

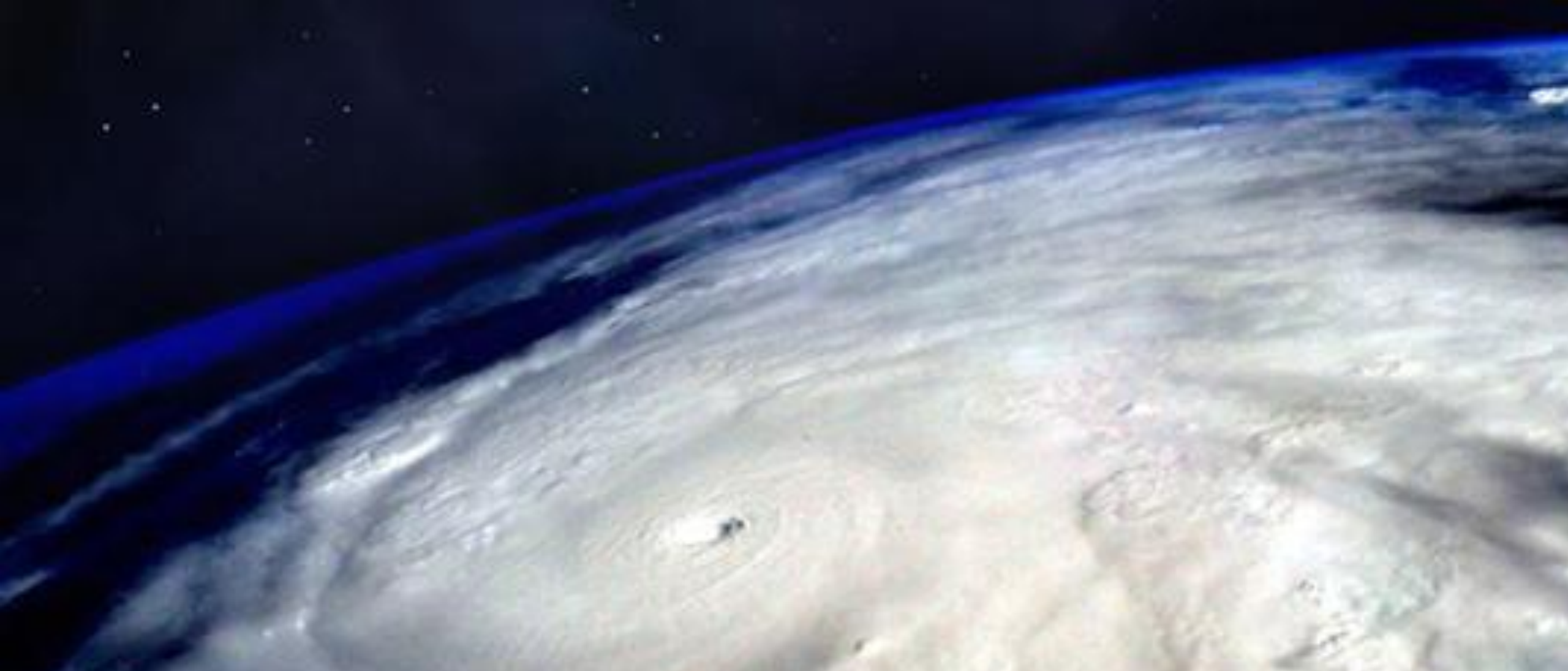
# Disaster Medicine in Today's Environment of Escalating Hazards

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## **Disaster Medicine: Crisis Healthcare When Needs Outweigh Resources**





# The Evolution of Disaster Medicine



# Hospital Overcrowding is a Global Problem.

## How Do We Handle The Surge?

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- Historical MCIs

- 1904 General Slocum excursion steamship fire New York, NY: 1021 killed, 350 injured
- 1942 Boston Cocoanut Grove night club fire: 492 killed, 130 injured
- 1944 Port Chicago munitions explosion: 320 killed, 390 injured
- 1995 Sarin Attacks Tokyo: 500 patients to St Luke's ED first 1 hour
- 2017 Las Vegas Shooting: 800+ total victims, 124 gunshot wounds to Sunrise hospital

How to convert hospitals to be able to care for 100s....1000s of patients?





# 21<sup>st</sup> Century: Escalating hazards AND vulnerabilities

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## Some Concerning Firsts

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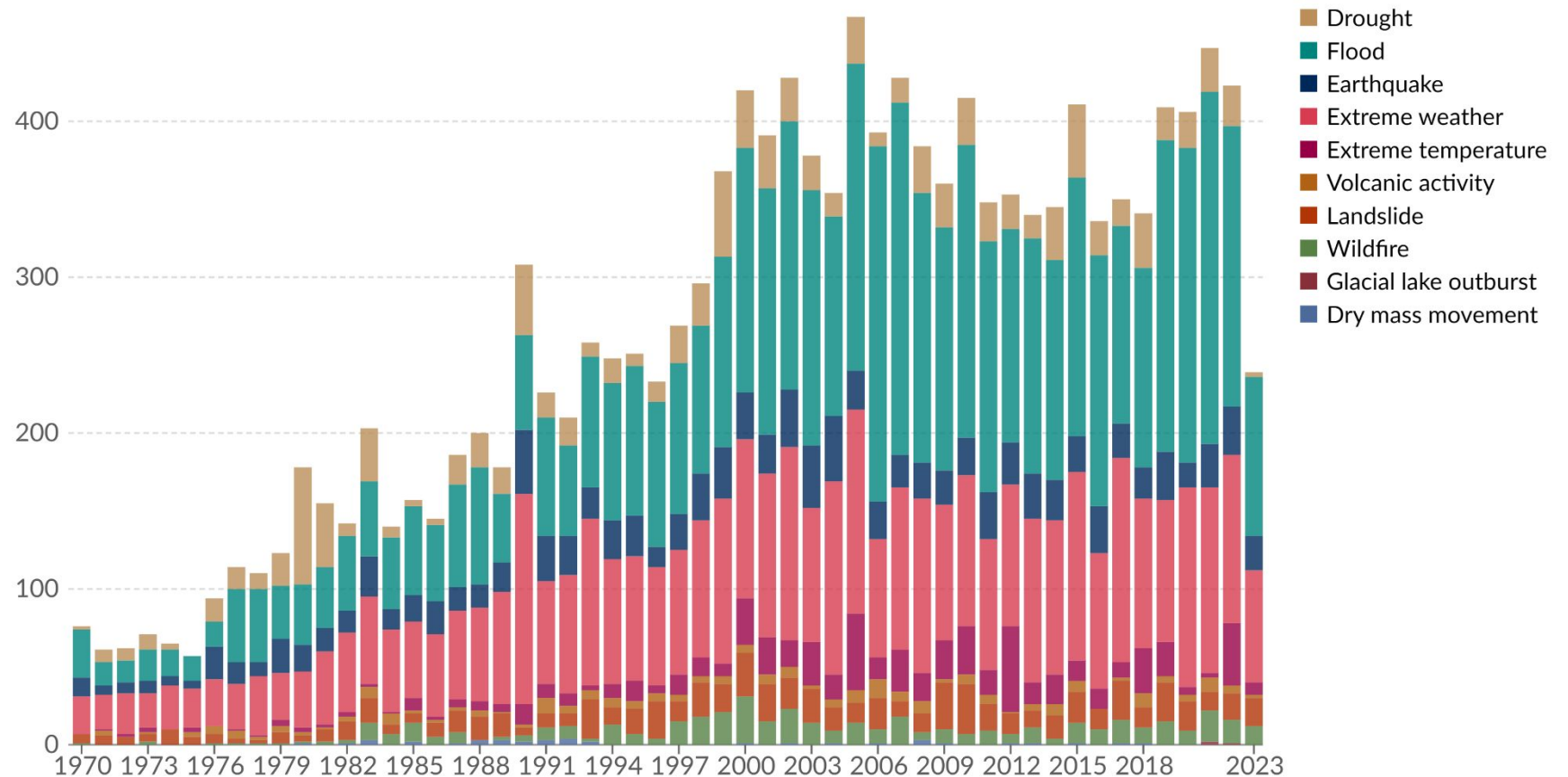
- 2015-2022 were warmest on record
- Sea levels reached record high in 2022
- First time over 630 million people live at elevation of 10 meters or less from sea level
- First time airborne-transmission pandemic with  $R_0 > 2$  in era of modern air travel
- First time large-scale active warfare in and around nuclear power stations
- First time AI-empowered weapons can kill humans autonomously
- First time entire healthcare systems' IT can be brought down from continents away. Ditto for power grid
- First time a chemical weapon capable of killing hundreds of thousands can be purchased on the street or from the dark web



## Global reported natural disasters by type, 1970 to 2023

The annual reported number of natural disasters, categorised by type. The number of global reported natural disaster events in any given year. Note that this largely reflects increases in data reporting, and should not be used to assess the total number of events.

**Trends In  
Natural  
Disaster Type  
Reflect  
Climate  
Change**

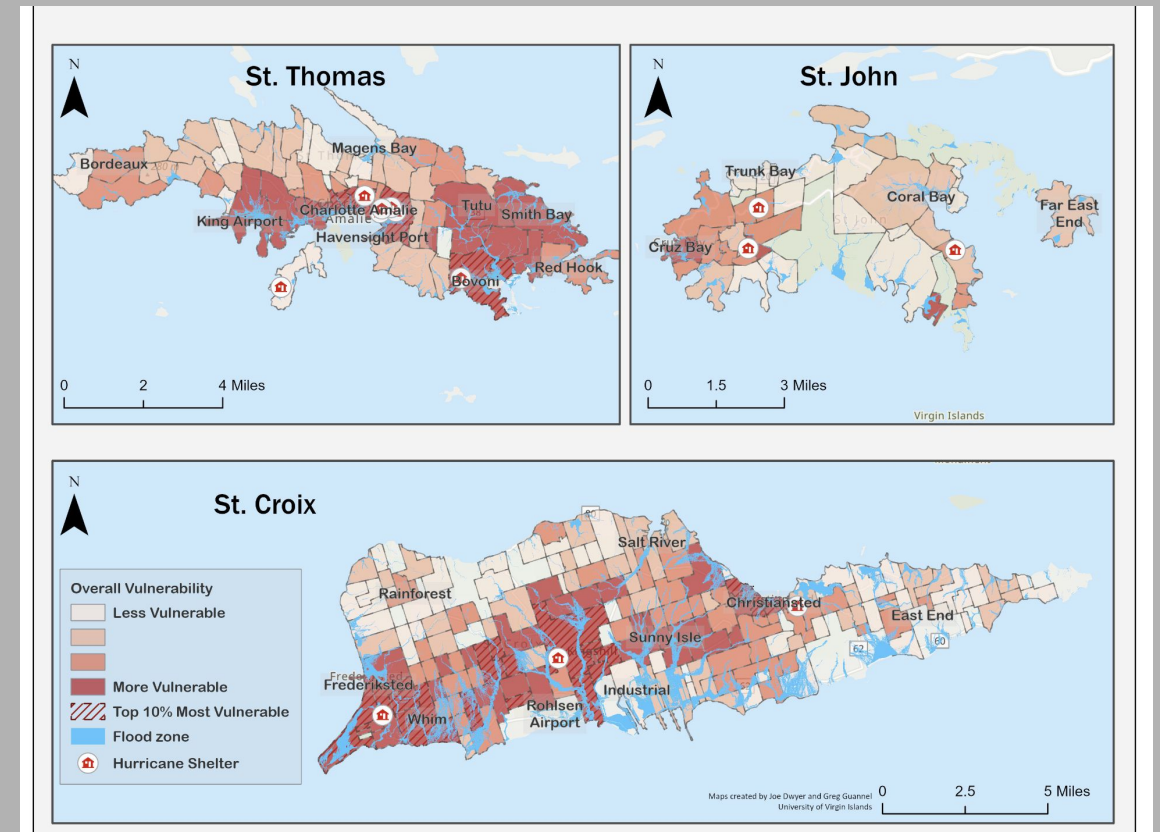
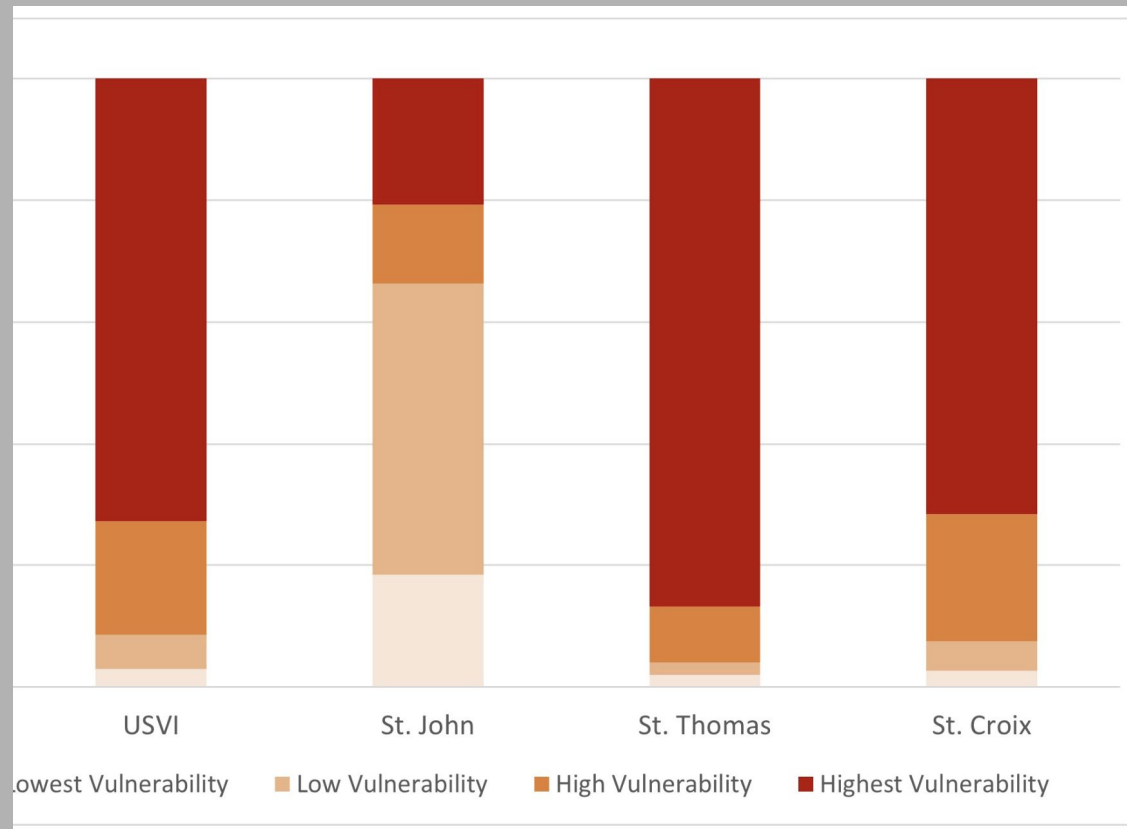


Data source: EM-DAT, CRED / UCLouvain (2023)

Note: Data includes disasters recorded up to September 2023.

[OurWorldInData.org/natural-disasters](https://OurWorldInData.org/natural-disasters) | CC BY

# Mapping Vulnerabilities and Hazards



Guannel, G., Lohmann, H., & Dwyer, J. (2022). The Public Health Implications of Social Vulnerability in the U.S. Virgin Islands (Natural Hazards Center Public Health Disaster Research Report Series, Report 23). Natural Hazards Center, University of Colorado Boulder.



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# Predictable Impact of Natural Disasters

	Earthquakes	Hurricanes	Tsunamis	Floods	Landslides	Volcanoes
Deaths	+++	+	+++	+	+++	+++
Complex injuries	+++	++	+	+	+	+
Infectious diseases	..... <i>Always a risk</i> .....					
Damage to health facilities	+++	+++	+++ (local)	+++ (equipment)	+++ (local)	+++
Damage to water systems	+++	+	+++	+	+++ (local)	+++
Food shortage	+	+	+++	+++	+	+
Mass displacement	..... <i>Always a risk</i> .....					



# Island Nations And Rural Areas Are Different



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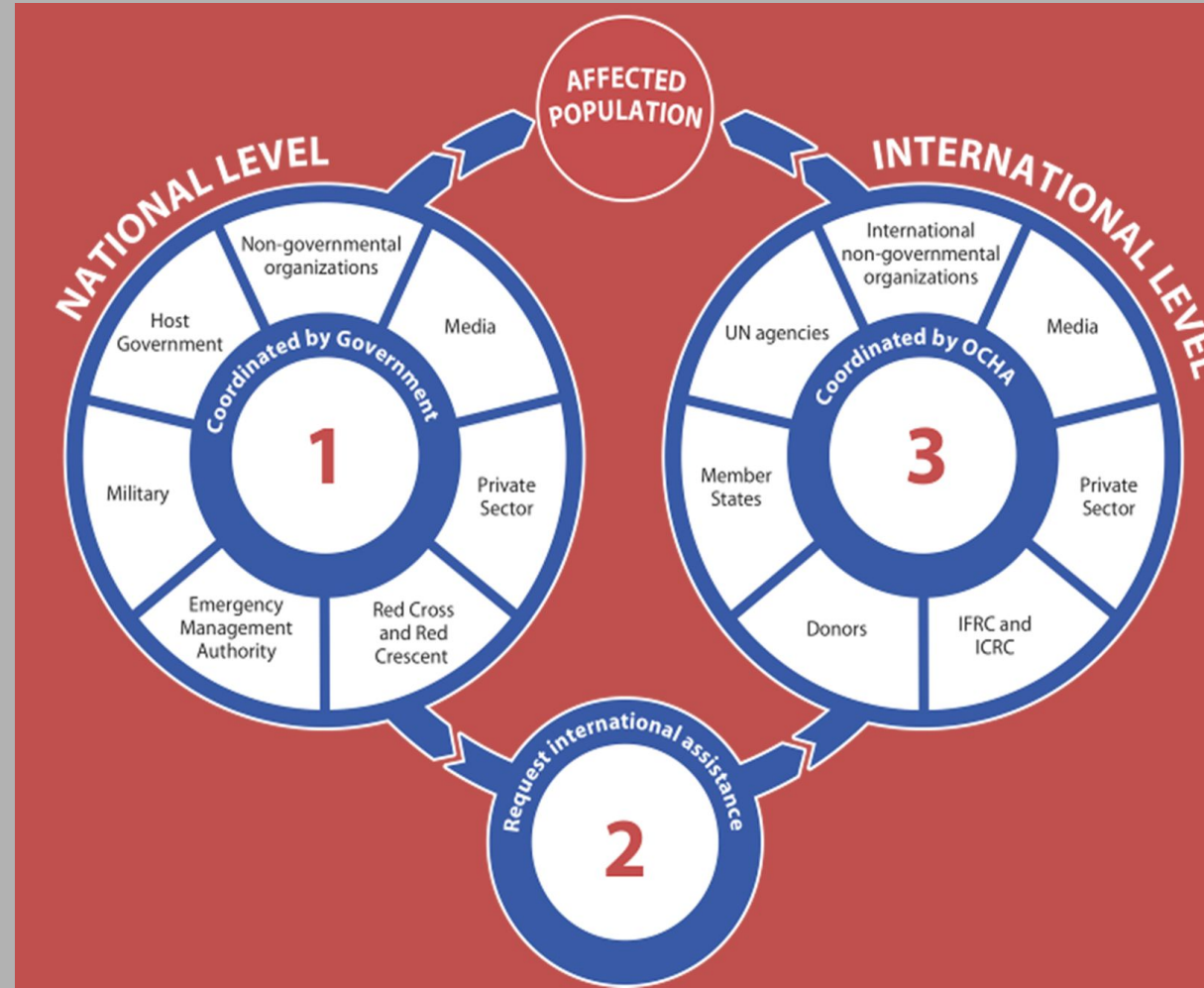


# Disaster Medicine: Mitigation and Preparedness, and Response in Latin America and the Caribbean

- Planning
- Evacuation
- Acute casualty care
- Vulnerable Populations
- Shelter care
- Pharmaceuticals
- Chronic Care
- Restoration of healthcare infrastructure



# A Coordinated Response





There will always  
be a need for  
response but also  
for building local  
infrastructure





# Island Nations May Have A Prolonged Disaster-Mortality Period

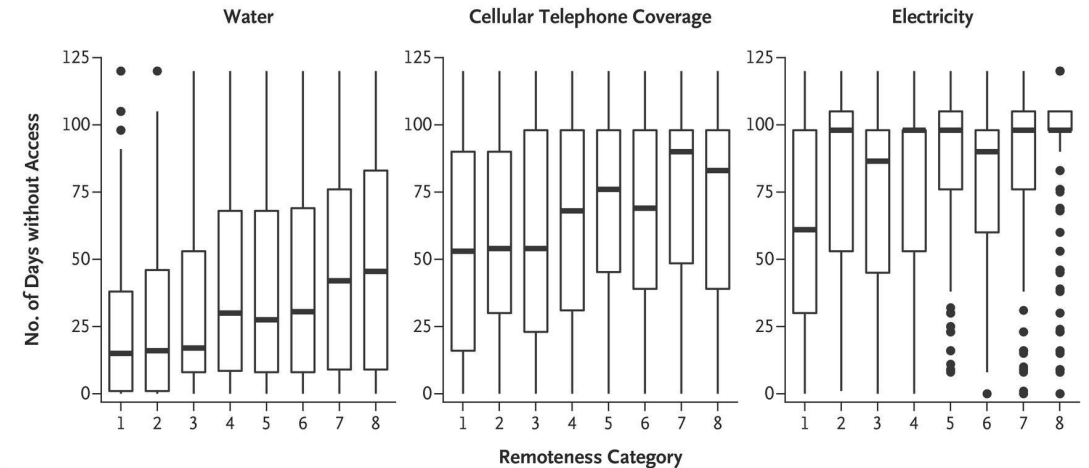
THE NEW ENGLAND JOURNAL of MEDICINE

## SPECIAL ARTICLE

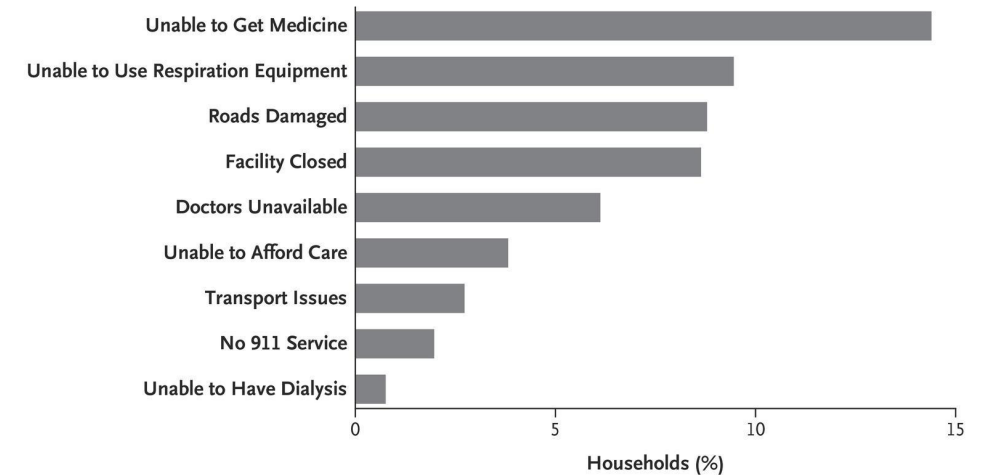
### Mortality in Puerto Rico after Hurricane Maria

Nishant Kishore, M.P.H., Domingo Marqués, Psy.D., Ayesha Mahmud, Ph.D.,  
Mathew V. Kiang, M.P.H., Irmay Rodriguez, B.A., Arlan Fuller, J.D., M.A.,  
Peggy Ebner, B.A., Cecilia Sorensen, M.D., Fabio Racy, M.D., Jay Lemery, M.D.,  
Leslie Maas, M.H.S., Jennifer Leaning, M.D., S.M.H., Rafael A. Irizarry, Ph.D.,  
Satchit Balsari, M.D., M.P.H., and Caroline O. Buckee, D.Phil.

#### A Loss of Basic Utilities



#### B Disruption of Medical Services



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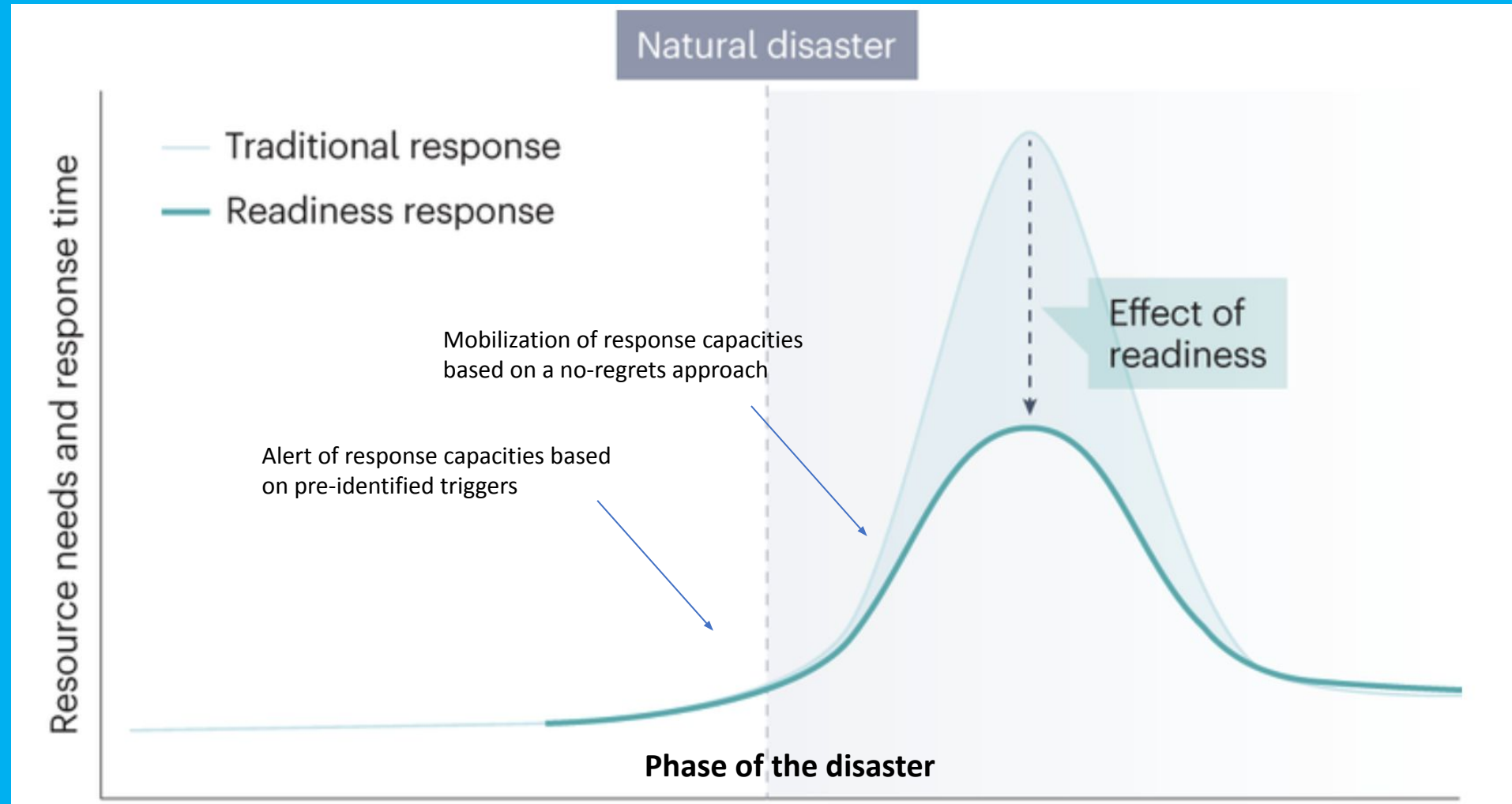


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# Readiness is the key



Readiness

Mitigation

Preparedness

Response

Recovery



Are you ready? What must be done to enhance Readiness?  
Improving the continuum of care



# Emergency Management





# The Solution: Enhanced Readiness Through Local Capacity-Building





# Post Covid: Re-Thinking Shelter Design



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Civilian-Military Coordination



# Post-Acute Phase Disaster Medicine: Reaching Beyond Emergency Medicine

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A photograph of a sunset over the ocean. The sun is a bright yellow orb partially obscured by dark, silhouetted clouds. The sky is a mix of orange, yellow, and blue. The ocean below is dark blue with white foam from breaking waves. The text 'THANK YOU!' is written in a large, white, sans-serif font across the middle of the image.

THANK YOU!