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#aphl
Responding to Hurricane Harvey

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Disclosures

None
Objectives

1. Understand how to engage partners and utilize information sharing to manage responses

2. Describe steps to restore essential laboratory testing services when they are affected by natural disasters

3. Apply the lessons learned from Hurricane Harvey to respond to future incidents in your jurisdiction
Hurricane Harvey made landfall as a **Category 4** storm on the evening of **Friday, August 25, 2017** near Rockport, Texas. The slow moving, torrential storm inundated the Houston area with **41-60 inches** of rainfall over the five-day period from **August 26th -30th**. The resulting catastrophic flooding claimed lives, property, and displaced thousands from their homes.

- HHD PUBLIC HEALTH PREPAREDNESS
HOUSTON FACTS
Statistics Specific to Houston-Area Only

HARVEY CAUSED A 1,000 YEAR FLOOD

20 TRILLION GALLONS OF RAIN FELL

1/3 OF HOUSTON WAS UNDER WATER
About a third (approx. 188 sq. mi.) of Houston/Harris County was under water at the peak of the storm.
Houston Facts
Statistics Specific to Houston-Area Only

- **$125bn in Damages**: Some estimates are as high as $190 billion.
- **50+ Deaths Attributed to Harvey**
- **311,859 Homes & Structures Flooded in Harris Co.**

Loss of Life & Property
HOUSTON FACTS

Statistics Specific to Houston-Area Only

256,845 VOLUNTEER HOURS RECORDED

3,000+ RESCUES TOOK PLACE

37,000 PEOPLE EVACUATED TO SHELTERS

RESCUE EFForts
Response to Harvey

Refugees:

- Shelters for displaced: 37,000
- GRB Planned Capacity: 5,000
  Actual Refugees: >10,000
- NRG Stadium: Refugees: 5,000
- Toyota Center: 1,000
- Many churches
- Fled to other locations
HHD mobilized a significant number of resources to monitor Hurricane Harvey’s impact across the city and within shelters. The Laboratory, Environmental, and Epidemiology divisions contributed to efforts at investigating, tracking, and reporting emergent situations during and subsequent to the disaster.

**Laboratory**

- **Water Well Samples Tested from 8/29 to 9/15**: 1,382
- **Virology Tested 35 Specimens from Evacuees at GRB**

**As of 9/19**

- **Water Well Samples Tested**: 4,078
- **1,144 of these Tested Positive for E. Coli/Total Coliform Bacteria**
HUMAN SERVICES

At the peak of the storm and during the ensuing weeks, Houston’s population struggled with a variety of basic needs. Through HHD’s Women, Infants, and Children (WIC) program; Multi-Service Centers (MSC); and Health Centers, HHD was able to address many of the material needs that the population faced during the storm.

IMMUNIZATIONS

520 TDAP VACCINATIONS ADMINISTERED

TUBERCULOSIS CASES

ALL 89 CASES LOCATED WITHIN 1ST WEEK POST HARVEY
Laboratory Damage
Damage to Laboratory Infrastructure

- **NO FLOODING!**
- Five very minor roof leaks—aggregate of 5 gallons over 5 days
- 15 wet ceiling tiles
- No loss of Electric, Water or Sewerage Utilities
- No loss of communication capabilities:
  - Telephone
  - Cell Telephones
  - Internet

**BOTTOM LINE:** We were really, really lucky!
What Did We Do Right?
What Did We Do RIGHT?

• Major infrastructure improvements to Texas Medical Center district after Hurricane Allison-2001

• Dredging of Braes Bayou
• Improved flood gates and flood pumps
• Improved street drainage
What Did We Do RIGHT?

- Relocation of the Laboratory in 2012
- Design of the Laboratory Buildings
  - Location—good drainage into new Braes Bayou reservoir (150 yards away)
  - Hurricane code structure
  - Two emergency generators with automatic switching for lights, refrigeration, instruments & essential equipment
- Added emergency generators for HVAC
What Did We Do RIGHT?

Inter-agency Collaboration is essential!

Houston Police & Fire Departments                 Texas DSHS
Houston Public Works                              Texas DPS
Harris County Department of Health                Texas National Guard
   (Mosquito Control and Well Water Sample         SETRAC
    Transportation)
Ft. Bend County Department of Health             SETRAC
   (Well Water Sample Transportation)
RED CROSS
CDC
EPA
What Did We Do RIGHT?

Intra-departmental Collaboration is vital!

Houston Health Department

- Deputy Health Authority
- Community Health Services
- Public Health Preparedness
- Environmental Quality
- Epidemiology
- STD & HIV Clinics
- TB Prevention Program
What Did We Do RIGHT?

- **Collaboration activities** with regional PH emergency preparedness partners included:
  
  - Scheduled Preparedness exercises
  
  - Maintained ICS training thru Mission Saving Smiles and Project See to Succeed
What Did We Do RIGHT?

- Anticipated testing requirements
  - Historical testing requirements
  - Current surveillance issues, e.g., Influenza, ILI
  - Maximized needed reagents/supplies
What Did We Do RIGHT?

- Anticipated facility monitoring requirements
  - Maintenance Engineer & Security Guard
    - On-site 24/7 four consecutive days from landfall
  - Set up and tested emergency equipment
  - Topped off diesel tanks
What Did We Do RIGHT?

• Immediate Pre-Harvey Risk Assessments

• Area wide—frequent reports from the National Weather Service during the days preceding landfall

• City wide—review of communications

• Departmental—frequent communications with:
  • Public Health Preparedness
  • Epidemiology
  • Deputy Public Health Authority
  • Environmental Health
What Did We Do RIGHT?

• **Immediate Pre-Harvey Activities**
  • Instructed supervisors to bring all testing to a stopping point in the hours preceding landfall at COB Friday, August 25
  • Brought all instruments/equipment to standby
  • Secured specimens
  • Unplugged all equipment that did not need power
What Did We Do RIGHT?

• Immediate Pre-Harvey Activities, cont.
  • Computer Equipment: unplugged, disconnected, relocated to counter tops or high shelves, and covered
  • All instruments, equipment & biosafety cabinets: covered/wrapped in plastic sheeting or bags, taped down to counter tops
  • Moved all items from floor to counters or shelves
  • First floor—checked drawers for valuable items, relocated to higher shelves
What Did We Do RIGHT?

• Immediate Pre-Harvey Activities, cont.

At COB Friday, August 25
• Instructed all personnel:
  • laboratory closed until further notice
  • not to work weekend hours
  • to monitor communication system for instructions
What Did We Do RIGHT?

• Immediate Post-Harvey Activities

• Notified all personnel to return on a tiered schedule:
  • First day: Director & available managers
    • Assessed damage to facility
    • Communicated with PHP to assess testing needs and specimen availability
  • Second day: available supervisors & analysts
    • Testing resumed sixth day after landfall
What Did We Do RIGHT?

• Immediate Post-Harvey Activities
  • Offers of aid
    • Vendors—products and expedited shipping if needed
    • Public Health Laboratories
      • Texas
      • Nationwide
    • APHL
What Did We Learn?
What Did We LEARN?

• Achilles Heel—lack of access to the Laboratory by staff
• If the staff cannot get to the lab, neither can the samples!
• Reliance on State and Federal Agencies for sample transportation during and immediately after Harvey was not practical
• Our PHL partners and APHL were there for us
What Needs IMPROVEMENT?
What Needs IMPROVEMENT?

Current Well Water Sample Testing Program:

- Predominately from privately owned wells
- Some from smaller municipalities in region
- HHD Laboratory has well established program
  - Robust training for private well owners via brochure with links to YouTube video for well disinfection and sample collection
  - Public service announcements
What Needs IMPROVEMENT?

Well Water Sample Testing Program, cont.:

• Current sample transportation practice:
  • Local PH jurisdictions:
    • provide multiple sample drop-off points
    • consolidate samples and deliver to the HHD Laboratory
  • Service confined predominately to two adjacent counties
  • Need to expand to include 14 more counties in our region
What Needs IMPROVEMENT?
Well Water Sample Testing Program, cont.:

Issues for Improvement:

• **Jurisdiction:**
  • Texas Commission for Environmental Quality is responsible for drinking water testing—but
  • TCEQ regulates only municipal water supplies
  • No regulations for private water wells
  • Federal agencies do not have jurisdiction for private water wells in Texas
  • No financial aid from federal agencies or state agencies (TCEQ, DSHS)
What Needs IMPROVEMENT?
Well Water Sample Testing Program, cont.:

Issues for Improvement:

• Jurisdiction, cont.:

• Jurisdictional Agreements Needed
  • Need Mutual Aid Agreements among federal, state, county and municipal entities
  • Need more interagency involvement to provide more funding opportunities for vehicles, salaries and supplies.
What Needs IMPROVEMENT?

Well Water Sample Testing Program, cont.:

Issues for Improvement:

• Transportation of Samples:

• Federal Funding—applying for a one-time CDC grant: Crisis Cooperative Agreement

• Need two vehicles--for pickup of private well-water samples/payment across 16 counties by HHD staff

  • Problem: grant precludes purchase of vehicles
  • Proposed solution: lease vehicles
What Needs IMPROVEMENT?

Well Water Sample Testing Program, cont.:

Issues for Improvement:

• **Education:**

• Education needed for:
  • Public awareness campaigns in rural areas—owners of private water wells
  • PHD staff in rural areas
What Needs IMPROVEMENT?

Well Water Sample Testing Program, cont.:

Opportunity for Partnership:

• Texas A&M Agri-Life Extension Service: Water Well Screening & Education Program
  • Private Water Well Testing
  • Education
  • On-site training and “screening”

Dr. Drew Ghoulson
Summary
SUMMARY

• PREPARE for a specific type of event
• Fill in Gaps: Harden Community Infrastructure and Laboratory facility
• Establish COOP plans
• Participate fully in PHP exercises
• Be detail-oriented in Immediate Pre-Event preparations: protect facility, equipment and personnel
• Resume operations only when it is safe to do so
• Be flexible
• COMMUNICATE
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