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MITIGATION FOR UNIVERSITY HEALTH SYSTEMS AND TRANSFER TRAUMA: HURRICANE SANDY AS CASE STUDY

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Issues Relating to Transfer Trauma

- Since Hurricane Katrina, disaster preparedness and disaster response have received increased attention since Hurricane Katrina
 - Academic Medical Centers have been both victims and important resources for disaster response and mitigation.
- 


SUPER STORM SANDY



HURRICANE SANDY


Hurricane Sandy was the largest Atlantic hurricane on record, as well as the second costliest Atlantic hurricane, only surpassed by Hurricane Katrina in 2005. Hurricane Sandy devastated portions of the Caribbean, Mid-Atlantic and North-Eastern United States in late October 2012. Sandy is estimated in early calculations to have caused damage of at least \$20 billion (2012 USD).






Hospital Evacuations

New York University Health System

- NYU didn't anticipate such heavy flooding from Sandy and chose not to evacuate all its patients before the storm, as they did with Hurricane Irene a year ago.
 - **But between 7 and 7:45 p.m. Monday, the hospital's basement, lower floors, and elevator shafts filled with 10 to 12 feet of water, and the hospital lost its power**
- 




“The flooding was just unprecedented.”

- Emergency generators did kick in, but two hours later, about 90% of that power went out, and the hospital decided to evacuate. [...] Four of the newborns were on respirators that were breathing for them, and **when the power went out, each baby was carried down nine flights of stairs while a nurse manually squeezed a bag to deliver air to the baby’s lungs.**
- 




The Evacuation Process

- About 1,000 staff members — including doctors, nurses, residents, and medical students — worked to evacuate the remaining patients by flashlight, along with the help of firefighters and police officers
- 




NYU Medical Center Under Water

- NYU's facility is designed to withstand floods, and only one building flooded during Hurricane Irene.
 - Sandy left seven hospital buildings flooded with between seven and ten feet of water.
- 



Disaster Medicine?


- Includes:
 - Planning
 - Surveillance
 - Response
- 



Hospital Preparation

Hospitals with a regular risk of “predicted” disasters prepare differently than hospitals facing “unpredicted” disasters.

With respect to “predicted” disasters, plans should address not just staff coverage, but also coverage for patients who can or can't be evacuated easily

- 
- Transfer trauma associated with transfer vs. possible diminished capacity to treat after the storm hits;
 - Need to assess the likelihood of catastrophic failures in ability to care for patients.
 - Need to assess the expected medical costs associated with transfer/transportation out of risk zone against possible risk of keeping patient in risk zone in the event of catastrophic failures.
 - Financial costs of transfer should not be controlling factor; and
 - Consideration of location of facility, back-up systems, risk of breaches to integrity of structure, etc.
 -



Review Weakest Links for Failure

Concerns of potential flooding may have led to relocation of back-up power generators above area of potential flooding;

if portion of wiring remains below area of potential flooding, that is the weakest link that will fail;
and

Consider difficulties of evacuating critically ill patients down several flights of stairs if a catastrophic power failure and back up generator failure:

No elevator service;

Loss of Ventilator capabilities;


Need to manually ventilate patients while team carries patients down stairs;
and

Considerations of logistical difficulties may impact decision on where to house most critical patients





Evacuation Issues

- What should be order of evacuation?
 -
 - i) Most critically ill first?
 -
 - (1) Issue of whether some of most critically ill would be able to survive evacuations.
 -
 - ii) Infants and new mothers first?
 -
 - iii) Strategy for evacuating patients with poor survival prognosis?
 -
- 




Issues with Evacuating High Technology

Dialysis patients

Ventilator patients;


(1) Manual ventilation

(2) Evacuation of patients with personnel to provide manual ventilation

- 
- (a) Potential loss of staff coverage when needed staff evacuate with patients.
 - (3) Carrying patients down stairs and onto evacuation vehicle all while
 - manually ventilating patient.



Recommendations

- Use community capacity-building strategies
 - Involve diverse stakeholders
 - Address different levels of preparedness
 - Initiate locally
 - Coordinate collaboration
- 



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