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<https://files.asprtracie.hhs.gov/documents/aspr-tracie-healthcare-system-preparedness-considerations-speaker-series-summary.pdf>

Access speaker bios here:

<https://files.asprtracie.hhs.gov/documents/healthcare-preparedness-speaker-series-winter-storm-uri-response-speaker-bios.pdf>

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T R A C I E

HEALTHCARE EMERGENCY PREPAREDNESS  
INFORMATION GATEWAY

## Healthcare System Preparedness Considerations Speaker Series

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**ASPR**  
ADMINISTRATION FOR STRATEGIC  
PREPAREDNESS AND RESPONSE



# Sudden Water Loss & Actionable Considerations

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Toni Carnie      Safety Officer & Emergency Management Coordinator | HCA Houston Healthcare Tomball

# Operational Scope



# Protecting the Enterprise

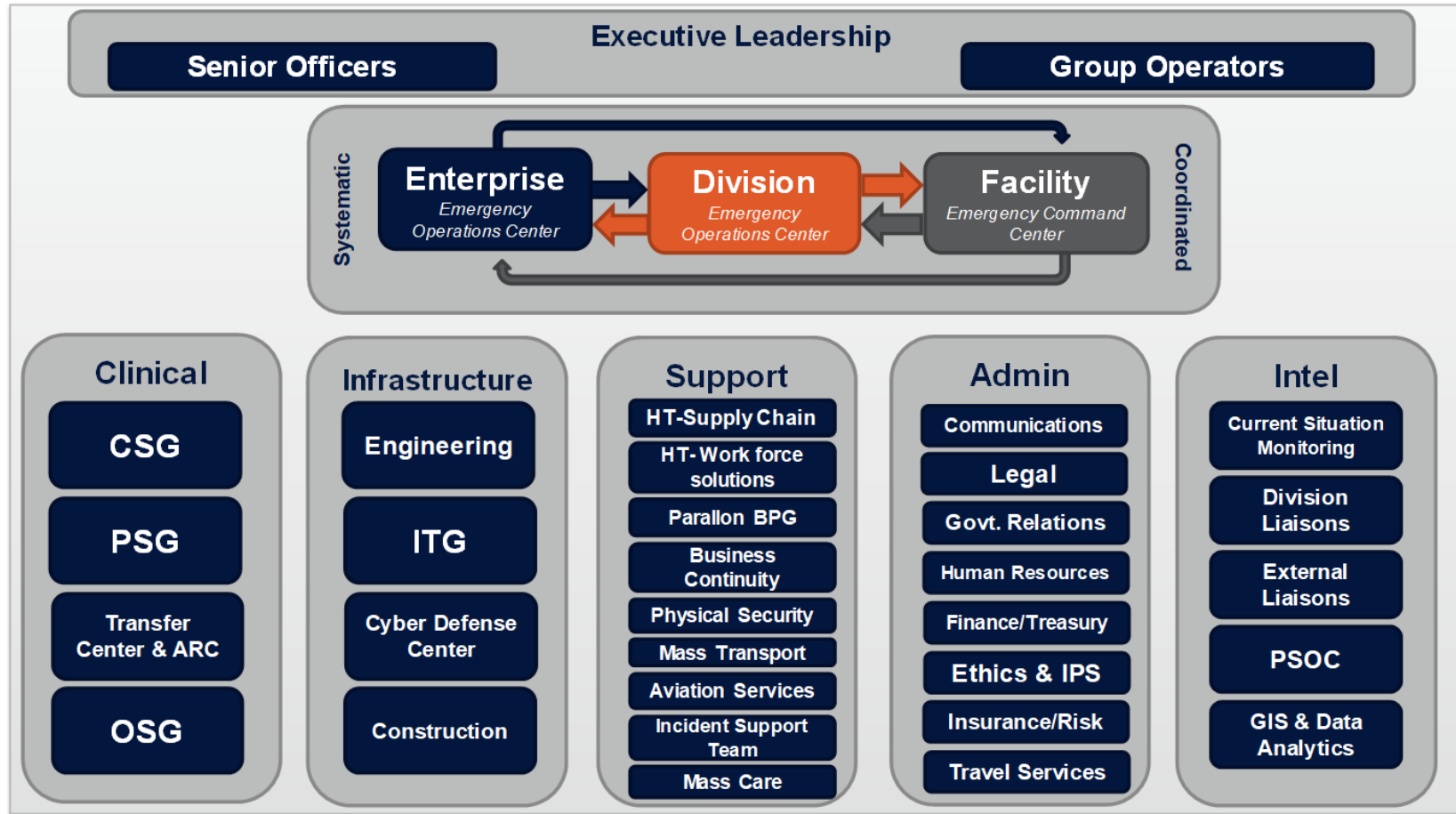
*“Our Enterprise Emergency Operations is part of HCA’s core business fabric.”*  
Sam Hazen, HCA Board of Trustee’s Meeting 2021

## Core Priorities:

- **Life Safety**
  - Ensuring the physical and mental wellbeing of our patients, staff, visitors, & communities.
- **Infrastructure**
  - Providing resources to enable our staff to care for patients and continue operations.
- **Operations**
  - Delivering essential care and operations to the communities we serve.
- **Mission**
  - Delivering care and improvement to human lives.



# Enterprise Incident Management Structure



# Water Loss Considerations

# Operating Assumptions

- Impacts from severe weather frequently cause community infrastructure impacts, including to municipal water systems.
- No-notice water outages are a high probability incident in many areas.
- Healthcare facility operations require significant supplies of water to maintain continuous clinical operations.
  - Drinking water, hemodialysis, sterilization of supplies, lab equipment, HVAC, etc.
- All U.S. healthcare facilities are required to have a plan for water sustainability. Without municipal water pressure, few can operate 96 hours without resupply by a vendor.



# Operational Realities

- During true community-wide disasters, water supplies may have to be brought from outside of region or state. Vendors should have exercised plans.
- Cannot rely on traditional partnerships with public safety for emergency water resupply – they may not have any themselves.
- Community water stations may not be hardened against damage – may cause prolonged outages.
- Support services such as hospital linen may be outsourced. Does the vendor have tested capability to continue operations?





# Key Thoughts to Take Away

- Evaluate the ability to install deep water wells.
- Plans must include support to staff and their families over a prolonged period of community-wide outage.
- Hospitals should always be on a prioritized restoration list for water services, but consider other critical locations (e.g., FSERs, dialysis centers).
- Ensure vendors have true business continuity capabilities.
- Work with healthcare coalitions to harden community hemodialysis capability against prolonged water loss event.



# A Tale of No Pressure

HCA HH Tomball's *Winter Storm Uri* Mitigation, Preparedness, Response, & Recovery

# HCA Houston Healthcare Tomball

- 350 Licensed Beds – 150-acre campus
- Designated level III trauma center
- TJC certified primary stroke center
- Level II NICU
- Ambulatory surgery center
- Women's center
- MRI
- 2 free-standing ED's: CyFair & Magnolia



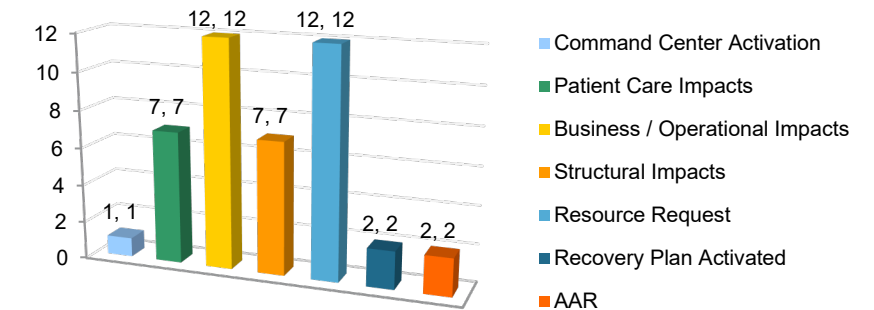
# 2021 Hazard Vulnerability Analysis

Top 10:

1. HVAC failure
2. Epidemic
3. Other utility failure
4. Pandemic
5. Trauma
6. Water contamination
7. Fire
8. Generator failure
9. Infectious disease outbreak
10. Workplace violence/threat

2021

TOP 10 ACTUAL ALERTS	OCCURRENCE	HVA RANK
Other Utility Failure	3	3
Inclement Weather	1	15
Water Disruption	1	30
Shelter in Place	1	46
HVAC Failure	1	1
Communication / Telephony Failure	1	25
Patient Surge	1	14
IT System Outage	1	13
Water Contamination	1	6
Sewer Failure	1	19



# Mitigation & Preparedness



# What's Going On?

## Gearing up:



EMC winter weather awareness communication began 02/09/2021.

Employees were encouraged to prepare their families & homes.

Facility began preparations to ensure continuity of operations:

- Facility access control
- Patient flow/surge capacity
- Personnel
- Supply resources

## We did know:

A sprawling winter storm system fueled by an arctic cold front would sweep across the state on Valentine's weekend 2021, bringing snow, sleet, freezing rain and record-breaking cold temperatures lingering over SE Texas for several days.

Infrastructure impacts similar to a Category 5 hurricane were expected:

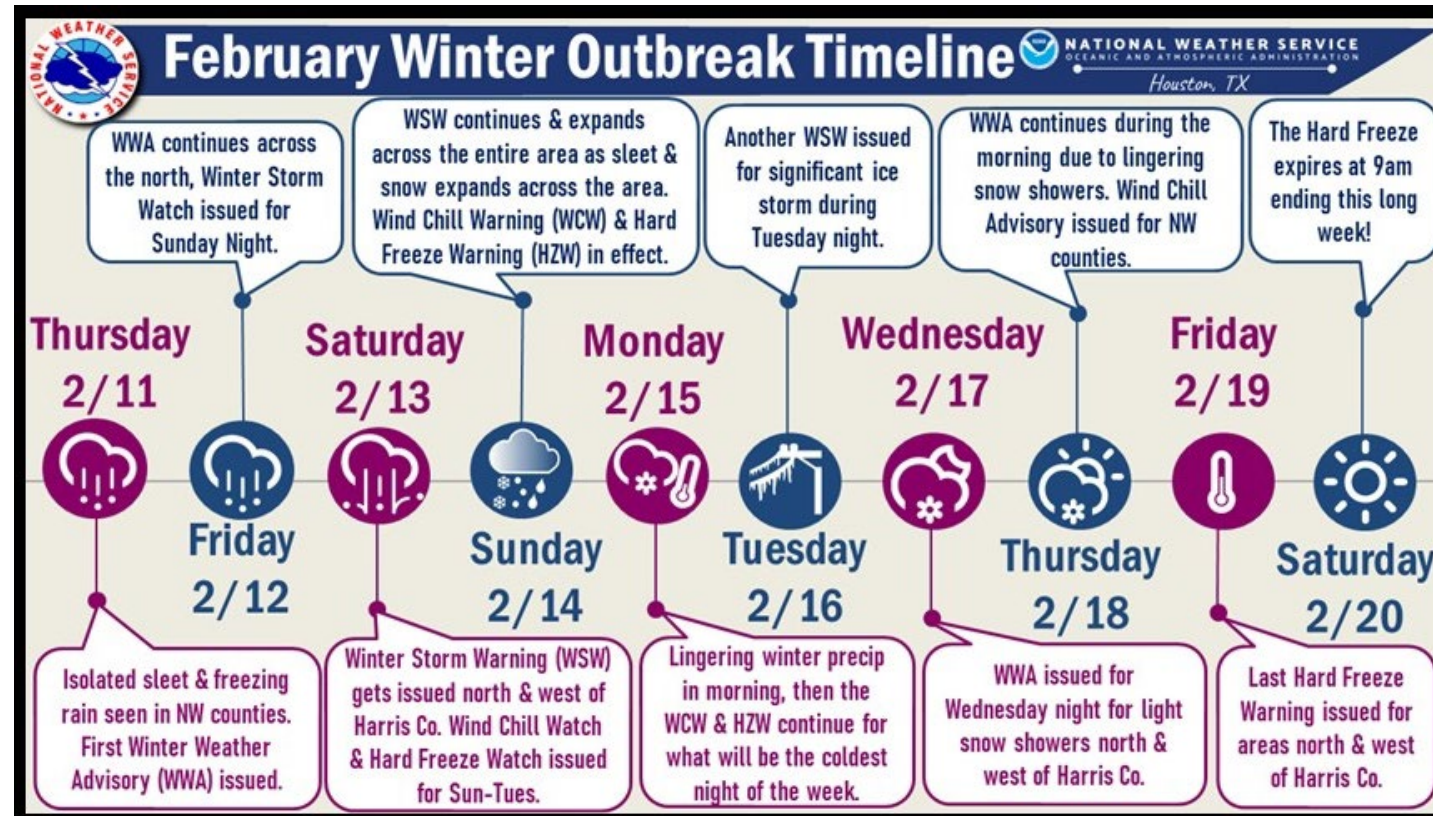
- Power failure
- Road closures
- Disrupted water supply

## We didn't know:

*This would be one of the most impactful winter events in recent history that brought multiday road closures, power outages, loss of heat, broken pipes, and other societal impacts for the region.*

*...potentially the most costly weather disaster for the state of Texas in history, surpassing even [Hurricane Harvey](#) from 2017.*

# The Alerts Begin





# Back To Basics



## Make a Plan

Protect the 4 – P's

1. People
2. Pets
3. Pipes
4. Plants



## Build a Kit

- Food / water
- Personal hygiene
- Medications
- Communication devices
- Charger cables / batteries



## Stay Informed

- Weather forecasts
- Road conditions
- Power outages



# 120-72 Hour winter weather playbook

## 120- 72 Hours

- Establish incident battle rhythm
- CodeReady incident created
- Safety/Liaison Officer to monitor weather & provided daily updates
- Verify response equipment and resources:
  - Patient/staff food
  - Potable water
  - Generator status/fuel
  - Etc.
- Infrastructure checklist
- Establish shelter-in-place lodging

## 48 Hours

- Communicate command structure to all staff with point of contact for resource requests
- Communicate weather briefing and IAP with all staff
- Verify off-site sheltering options
- Update EM Hotline for EOP Leveling

## 24 hours



- Finalize winter weather response planning and objectives
- Verify all facility vehicles are fueled
- Identify employee assistance liaison
- Cancel all non-emergent procedures
- Discharge patients without parameters
- Non-essential staff to stay home
- Community “at-risk” population surge data gathered

# Response



# Sunday: 2/14/2021

HCA HH Tomball's EOP level increased on Sunday, February 14, 2021 to Level I – Maximum Readiness

\*Facility Locked Down @ 19:00

.HAPPY.  
Valentine's  
Day

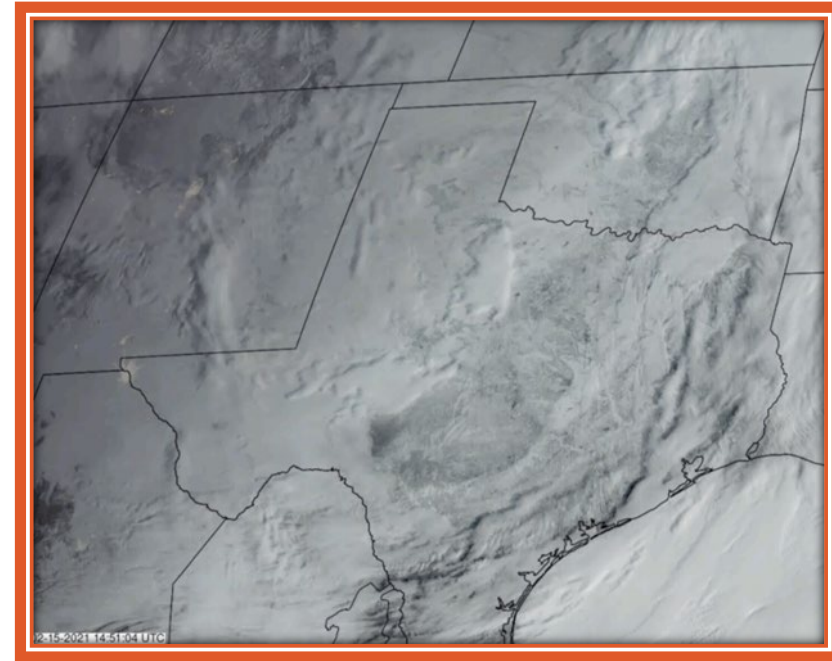


# Monday: 2/15/2021

Time	Event
05:30	<ul style="list-style-type: none"><li>• Hotel back-up generator failed; relocate 40 personnel into main campus housing</li><li>• Additional patient rooms needed; relocate 20 personnel</li></ul>
07:22	Magnolia FSED lost power
12:17	Magnolia FSED lost water pressure
12:44	<b>Mag. FSED ON Internal Disaster</b>
14:35	<b>Mag. FSED CLOSED</b>
15:00	How water fan coil unit failed & flooded corridor/storage room in physical therapy
17:27	HCA HH Tomball experienced notable drop in water pressure; pumps failed. Back up water supply from well also failed. Repair time estimated <b>45-60</b> minutes.
17:56	<b>City of Tomball lost water pressure</b>
18:27	<b>HCA HH Tomball ON Internal Disaster</b>
20:22	<b>CyFair FSED ON Internal Disaster – FAN's holds, saturation</b>



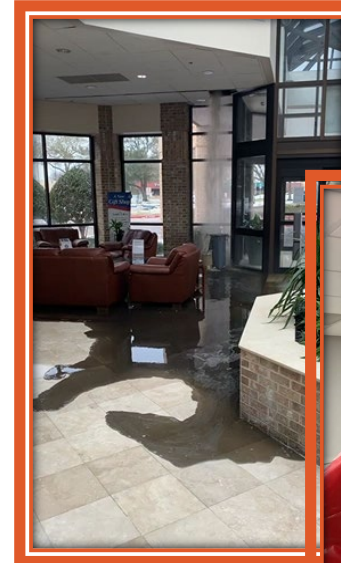
# Monday: 2/15/2021





# Tuesday: 2/16/2021

Time	Event
06:22	Request sent to GCD for emergency water tanker
09:00	Domestic cold water line failed at Entrance B
09:24	Tanker trucks dispatched to main campus
10:06	Magnolia FSED <b>power restored</b> ; no water
10:15	<b>Non-potable</b> – bucket brigade process began – instructions provided to all staff
12:57	AHU 51 chilled water coil failed & flooded the Lab, Wound Care, & corridor
13:03	Fire suppression pipe failed at Entrance B & flooded corridor/admin
13:39	Fire sprinkler failed & flooded PACU
14:00	First H2O tanker arrived; AHU 16 coil failed; Rehab lost air conditioning
14:03	AHU RTU coil failed & flooded Cath Lab & Offices
15:15	Fire suppression system failed at Loading Dock 2
23:24	<b>CyFair FSED OFF Internal Disaster</b>



# Wednesday: 2/17/2021

Time	Event
07:00	Lock-down lifted for all campus facilities
08:00	AHU 31 chilled water piping failed – no air in Pre-Op
19:55	Domestic water piping failed in Hazardous Waste (CAA)
23:15	Fire sprinkler piping failed at Main ED EMS canopy



Entrance E Canopy-fire system.MOV

# Recovery





# Thursday: 2/18/2021

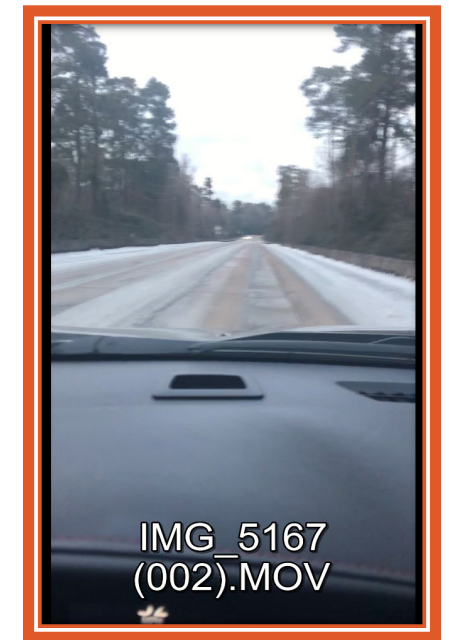
Time	Event
07:25	AHU- 11 chilled water coil failed leaking down 10 <sup>th</sup> floor – No AC for East side of South Tower. L&D OR's, SCU, 4A, 3A, PCU
11:35	Cooling tower 1 supply line burst; was repaired
12:46	Cooling tower 2 supply line found frozen & broken. Ball valve on condenser pump 2 cracked/leaking
12:56	No toileting in patient rooms, public restroom use permitted unless marked "Closed" – notification distributed to all staff
13:15	Kitchen make-up air unit coils found burst

The **HCA Healthcare Hope Fund** was available for employees to help with financial assistance for losses and needs related to:

Temporary Housing - Up to five days of immediate temporary housing assistance if home is unsafe or power outage duration is significant.

Food – Up to five days of food per person when home is damaged or an employee is displaced from their home. May be extended depending on need.

Repairs/Deductibles – Disaster damage to home, contents and primary vehicle not covered by insurance.



# Friday: 2/19/2021

Time	Event
7:00	AHU 7 chilled water coil failed and flooded 1st FL corridor outside Sterile Processing causing loss of air conditioning in <b>Central Sterile</b> , Dr. Lounge and Medical Records
8:41	Tomball city water pressure is restored
10:00	Water tankers released
<b>16:05</b>	<b>HCA HH Tomball Off Internal Disaster</b>
16:31	Magnolia ER city water pressure restored
16:45	AHU 19 hot water coil failed and flooded corridor on 4th FI and lost air conditioning in Rehab
<b>19:03</b>	<b>Magnolia FSED OPEN</b>



# Above All Else...Care

## Employee Homes

Impacts:

- Not inhabitable
- No potable water
- No electricity

\*System-wide >300 colleagues reported significant damage to their home

Response - established pantry:

- Grab-and-go family size meals
- Fresh produce
- Bottled water
- Basic household staples

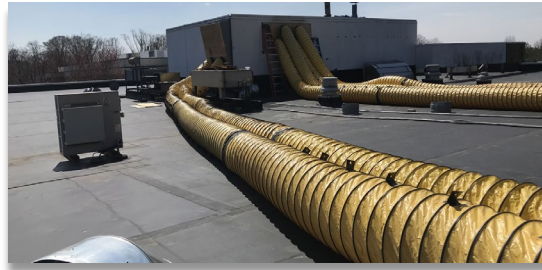


# Recovery Continues



## Boil Water Process

- Initiated on 02/16/2021
- Rescinded for Tomball 02/20/2021, Magnolia 02/26/21
- Flushing lines from top down completed 02/24/2021
- Replacing filters on ice machines completed 02/25/2021
- Replacing filters on coffee machines completed on 03/03/2021



## HVAC Systems

- Temporary units installed
- Temperature fluctuations continued
- Mitigated safety issues



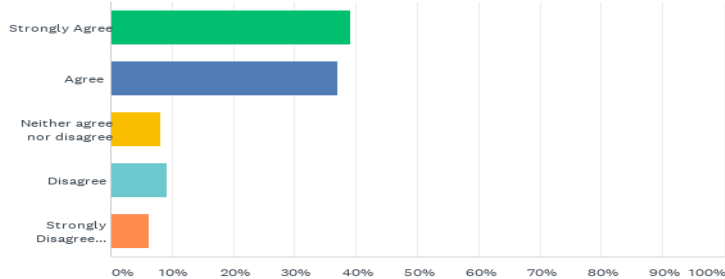
## Community FAN's

- They will come
- Work with local RAC's & community partners to establish location

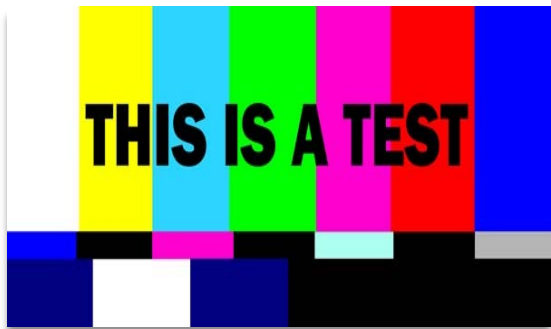
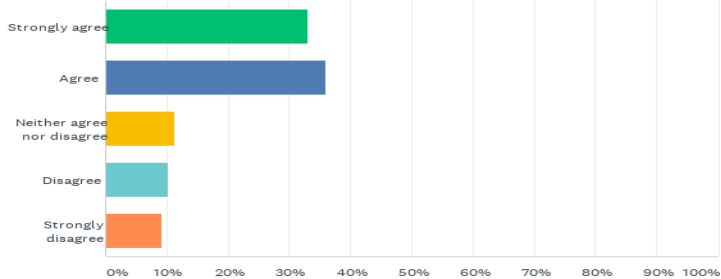
# AAR Participant Survey



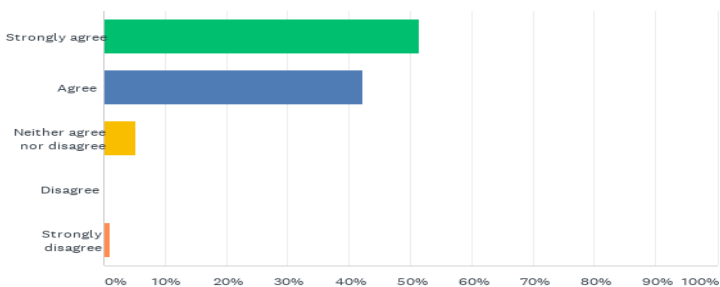
Objectives were clearly communicated



Overall satisfaction with facility response



Event tested our EOP & Response Capabilities

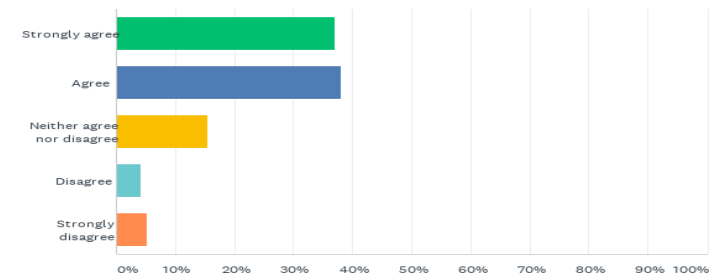




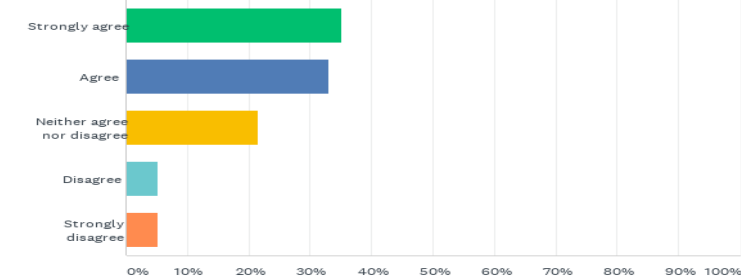
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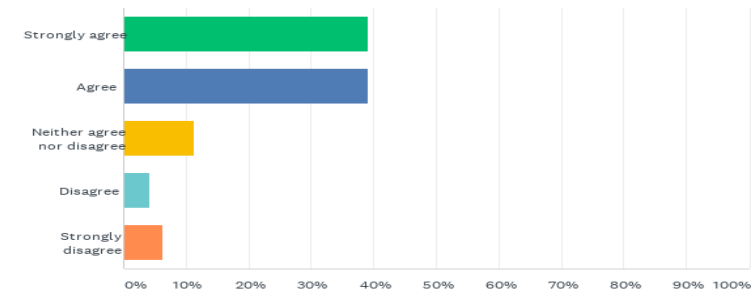
Helped to understand expectations notice events



Event helped strengthen facility response capabilities



Safety was a priority throughout response



# Strengths Identified

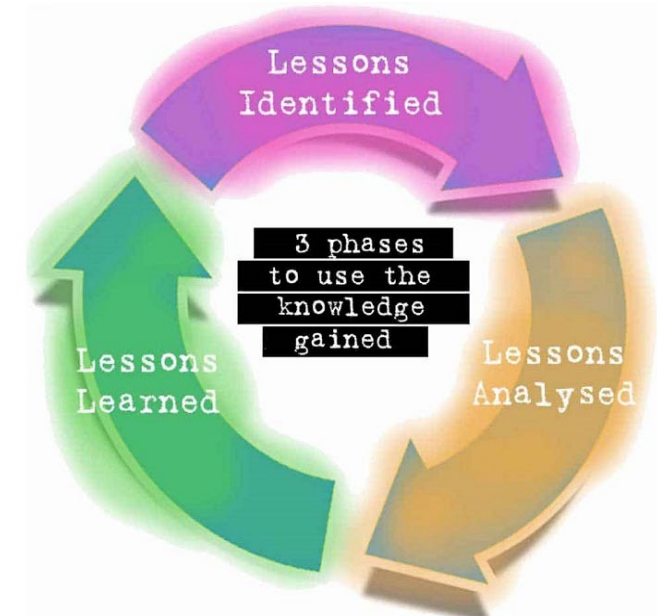
- **Communications** – HCC provided thorough communication with experienced and knowledgeable team member involvement. Established relationships with community leaders helped our facility obtain real time information for city capabilities for improved decision making.
- **Resources & Assets** – Ability to acquire additional equipment for patient care (vents, PPE). Cots were readily available.
- **Safety & Security – *Zero Patients & Employees Harmed.*** Screening stations were maintained due to COVID protocols. ILSM & safety policies hardwired expedited implementation.
- **Staff Roles & Responsibilities** – Plant operations team knowledge with tenured employees.
- **Utilities Management** – Adaptability to unforeseen events during multiple utility failures. Emergency process developed to use water from physical chiller plant of facility to maintain boiler heating and life safety continuity during prolonged period of water loss.
- **Clinical & Support Activities Management** – Lab department facilitation to develop testing capability alternatives due to water loss and damaged equipment.



“Above all else, we are committed to the care and improvement of human life.” –  
HCA Mission Statement

# Opportunities for Improvement

- **Communication** – HCC set up was delayed until 2/16/21 even though the EOP was activated @ 1900 on 02/14/2021.
- **Resources & Assets** –Alternative needed for bathing when water is not available; potable water storage capacity inadequate.
- **Safety & Security** – “Safety Officer / EMC should never be assigned to any additional duties during an activation.” – Rob Sabina, COO
- **Staff Responsibilities** – Ride-out / recovery team activation confusion with new employees.
- **Utilities Management** – old tower mechanical drawings were not readily available for Plant 1; city domestic water supply bob valve failed; do not put non-potable water into your facility.
- **Clinical & Support Activities**– Unnecessarily relocated IP Rehab unit, assumed that the AHU that served the location failed – a switch was flipped; process guidelines for dialysis patient care during a water crisis.







# Thank you

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# Contact ASPR TRACIE



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