



Hurricane María: Healthcare Resiliency Amidst a Major Natural Disaster

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VA
HEALTH
CARE

Defining
EXCELLENCE
in the 21st Century



- ▶ Tertiary Medical Center at San Juan
- ▶ Three Outpatient Clinics: Ponce (South), Mayaguez (West), Arecibo (North)
- ▶ Seven Rural and Community-based Outpatient Clinics
- ▶ We serve a population of approximately 65,000 veterans in PR and US Virgin Islands

VA Caribbean Healthcare System



▶ Not shown in map: ● St. Thomas and ● St. Croix Community-based Outpatient Clinics

On Wednesday, September 20 2017...

Hurricane Maria crashed across the entire U.S. territory of Puerto Rico, making landfall with sustained winds of 150 mph and gusts upwards of 185 mph. Widespread destruction from the worst storm to hit in nearly a century had left the entire island without power, and many without running water or communications. This phenomenon also brought heavy rains and flooding, and has been blamed for at least 64 deaths in Puerto Rico alone.

Hurricane María's Immediate Aftermath



100 % of the Island's electrical grid was inoperable.

Severe damage to electrical infrastructure throughout the Island

Further complications emerged from total loss of communications.

Hurricane María's Immediate Aftermath



Source: CNN.com (San Juan PR, Sep 20)

Strong winds had destroyed many homes, leaving people with nothing.



Source: The Guardian.com (Corozal, Sep 24)

Hurricane María's Immediate Aftermath



Source: TIME.com (Barranquitas – central mountain area- Oct 2017).



Source: TIME.com (Yabucoa - south east PR- Sept 29)

Hurricane María's Immediate Aftermath



Source: *The Guardian.com* (east coast PR)

Severe road damage and erosion caused by unforgiving surge and heavy rain / flooding (below).



Source: *The Guardian.com* (Toa Alta PR Sep 24)

Hurricane María's Immediate Aftermath



Source: TIME.com (Morovis – central mountain area- Oct 1)

Gas shortage translated into 6-hr+ waiting lines. Below: food was scarce as many supermarkets were destroyed or without power.



Source: The Atlantic.com (Supermarket in Guayama Sep 20)

Before the Hurricane Impact: How did we prepare?

- ▶ The VACHS maintains a Comprehensive Emergency Management Plan and an Emergency Management Committee that meets monthly.
- ▶ Hospital Incident Command System (HICS)
- ▶ The Committee's chairperson is the VACHS' Associate Director and the focus is **PREPAREDNESS**. Multiple exercises are conducted throughout the year to ensure adequate emergency response.
- ▶ The Facility maintains two million-gallon storage tanks and a 200K-gallon cistern.
- ▶ The hospital has 14 emergency power generators that provide electricity to the entire San Juan campus.
- ▶ On-site diesel and gasoline storage facility

Before the Hurricane Impact: How did we prepare?

- ▶ The Facility activated its Hospital Incident Command System (HICS) Operations with considerable time before the Hurricane hit.
- ▶ Established purchase agreements with water and fuel suppliers to maintain essential utility supply.



Source: VACHS, Hospital Incident Command System Activation



Source: VACHS, Federal Health Coordinating Official, US Dept. of Health and Human Services, VACHS Emergency Liaison and Center Director

How the VA hospital responded?

- ▶ Medical Center Inpatient healthcare services were overall uninterrupted during the emergency.
- ▶ Disaster Emergency Medical Personnel System (DEMPS) Volunteers mobilized from all over the Nation soon after the Hurricane impact– 691 Volunteers.
- ▶ San Juan and Outpatient Clinics recovery process was initiated. Temporary Clinics were established in Ponce, Arecibo and Vieques.



Source: VACHS, Emergency management personnel caring for our veterans at the outpatient clinics



Source: VACHS. Ponce Temporary OPC (Left). Arecibo Temporary OPC installation (Right)

How the VA hospital responded?

- ▶ Ensured adequate water and diesel fuel levels by continuously replenishing our reserves.
- ▶ Provided gasoline, free of charge, to employees until fuel crisis calmed down.
- ▶ Provided daily hot dinner to all employees and family members, free of charge, until food availability stabilized. Additionally, breakfast and lunch prices were significantly reduced.



Source: VACHS, Veterans Canteen Service employees worked long shifts to ensure hot meals for fellow VA employees and visitors

How the VA hospital responded?

- ▶ Community outreach



Cooperation agreements were held among agencies (HHS and VA) to install a Federal Medical Center in Manatí (Northern PR). Source: VACHS September 2017

How the VA hospital responded?

VA Hospital employees held a community outreach campaign for veterans living in the most affected areas of the island, delivering much needed supplies.



Facility Damages and Losses: VACHS

- ▶ Two outpatient clinics were completely lost: Arecibo OPC and Vieques CBOC.
- ▶ Multiple damages to the Main Hospital at San Juan:
 - ▶ Roofing damage
 - ▶ Flooding
 - ▶ Solar panel loss
 - ▶ Wind turbine loss
 - ▶ Power generator catalyst system damage

Facility Damages and Losses: VACHS



Left: Pollution control catalyst damage. Right: Flooding at Premises VA San Juan (Source: VACHS. September 2017)

Facility Damages and Losses: VACHS



Left: Two energy-producing wind turbines were lost. Right: Multiple solar panels were damaged and/or lost VA San Juan (Source: VACHS. September 2017)

Facility Damages and Losses: VACHS



Left: Solar panel struck by dangerous flying debris . Right: Multiple solar panels were damaged and/or lost VA San Juan (Source: VACHS. September 2017)

Facility Damages and Losses: VACHS



Left: Roof damage caused by heavy rain. Below: Multiple clinical areas affected by roof damage (Source: VACHS. September 2017)



Arecibo Outpatient Clinic



Arecibo Outpatient Clinic



(Source: VACHS. September 2017)

St. Thomas Community-based Outpatient Clinic



Looking forward to recovery...

Repairs

- ▶ VA Central Office Damage Assessment Team (DAT) promptly determined major and minor damages to main medical facility and clinics.
- ▶ An action plan was developed to repair or replace damaged equipment and materials: 109 repairs/replacements were identified
- ▶ Estimated repair costs of: \$46.3 million

Re-building for Resilience: Hurricane Hardening projects

- ▶ 19 Hardening Opportunities Identified: Approximate investment of \$66.8 million in a 5-year timeframe
 - ▶ Build building enclosures to ensure safe access for employees to critical utility and support areas
 - ▶ Expansion of communication room, enhance electrical backup system
 - ▶ Improve radio communications, provide PA to all buildings
 - ▶ Upgrade Synchronization Standby Power System and Provide SCADA Systems for CTs, MRSs, Linear accelerator's chillers.
 - ▶ Provide alternate water supply and treatment systems
 - ▶ Infrared cameras – Improve security
 - ▶ Hurricane resistant doors and shutters
- ▶ Upgrade Communications within and satellite facilities
- ▶ Upgrade Utilities Supply storages
- ▶ Support Recruitment

Our two cents

- ▶ Preparedness, Preparedness, and Preparedness
- ▶ Strengthen Communication
- ▶ Unexpected events that complicate recovery
- ▶ Sometimes things simply don't work, have a plan B
 - ▶ Redundancy of equipment
- ▶ Prepare for fuel shortage
- ▶ Prepare for extended periods without power
- ▶ Think of your people, their families, and the psychological and burn-out factors.
- ▶ Prepare for community outreach
- ▶ Re-think engineering codes to withstand >145 mph winds
- ▶ Patience: things WILL get better



Thank you!