

Hurricanes, Health, and Equity

Strengthening Local Preparedness to Build
Resilient Communities

June 4, 2025

Training Outline

- Background on Health Impacts of Hurricanes
- Populations at Higher Risk and Likely to be Disproportionately Impacted
 - Community-Level Data
- Best and Promising Strategies for Mitigating the Health Impacts of Hurricanes

Background on Health Impacts of Hurricanes



Question

What is one health impact that can happen as a result of a hurricane?

Health Impacts: Acute Health Crises

- Direct Physical Trauma
 - Drowning
 - Traumatic injuries - flying debris, structural collapse
 - Electrocution
- Acute Illnesses and Environmental Hazards
 - Carbon monoxide poisoning
 - Hypothermia
- Immediate Psychological Distress
 - Shock, fear, confusion, acute anxiety, intense stress, immediate grief

Health Impacts: Infectious Diseases & Environmental Exposures



- Infectious Diseases
 - Waterborne and foodborne illnesses
 - Vector-borne diseases
- Mold-Related Illnesses
 - Respiratory problems - asthma, sinusitis, bronchitis
 - Neurological issues - “brain fog,” mood disorders
 - Immune suppression, chronic fatigue
- Chemical Contaminations
 - Acute effects - skin and respiratory irritation
 - Potential long-term effects - organ damage, cancer risk

Health Impacts: Exacerbation of Chronic Conditions



- Cardiovascular Disease
 - Heart attacks, strokes, hypertension
- Diabetes
- Respiratory Illnesses
 - Asthma, COPD

Health Impacts: Mental Health Impacts

- Exacerbation of existing mental health issues and development of new issues:
 - PTSD
 - Depression
 - Anxiety
 - Substance abuse
 - Survivor's guilt

Summary of Potential Health Impacts

Impact Category	Short-Term	Long-Term
Acute Illnesses & Physical Trauma	Drowning, traumatic injuries from debris/collapse, electrocution, hypothermia, carbon monoxide poisoning	Chronic pain, disability from injuries, increased all-cause mortality
Infectious Diseases	Gastrointestinal illnesses, acute skin infections from contaminated water	Persistent or recurrent skin infections, vector-borne diseases, melioidosis
Environmental Exposure Illnesses	Acute respiratory irritation from dust/debris	Mold-related illnesses (chronic respiratory conditions, neurological issues, immune suppression, chronic fatigue), potential effects of chemical exposure
Mental Health	Acute stress, anxiety, fear, shock, confusion, immediate grief	PTSD, depression, anxiety disorders, substance abuse, prolonged grief, survivor's guilt, sleep disturbances
Chronic Condition Exacerbation	Immediate worsening due to stress, missed medications (e.g., hypertensive crisis, asthma attack)	Worsened glycemic control in diabetes, increased cardiovascular events, progressive respiratory disease, development of complications

Populations At Risk of Hurricane Health Effects



“**Higher risk**” refers to people who are more likely than others to **experience negative health impacts**.

“**Disproportionately impacted**” refers to groups of people who are **more affected by harmful conditions** than others because of the situations or **inequities they experience**.

Question

What is a population you think might be at higher risk or likely to be disproportionately impacted by a hurricane?

Sociodemographic Factors

- People living alone or who are socially isolated
- Children
- People living in poverty
- Communities of color
- Non-English speakers or people with limited English
- Individuals who are undocumented
- Households without vehicles
- People experiencing homelessness
- People with pets
- People with limited access to health care

Pre-Existing Health & Medical Conditions

- People with pre-existing health conditions
- People who require medication
- People with power-dependent medical devices
- People with disabilities

Environment

- Communities that frequently lose power
- People living near the coast or in flood zones
- Living in housing that is not built or updated to withstand strong winds or flooding
- People in institutions, such as nursing facilities or correctional facilities
- Emergency responders and cleanup crews
- Tourists

Community Profiles



Health and Population Impacts Associated with Hurricanes Acton, Massachusetts Profile

Hurricanes can seriously affect people's health – especially if communities do not plan ahead. To protect residents during and after hurricanes, communities should customize their strategies to meet local needs. The MA Region 4AB Public Health Emergency Preparedness Coalition focuses on planning for the entire community and ensures health equity is considered in emergency preparedness and planning.

A person's risk of health impacts from a hurricane can vary based on many factors such as background, pre-existing health conditions, and where they live or work. Therefore, communities should develop plans that take these factors into account and address the needs of those who are most at risk. Each community is unique in its demographics, socioeconomic conditions, and geography. As a result, hurricane impacts – and the most effective solutions – may vary across the region.

Health Impacts of Hurricanes & Associated Events

Over the past few decades, hurricanes have become more frequent and severe. Experts predict this trend will continue.¹ Since 2000, Massachusetts has experienced six hurricanes that caused significant health impacts and infrastructure damage. Four of those hurricanes occurred since 2020.² In 2023, the Atlantic Basin (the section of the Atlantic Ocean along the Eastern Seaboard) saw 20 storms, including seven hurricanes. Of those, three were "major" hurricanes (Category 3 or higher on the Saffir-Simpson scale).³

These extreme storms often hit hardest for people with health conditions or those facing social and economic challenges. People and communities may face both immediate challenges after a hurricane and ongoing issues throughout the recovery process.

Physical Health Risks

Flooding, debris, strong winds, and building damage can harm people who do not – or cannot – evacuate. This is especially true in coastal and flood-prone areas. Hurricanes often cause power outages, which put people who rely on electronic medical devices at risk. Additionally, after a storm, damage to roads, buildings, and utilities can pose risks to emergency responders and make it more difficult for people to get medicine or medical care.

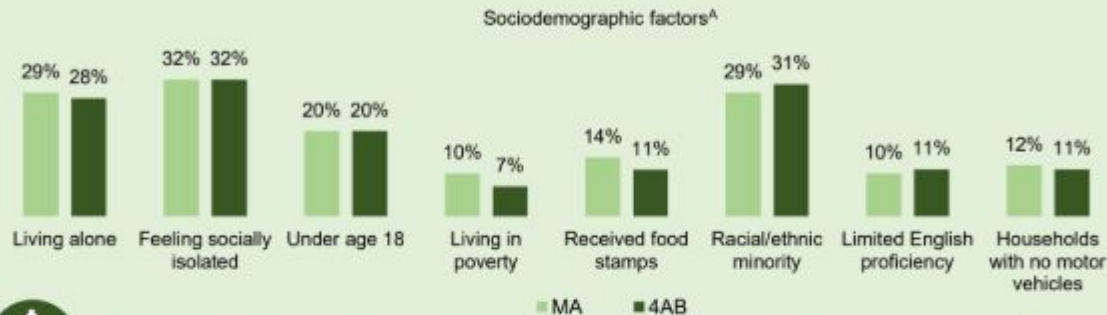


Organized by:

- Sociodemographic Factors
- Pre-existing Health & Medical Conditions
- Environment

Sociodemographic Factors

A person's age, income, language, household composition, housing situation, and other factors can affect their ability to prepare for, respond to, and recover from hurricanes.



People living alone or who are socially isolated may not receive critical evacuation notices.

They can be harder for emergency responders to reach and may have less support from friends or family.^{14,15} They are also more likely to have chronic diseases, disabilities, mental health challenges, or substance use issues – all of which increase their risks of negative health impacts.



Children who experience hurricanes are more likely to suffer physical and mental health effects later – especially if they lose vital support systems, such as family members, their home, or their school community.⁹



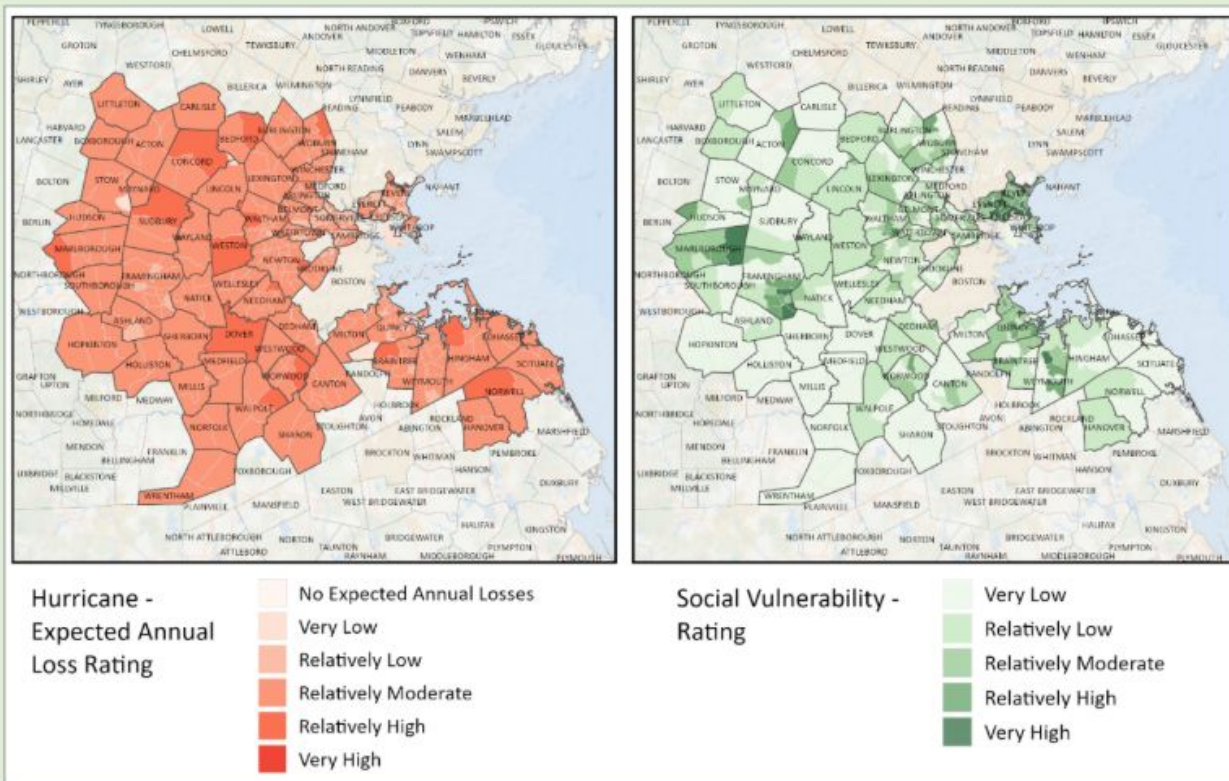
People living in poverty may live in housing that is easily damaged by strong winds or flooding.¹⁶

They often cannot afford emergency supplies, flood insurance, or the cost of evacuation.^{17,18} A recent survey found people who evacuated during Hurricane Harvey spent \$1,200–\$2,300.^{17,16} Low-income households may also face extra barriers – like limited access to communication, transportation, food, or medical care – both during and after a storm.

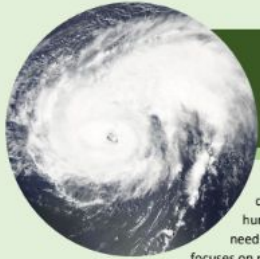
Areas Most Impacted by Hurricanes



The maps below show two measures for Region 4AB. **Annual Expected Loss** estimates how much money (in dollars) hurricanes could cost each year. **Social Vulnerability** shows how likely certain social groups are to be disproportionately impacted by hurricanes. Darker shades of orange and green represent higher expected economic loss and greater vulnerability, respectively.



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- Review your community's profile and note data that concerns you
 - Raw number
 - Significant difference from regional data
 - Reflect on services available within your community to help identify populations with unmet needs
- **Question:** Which populations within your community do you think preparedness efforts should focus on?

Best and Promising Strategies for Mitigating the Health Impacts of Hurricanes



Goal and Approach

- Develop a compendium of best and promising practices for hurricane health impact mitigation
 - Ensure inclusion of practices to reach higher risk or disproportionately impacted populations.
- Review Compendium of Best and Promising Practices for Extreme Temperature Health Impact Mitigation to identify practices relevant to hurricanes
- Conduct literature review to:
 - Identify additional hurricane-related health impacts
 - Identify best and promising practices
- Resources include peer-reviewed journal articles, guidance documents from federal and state agencies, after action reports from hurricane responses)
- Determine organization of compendium based on literature review
- Compendium is representative of the existing health impact guidance (not an exhaustive list)

Compendium Overview

Topic

- Community Preparedness
- Messaging
- Evacuation
- Back-up Power
- Sheltering
- Policy Implementation
- Continuity of Operations (COOP)
- Outreach/Welfare Checks
- Recovery Planning

Sheltering

Overarching Principle: Provide and ensure a safe, dignified, and accessible space to meet the key needs of individuals; consider what needs a community in crisis may need, including protection from hazards, clean water, food, basic hygiene, psychological aid and/or privacy, necessary health services, transportation, and power sources. (69)

Relevant Populations	Best and Promising Practices
All community members	Ensure sheltering plans include provisions for keeping the shelter environment safe for shelter residents, including access to basic hygiene and healthcare services, clean water and safe food, and monitoring for potential health hazards. (28, 43)
People with disabilities; People with pre-existing health conditions; People with pets; People with power-dependent medical devices	Ensure emergency shelter plans incorporate guidance and best practices for accessibility and integration of functional needs support services. Specific considerations include: <ul style="list-style-type: none"> → Providing reasonable accommodations to ensure service animals are welcomed in all shelters per the Americans with Disabilities Act (ADA) → Allowing pets and emotional support animals in a co-located or nearby standalone animal shelter → Including supports for residents who use power-dependent medical devices (57, 16, 3)
Household with no motor vehicles; People with disabilities	Establish shelters at locations accessible by public transportation, and clearly designate the transportation routes to the centers. Work with partners to provide accessible transportation to shelters for people they serve. (65)
Tourists	Establish shelters in tourist-heavy areas. (18)

Overarching Planning Principles

- Engage individuals who are at higher risk or likely to be disproportionately impacted by disasters
- Incorporate equity measures into community interventions when planning for a disaster
- Invest in preparedness efforts that focus on individuals who are at higher risk or likely to be disproportionately impacted
- Builds on an understand how inequities occur within disaster response to avoid further exacerbating these inequities

Compendium - A Deeper Dive

Topic

- Community Preparedness
- Messaging
 - Trusted messengers
 - Accessibility
 - Channels
- Evacuation & Sheltering
- Back-up Power
- Policy Implementation
- Continuity of Operations (COOP)
- Outreach/Welfare Checks
- Recovery Planning

For the population(s) in your community that are at higher risk or likely to be disproportionately impacted:

- **What practice(s) feel most impactful and why?**
- **Is there a new idea here?**
- **Is there a related strategy you have experience with implementing?**

Community Preparedness

- Assess community readiness and identify populations that are susceptible to health impacts from hurricanes. Promote and support the development of customized individual preparedness plans to support community members to become more prepared for disasters.
- Individual and household preparedness planning
- Customizing plan to reflect unique needs:
 - Medications
 - Power-dependent equipment
 - Notification equipment
 - Location in flood plain or near coast



**STAY AWARE.
BE PREPARED.**



**ESTÉ ATENTO.
PREPÁRESE.**



Messaging

- Trusted messengers
- Accessibility
- Channels
- Hurricane-impact-specific messaging



Evacuation & Sheltering

Evacuation

Predetermined evacuation options for individuals without transportation options:

- Cost-free public transportation
- Pre-emptive evacuation planning

Sheltering

Planning for safe sheltering for all residents (basic hygiene, healthcare, clean water and safe food, health hazard surveillance.

Accessibility and integration of Functional Needs Support Services including:

- ADA compliance
- Provisions for pets and emotional support animals
- Geographic accessibility
- Shelter capacity in tourist locations

Policy Implementation

- Explore FEMA's voluntary incentive program to reduce flood insurance premium rates, if appropriate
- Encourage recognition of storm exposure as impactful to health
- Encourage adoption of OSHA and NIOSH regulations during response and recovery
- Appeal to employers to support worker early evacuation
- Purchase battery packs for power-dependent medical equipment

Continuity of Operations

Strategy

Outreach to outpatient and institutional healthcare organizations and carceral settings to support them to maintain operations through partnerships and planning.

Types of organizations

- Dialysis Centers
- DME Suppliers
- Mental health providers
- Opioid treatment programs
- Long-term care facilities
- Psychiatric hospitals
- Jails, prisons, detention centers

Outreach/Welfare Checks

- Connect and collaborate with community organizations to provide hurricane-related outreach to those they serve.
- Recommend that local officials limit unhoused encampment sweeps to avoid separating people from their possessions, medications, devices, personal resources, and shelter.
- Collaborate with local tourism entities and businesses to develop emergency response actions that will support tourist safety.

Recovery Planning

- Disaster assistance safety net:
 - Identification of locally available resources
 - Psychological first aid
 - Family reunification
 - Pharmacy partnerships
 - CMS coverage for replacement DME
- Screening - Mental health
- Surveillance
 - Stepped-up coding or data collection by health care providers
 - Community based rapid surveys (e.g., CASPER)
- Debris management
 - Support community clean-up events



Source: [Community Assessment for Public Health Emergency Response \(CASPER\) Toolkit](#)

Debrief

What are your takeaways from today?

What do you plan to incorporate or change about hurricane planning in your jurisdiction or organization?

Thank you!

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