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Public Health Surveillance in a Large Evacuation Shelter Post Hurricane Harvey

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Objective

1) Describe HCPH's disease surveillance and prevention activities within the NRG Center mega-shelter; 2) Present surveillance findings with an emphasis on sharing tools that were developed and may be utilized for future disaster response efforts; 3) Discuss successes achieved, challenges encountered, and lessons learned from this emergency response.

Introduction

Hurricane Harvey made landfall along the Texas coast on August 25th, 2017 as a Category 4 storm. It is estimated that the ensuing rainfall caused record flooding of at least 18 inches in 70% of Harris County. Over 30,000 residents were displaced and 50 deaths occurred due to the devastation. At least 53 temporary refuge shelters opened in various parts of Harris County to accommodate displaced residents. On the evening of August 29th, Harris County and community partners set up a 10,000 bed mega-shelter at NRG Center, in efforts to centralize refuge efforts. Harris County Public Health (HCPH) was responsible for round-the-clock surveillance to monitor resident health status and prevent communicable disease outbreaks within the mega-shelter. This was accomplished through direct and indirect resident health assessments, along with coordinated prevention and disease control efforts. Despite HCPH's 20-day active response, and identification of two relatively small but potentially worrisome communicable disease outbreaks, no large-scale disease outbreaks occurred within the NRG Center mega-shelter.

Methods

Active surveillance was conducted in the NRG shelter to rapidly detect communicable and high-consequence illness and to prevent disease transmission. An online survey tool and novel epidemiology consulting method were developed to aid in this surveillance. Surveillance included daily review of onsite medical, mental health, pharmacy, and vaccination activities, as well as nightly cot-to-cot resident health surveys. Symptoms of infectious disease, exacerbation of chronic disease, and mental health issues among evacuees were closely monitored. Rapid epidemiology consultations were performed for shelter residents displaying symptoms consistent with communicable illness or other signs of distress during nightly cot surveys. Onsite rapid assay tests and public health laboratory testing were used to confirm disease diagnoses. When indicated, disease control measures were implemented and residents referred for further evaluation. Frequencies and percentages were used in the descriptive analysis.

Results

Harris County's NRG Center mega-shelter housed 3,365 evacuees at its peak. 3,606 household health surveys were completed during 20 days of active surveillance, representing 7,152 individual resident evaluations, and 395 epidemiology consultations. Multifaceted surveillance uncovered influenza-like illness and gastrointestinal (GI) complaints, revealing an Influenza A outbreak of 20 cases, 3 isolated cases of strep throat, and a Norovirus cluster of 5 cases. Disease control activities included creation of respiratory and GI isolation rooms, provision of over 771 influenza vaccinations, generous distribution of hand sanitizer throughout the shelter, placement of hygiene signage, and frequent bilingual public health public service announcements in the dormitory areas. No widespread outbreaks of communicable disease occurred. Additionally, a number of shelter residents were referred to the clinic after reporting exacerbation of chronical conditions or mental health concerns, including one individual with suicidal ideations.

Conclusions

Effective public health surveillance and implementation of disease control measures in disaster shelters are critical to detecting and preventing communicable illness. HCPH's rigorous surveillance and response system in the NRG Center mega-shelter, including online survey tool and novel consultation method, resulted in timely identification and isolation of patients with gastrointestinal and influenza-like illness. These were likely key factors in the successful prevention of widespread disease transmission. Additional success factors included successful partnerships with onsite clinical and pharmacy teams, cooperative and engaged shelter leadership, synergistic internal surveillance team dynamics, availability of student volunteers, sufficient quantities of influenza vaccine, and access to mobile survey technology. Challenges, mostly related to scope and magnitude of response, included lack of pre-designed survey tools, relatively new staff without significant disaster experience, and simultaneous management of multiple surveillance activities within the community. Personal hurricane-related losses experienced by HCPH staff also impacted response efforts. HCPH's rich disaster response experiences at the NRG mega-shelter and developed surveillance tools can serve as a planning guide for future public health emergencies in Harris County and other jurisdictions.

Keywords

Public Health Surveillance; Emergency Response; Shelter Surveillance; Hurricane Harvey; Epidemiology

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