Public Health Surveillance and Response Post Hurricane Harvey, Harris County, Texas

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Harris County & HCPH

Harris County, TX:
- Third most populous county with over **4.7 million people**
- Geographically spread over **1,778 square miles** (size of Rhode Island)
- Home to 4th largest city (**Houston**), world’s largest medical center, and one of world’s busiest ports.

Harris County Public Health (HCPH):
- Local health department for Harris County with over **700** public health professionals and over **$100 million** budget & **growing**
- Annually, see over **100,000** patients in 16 wellness clinics & WIC sites, inspect **7,500** food establishments, house **25,000** animals in our shelter.
- Serve unincorporated Harris County outside of City of Houston. Provide refugee health screening, mosquito control, Ryan White HIV/AIDS funding for entire community, including City of Houston.
Hurricane Harvey in Texas, August 25th, 2017

- A category 4 storm
- Record flooding of at least 18 inches in 70% of Harris County
- Tens of thousands of residents were displaced and 36 deaths occurred due to the devastation.
- At least 53 temporary shelters opened in various parts of Harris County.
- August 29, 2017, 10,000 bed mega-shelter was set up at NRG Center by Harris County and community partners.
- HCPH was responsible for ongoing public health surveillance.
Before Harvey

After Harvey
Note: The cone could be as large as the size of the state.
HCPH Surveillance and Response Post Harvey

- Multi-agency collaboration
- Multi-faceted holistic approach:
  - Functional Needs Medical Refuge (FNMR)
  - NRG mega-shelter surveillance
  - Community shelter surveillance
  - Hospital surveillance
  - Enhanced communicable disease surveillance
- Community outreach
  - Mobile unit services
  - WIC services
  - Mosquito and vector control activities
  - VPH services
  - CASPER (Community Assessment for Public Health Emergency Response)
Enhanced Community Disease Surveillance

- Conditions potentially related to hurricane and flood were monitored
- No major outbreaks observed post-Harvey

Data source: Harris County Public Health Surveillance and Epidemiology Unit disease surveillance data
Community Shelter Surveillance

- 53 community shelters identified in HCPH jurisdiction
- Utilized modified CDC shelter assessment form
- Monitored once a day in person or by phone
  - Shelter census
  - Illnesses/symptoms of concern
  - Hospitalizations/ER visits
  - Any supplies/medications needed
- Environment Public Health inspections
- Requests for supplies sent to OEM

Data source: Harris County Public Health Surveillance and Epidemiology Unit Harvey surveillance data
Community Shelter Surveillance

- Most community shelters closed by September 5th

![Graph showing community shelters assessed by HCPH Epidemiology](image-url)
Post-hurricane CASPERS

- Two post-hurricane CASPERS in September
- Goals
  - Gauge health status of residents
  - Assess hurricane-caused property damage
  - Determine immediate health care/functional needs
  - Provide information to guide post-disaster response
  - Provide necessary resources to communities

<table>
<thead>
<tr>
<th></th>
<th>Area 1</th>
<th></th>
<th>Area 2</th>
<th></th>
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<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>%</td>
<td>Frequency</td>
<td>%</td>
</tr>
<tr>
<td>Damage to house</td>
<td>2227</td>
<td>32.5</td>
<td>12497</td>
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<td>Home safe to live in</td>
<td>5635</td>
<td>82.2</td>
<td>13442</td>
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<td>Mold growth in house</td>
<td>962</td>
<td>14.0</td>
<td>6570</td>
<td>32.7</td>
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<td>Lost electricity</td>
<td>1885</td>
<td>27.5</td>
<td>7632</td>
<td>38.0</td>
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<tr>
<td>Used generator outside</td>
<td>137</td>
<td>57.1</td>
<td>669</td>
<td>35.9</td>
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Data source: HCPH CASPER data- weighted
NRG Mega-Shelter

On August 29, 2017, the County and community partners set up a 10,000 bed mega-shelter at NRG Center.

- Monitor resident health status and identify their needs on a daily basis.
- Identify infectious diseases and outbreaks in the shelter in a timely manner and implement effective control measures to prevent further spread of illness.
- Identify severe exacerbation of chronic conditions, including new or existing mental issues and provide interventions.
- Timely dissemination of health alerts and services available to shelter residents and information sharing between HCPH and partners.
- Apply One Health principle to achieve a holistic approach to public health surveillance incorporating various types of disease surveillance along with environmental surveillance and animal health consideration.
FNMR (August 29th – September 2nd)

✓ Provided care to those require minor or continuous medical care
✓ Took in displaced residents with medical conditions (hospital discharges, nursing homes)
✓ Staffed with medical providers
✓ Approximately 90 people came through (median age of 79)
✓ Epidemiologists reviewed medical charts twice daily and completed assessment

- Chronic diseases (HTN, DM, dementia)
- 2 scabies cases
- 2 patients with drug withdrawal symptoms
- Supply needs
  - Glasses, walkers, wheelchairs
  - Ostomy bag, CPAP, prescriptions
NRG Shelter Surveillance Activities

- 20 days of active surveillance
- 24 hour coverage of on-site surveillance station
  - Day shift (7am – 7pm)
  - Night shift (7pm – 7am)
- Nightly cot-to-cot survey
- Daily data abstraction from patient visits to on-site clinics
- Daily monitoring of vaccine administrations and Tamiflu prescriptions in on-site pharmacies
Daily Cot-to-Cot Survey

• Survey teams were comprised of HCPH Epidemiologists and staff, student volunteers from local universities.

• Just in Time Training before survey and briefing after survey were provided every night.

• Messages regarding services available and health alerts were delivered to residents daily through surveyors during interviews.

• Epidemiologists led survey teams and conducted epidemiological consultations as needed.
Daily Cot-to-Cot Survey

• Head of household survey – health status, healthcare needs, and other public health concerns for the entire family.
  ▪ Paper survey → mobile survey done on mobile phone

• Epidemiology consultation – if symptoms of communicable diseases, exacerbation of chronic conditions, or mental health concerns were identified, further consultation would be conducted by an epidemiologist.

• Immediate referral to onsite clinics, education, and isolation were implemented when necessary.
Daily Cot-to-Cot Survey

- **3,365** evacuees at its peak.

- **3,606** household surveys were completed during 20 days.

- **395** epidemiology consultations were conducted
Daily Data Abstraction from On-site Clinics

Monitored for:

- Number of patients seen
- Infectious disease symptoms
  - Fever, diarrhea, vomiting, rash, etc.
- Diagnoses and tests ordered related to communicable diseases
- Chronic disease exacerbations
- Mental health complaints
- Injuries
Daily Monitoring of Vaccine Administrations and Tamiflu Prescriptions in On-site Pharmacies

- Walgreens and CVS were on-site to fill prescriptions and provide influenza, tetanus, and other vaccinations.
- A form was provided to document number of prescriptions filled, number of vaccines given, the top 5 prescriptions filled, vaccine supplies.
- Hurricane Harvey hit right before flu season
  - Concern for outbreak at the shelter
  - Flu vaccines provided to residents, staff, and volunteers
One Health Principles

Surveillance & Response Team: Epidemiologists, Environmental Sanitarians, Veterinarians, and Communication Specialists

- Epidemiology disease surveillance
  - Infectious diseases and outbreaks
  - Exacerbated chronic conditions and mental health issues
  - Bug or mosquito bites; animal bites
  - Control measures to prevent further spread of illness and interventions

- Environmental surveillance
  - Assessment of environmental risks
  - Coordinated hygiene efforts:
    - hand sanitizers throughout dormitory areas
    - ensured proper trash can placement
    - ensured frequent cleaning of common areas including bathroom facilities and eating areas

- Veterinary surveillance
  - On-site animal shelter
  - Assessments of vaccination for pets prior to entry in sleeping areas

- Robust communication efforts included large and ubiquitous signage and messaging for disease prevention placed throughout the shelter
Surveillance Findings

- A Flu A outbreak of 20 laboratory confirmed cases
- A Norovirus outbreak with 4 laboratory confirmed and 1 probable case
- Three isolated cases of strep throat
- A number of residents with mental health issues including one with suicidal ideation
- A number of residents with exacerbation of chronic conditions
An Influenza A Outbreak

<table>
<thead>
<tr>
<th>FLU A/H 3 (+) by PCR</th>
<th>By Rapid test</th>
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<tr>
<td>A (+)</td>
<td>A &amp; B (+)</td>
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<tr>
<td>14</td>
<td>5</td>
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Number of Cases by Onset Date

Illness Onset Dates:
1. 9/3  12. 9/13  19. 9/17 (HCPH Staff)
2. 9/5  13. 9/11 (Peace Officer)  20. 9/18 (HCPH Staff)
3. 9/7  14. 9/13
4. 9/10  15. 9/14
5. 9/12, 9/7, 9/4  16. 9/13 (Peace Officer)
6. 9/15  17. 9/18
11. 9/11  18. 9/16
Prevention and Control Measures at NRG

- Isolation rooms monitored daily
  - Flu and ILI
  - GI illness
  - Belongings of scabies cases disinfested
- 771 flu vaccines administered to residents, staff, volunteers
- Hand sanitizer and hygiene signage placement throughout shelter
- Bilingual public health service announcements in dormitory areas
- Environmental inspections of the entire facility
Success Achieved

• Timely identification and isolation of patients with influenza-like illness and gastrointestinal illness
• No widespread outbreaks of communicable diseases during the long operation
• Exacerbation of chronic conditions and mental health issues were intervened immediately
• Additional specimens were collected by HCPH surveillance team to confirm the diagnosis
• A mobile survey tool provided flexibility for an easy daily modification of questions and analyses
Challenges Encountered

- The number of surveyors changed daily depending on the availability of staff and volunteers
- Lack of pre-designed mobile survey tool (development on-site)
- Relatively new staff without sufficient response experience
- Shortage of Epidemiologists
- Simultaneous management of multiple surveillance activities within the community
- Personal hurricane-related losses experienced by HCPH staff
Acknowledgement

- HCPH staff and leadership: Lyndsey Hassmann, MPH; Elya Franciscus, MPH; Benjamin Hornstein, PhD; Sherrill Pirsamadi, LVN; April Beeks, MPH; Sarah Milligan, MPH; Erika Olsen, MPH; Natasha Wahab, MPH; Delisabel Lopez, PhD, MPH; Deborah Bujnowski, PhD, MPH; Martina Salgado; Norma Arcos; Amanda Nguyen; Vishaldeep Sekhon, MPH; Rebecca Rubinstein, MPH; Richard A. Williams; Valeria Brannon, RN, MSN; Ashley Minkeu, MPH; Masihullah Noori; Ana Zangeneh, MPH; Sherry Jin, MD, MPH; Aisha Haynie, MD, MPA; Dana Beckham, DVM, MPH, MBA; Brian C. Reed, MD; Jennifer Kiger, MPH; Mac McClendon; Michael Schaffer, MBA; Les Becker, MBA; Umair A. Shah, MD, MPH
- Samantha Solomon, CDC Public Health Associate; The University of Texas Health Science Center at Houston (UTHealth) School of Public Health (UTHealth SPH), Student Epidemic Intelligence Society; students from Texas Woman’s University (TWU); nurse students from TWU College of Nursing.

- HCPH Programs: OPHPR, DCCP, EPH, OCEE, VPH, MCVD, TB
- Houston Health Department
- NRG shelter on-site clinics and pharmacies: Harris County Medical Society Urgent Care Clinic and Pediatric Urgent Care, Baylor College of Medicine/Harris Health Same Day Clinic and Mental Health Clinic, Baptist Child & Family Services, Walgreens, CVS
- Texas Department of State Health Services
- Other Harris County partners
- Other volunteers
Questions?
Harris County Public Health

{ Vision }
- Healthy People,
- Healthy Communities,
- A Healthy Harris County

{ Values }
- Excellence
- Compassion
- Flexibility
- Integrity
- Accountability
- Professionalism
- Equity

{ Mission }
- Promoting a Health and Safe Community
- Preventing Injury and Illness
- Protecting You

www.hcphtx.org