this lack of information is a large barrier to their preparation. More adults (nearly 1 in 3) said that they do not have enough information to prepare for flooding.

When asked about preparations as a personal priority, nearly 1 out of 5 adults indicated that preparing for storms and power outages is not a personal priority, and approximately 1 in 4 adults said that preparing for flooding is not a priority.

Lack of personal resources (such as the inability to modify one's home or lack of money to prepare) were large barriers to emergency preparations for at least 1 out of 3 adults. Examples of preparedness actions that could be taken, which might require home modifications or additional expenditures, include trimming hazardous tree branches around the home, sealing drafts in the home, or making an emergency kit.

Figure 4: Percentage of U.S. adults who said they have taken action to prepare for extreme climate events in the place where they currently live

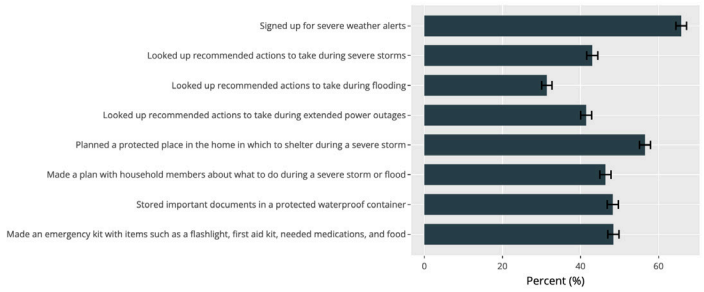

Figure Note: Error bars represent the 95% confidence interval for the reported percentage.

Figure 5: Percentage of U.S. adults who said they experienced large barriers to preparing for severe storms, flooding, and power outages

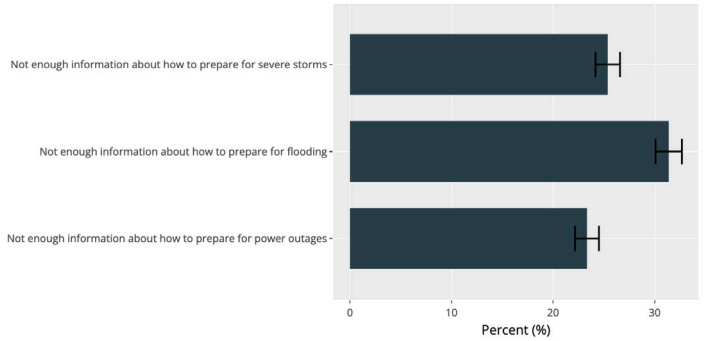

Figure Note: Participants who responded that they faced "4" (big barriers) or "5" (very big barriers) on a 5-point Likert scale were categorized as experiencing large barriers for each of the factors assessed. Error bars represent the 95% confidence interval for the reported percentage.

Conclusions

Four out of five U.S. adults have recently experienced at least one of these extreme climate-related events (severe storms, flooding, or power outages). This data underscores the need for personal preparations for such events, particularly in regions of the United States at high risk. Despite this need, fewer than 60% of U.S. adults reported that their household is currently prepared for severe storms and power outages, and even fewer adults said their household is prepared for flooding. These findings suggest a large gap in household preparedness across all regions of the United States.

We found disparities in household preparedness according to age, gender, household income, and race and ethnicity. Populations with the lowest levels of preparedness were adults ages 18-29, female or non-binary adults, low-income households, and adults who were Hispanic/Latino or Black/African American. Having recent, personal experience with these climate-related events was also strongly associated with current household preparedness, as we found higher likelihood of preparedness among adults who had experienced these events during the past 3 years versus those who had not.

Our findings suggest low levels of preparedness among most U.S. households. Fewer than half of U.S. adults reported having taken basic actions to prepare for severe storms, flooding, and power outages within their

current living situation, such as putting together an emergency kit or making a plan with household members regarding what to do during an emergency event. Some of this gap in action may be associated with barriers to preparedness, since at least 1 in 4 adults reported not having enough knowledge or resources to prepare. However, approximately 1 in 5 adults also said that preparedness is not a personal priority.

These findings suggest that much more work can be done around emergency preparedness among U.S. households. We identified multiple areas for improvement, as well as populations who may be most vulnerable to experiencing climate-related adverse events. Our findings indicate opportunities for public health interventions to improve emergency preparedness through education, addressing financial barriers, and working with specific populations that reported being the least prepared.

Technical Notes

Methods

In May 2024, Heluna Health conducted a representative panel survey of adults living in the United States, including all 50 states and the District of Columbia. After applying data quality screening criteria, a total of 6,223 survey responses were included in the analytic dataset, and post-stratification weights were applied so that sample demographics would match the nationwide distribution. Weights were based on population characteristics collected for age group, sex, race (White, Black/African American, Asian), Hispanic ethnicity, household income, rural zip code status, and U.S. Census geographic region. These population characteristics were drawn from the 2022 American Community Survey (ACS) 1-year estimates, except for urban/rural status, which was drawn from the 5-year estimates. For the following races, weighting was based on the proportion found in the survey sample due to very small proportions for each, to avoid creating extreme weights based on a small sample size: American Indian or Alaska Native, Native Hawaiian or Pacific Islander, and Middle Eastern or North African.

We constructed 95% confidence intervals using population-weighted estimates, which were used to provide ranges within which we would expect true population estimates to fall, and to identify statistically significant differences in estimates across demographic groups. We also used population-weighted multivariable logistic regression models to calculate odds ratios for preparedness. We controlled for multiple demographic characteristics based on their associations with the exposure and outcome in our models, to control for potential confounding.

Acknowledgements

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