

## Monitoring Population Changes for Emergency Management Support in Tennessee

### Public Health Problem

In late summer 2017, the United States endured two severe hurricanes back to back. On August 25, 2017, Hurricane Harvey made landfall in Texas and southwest Louisiana, dumping more than 19 trillion gallons of rain. On September 10, 2017, 20 days later, Hurricane Irma landed in Florida, leading residents across the Florida peninsula to evacuate inland and out of the path of the storm. Although Tennessee was far from the eye of the storms, state health officials knew residents from both states could choose to shelter in Tennessee. In preparation for the influx of evacuees during Hurricanes Harvey and Irma, Tennessee health officials turned to the Electronic Surveillance System for the Early Notification of Community-Based Epidemics, known as ESSENCE, to monitor out-of-state patients seeking emergency healthcare in Tennessee. ESSENCE captures data from emergency departments (EDs) in nearly real time.

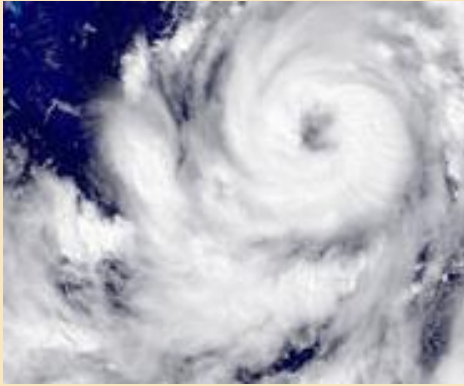
### Actions Taken

The Tennessee Department of Health (TDH) collects ED data from more than 70 hospitals across Tennessee. Hospitals in Tennessee typically provide syndromic data within 48 hours of a patient visit. Although syndromic surveillance often supplements disease- or condition-specific surveillance, syndromic data can also improve general situational awareness of ED patients during an event or response.

During Hurricanes Harvey and Irma, TDH used ESSENCE\* to support all-hazards situational awareness. TDH monitored data from August 18, 2017, through September 24, 2017.

Monitoring was set up in ESSENCE using a simple query of the Patient Location (Full Details) data set. Data were limited to hospital ED visits reported by Tennessee (Site = "Tennessee"). To monitor ED visits among residents of Texas before, during, and after Hurricane Harvey, data were queried for a patient ZIP code within Texas (State = "Texas"). ED visits among Florida residents were monitored similarly (State = "Florida") before, during, and after Hurricane Irma. Additionally, a free-text chief complaint search was used for the terms "Harvey," "Irma," "hurricane," "evacuee," "evacuate," "Florida," and "Texas." Chief complaint search results were then filtered to remove visits with patient ZIP codes within Tennessee.

\* ESSENCE is the syndromic surveillance component of the BioSense Platform. CDC's National Syndromic Surveillance Program (NSSP) BioSense Platform provides public health officials a common cloud-based health information system with standardized tools and procedures to rapidly collect, evaluate, share, and store information. Health officials can use the BioSense Platform to analyze and exchange syndromic data—improving their common awareness of health threats over time and across regional boundaries.



### Lessons Learned

- **Syndromic data may be the ONLY available data—so use it!** ESSENCE is Tennessee's only information source capable of rapidly collecting health data on out-of-state patients. ESSENCE allowed Tennessee health officials to identify patient population changes observed in the state's emergency departments. Health officials monitored the situation until the patient population returned to baseline levels.
- **Sensitivity of keyword searches can vary by event.** Patient ZIP codes were more sensitive than chief complaint searches during this event. Chief complaints, however, were monitored for unusual patterns in illness or injury.
- **Syndromic surveillance improves situational awareness.** The increase in patients displaced by hurricanes—or any natural or manmade public health disaster—can have a profound effect on healthcare facilities. Although the Tennessee Department of Health was unable to validate whether all patients identified as residents of Florida were displaced because of Hurricane Irma, the timing of the rise and fall of patient visits was highly suggestive. Likewise, seeing no substantial increase among emergency department patients who resided in Texas reassured health officials that the effects of Hurricane Harvey were not impacting Tennessee's hospital emergency departments.

## Outcome

From August 18, 2017, through September 24, 2017, Tennessee hospital EDs reported 277 patient visits among Texas residents and 1,041 patient visits among Florida residents. Visits among patients from Texas remained stable throughout the monitoring period. In contrast, visits among patients from Florida exceeded the expected value on September 7, peaked September 10 at 116 patient visits, and returned to expected levels on September 16, 2017. The increase in patients from Florida was evenly distributed across most of Tennessee, with some clustering around a popular tourism area in east Tennessee. No concerning trends in reported syndromes or chief complaints were identified among Texas or Florida patients.

The free-text chief complaint query first exceeded the expected value on September 9, peaked on September 11 with 5 patient visits, and returned to expected levels on September 14. From August 18 through September 24, at least 21 of 30 visits captured by the query were among Florida residents. One Tennessee hospital appeared to intentionally use the term “Irma” in its chief complaint field for patients from Florida affected by the hurricane.

By using ESSENCE, state health officials could monitor the volume of out-of-state ED patients in Tennessee, assess the impact on its healthcare system, and identify geographic or hospital-specific clustering of out-of-state patients. TDH shared these results in its daily State Health Operations Center (SHOC) situation reports and with agency response partners including the Tennessee Emergency Management Agency (TEMA).

## Contact

**Caleb Wiedeman, Epidemiologist**  
Emergency Preparedness Program  
Tennessee Department of Health  
caleb.wiedeman@tn.gov

**Centers for Disease Control and Prevention**  
Center for Surveillance, Epidemiology, and  
Laboratory Services  
Division of Health Informatics and Surveillance  
[www.cdc.gov/nssp](http://www.cdc.gov/nssp)

The findings and conclusions of this report are those of the authors and do not reflect the official position of the Centers for Disease Control and Prevention.

This success story shows how NSSP:

Improves Data Representativeness

- ✓ Improves Data Quality, Timeliness, and Use
- ✓ Strengthens Syndromic Surveillance Practice
- ✓ Informs Public Health Action or Response

**Emergency Department Visits in Tennessee Reported Among Patients with Residence in Texas and Florida**  
August 18, 2017 – September 24, 2017

