Using Data for Targeted Heat Illness Prevention in Houston
Jane Wiseman, April 2026

Summary
Houston, the nation's fourth largest city, eclipses the larger cities of New York, Los Angeles, and Chicago with the intensity of its tropical combination of heat and humidity. A new data-driven model is helping this city predict the most severe health impacts of extreme heat and take a proactive approach to protecting vulnerable populations against negative outcomes from heat related illness. This paper shares Houston's experience for other cities to replicate with city or outside data analytics resources using widely available and standardized data.

As Dr. Theresa Tran Carapucci, director of the Houston Health Department notes, "Houston's heat-health alert system is data-driven and informed by what Houstonians experience during extreme heat events. Using city data in a practical way will help reduce emergency department visits, prevent illness and improve people's lives, especially as summers become hotter with extended heat waves. Our heat-health alert system is a major innovation and significantly contributes to the way health departments can better address heat related illness."

Background
Recent years demonstrate a concerning public health threat from extreme heat, with a 329% increase in heat-related illness between 2019 and 2023, a total of 7,627 heat-related hospital visits, and 80 heat deaths in those years in Harris County, where Houston sits. Experts agree that hospitalization and death data count only the most extreme results, and that cumulative exposure to heat and humidity can cause or exacerbate a wide range of serious health problems, making the true impact far larger than typically documented.

Houston's heat program uses both prevention and response. To prevent heat illness, the city conducts comprehensive outreach and education and provides targeted assistance to vulnerable populations including free AC units and energy help for seniors and low-income residents. Longer-term urban cooling strategies include sustainable infrastructure planning, cool corridors, and an ambitious tree canopy expansion now with its millionth tree planted to increase shade and cooling. When an extreme heat event occurs, the city activates 20+ emergency cooling centers and provides access to free transportation to the centers via call to the city's 311 center. The city's emergency alert system sends out automated notices to over 133,000 residents who have signed up for alerts.

Using data to target heat response
The Houston Health Department's data-driven and research-informed approach to understanding and addressing heat health challenges is an innovation deserving of attention. Building on success with data-informed wastewater tracking to address the spread of Covid-19 that received recognition from the Centers for Disease Control and Prevention (CDC), and mapping efforts that identified where urban air quality could be

improved, in 2025 the Houston Health Department (HHD) launched its Houston Summer Surveillance dashboard to monitor heat illness on a real-time basis. The dashboard includes hospital emergency department visit data along with heat index data from the National Weather Service and provides easy public access to current and historical data on heat-related illness (HRI) such as dehydration, heat exhaustion, and heat stroke as well as heat exacerbated incidents, such as gun violence, asthma and pregnancy complications, kidney disease, and intimate partner violence.

To focus resources on the most vulnerable populations, HHD analyzed past heat illness data to determine which populations were most at risk of health issues on extreme heat days so that they could tailor outreach and prevention measures where they were most needed. Partnering with research partners from Baylor College of Medicine and Rice University, HHD analyzed hospital emergency department data for heat-related illnesses (HRIs) and other health conditions worsened by heat and developed their Heat Health Early Alert System. The goal is to alert health care providers in advance of an extreme heat event so that they can help patients at risk avoid heat-related illness.

To create the most precise model possible, the team examined the correlation between heat-related illness and four different ways of measuring heat: temperature, heat index (a combination of heat and humidity), wet bulb temperature (temperature measured with a thermometer wrapped in wet cloth), and wet bulb globe temperature (temperature combined with humidity, wind speed, and sun exposure). Analysis of multiple years of data showed the heat index as the most predictive of heat-related illness that results in a hospital emergency department visit.

Looking at the various heat exacerbated causes for hospital emergency visits, preterm births were the cause of the greatest increase in visits on extreme heat days at 12%, followed by acute kidney injury at 8%. Given the lasting negative consequences of preterm birth over the life course, HHD chose to prioritize prevention of this heat-related problem.

In 2025, a new initiative of proactive engagement on extreme heat days was launched to reduce the number of preterm births. When the heat index exceeds 104 degrees, the city sends email alerts to heath care providers who have opted into notifications so that they can alert pregnant patients to take precautions against preterm birth. In addition, the city alerts the general public via website and social media platforms and traditional media outlets. Other channels likely to reach the target audience also share alerts to clients via text message. Video recordings with pregnancy heat safety tips are shown in the waiting rooms of city health facilities. Other custom heat alerts go to hospital and healthcare providers; Women Infants and Children (WIC) partners for pregnancy-related alerts; and chronic disease programs, dialysis centers, and providers for acute kidney injury alerts.

Replication potential

The analytics tool used to gain insights about the most vulnerable populations could easily be replicated in other cities, as it relies on data that is standardized across the country and

typically accessible via national platforms. Heat index data is drawn from the National Weather Service, and hospital emergency department data is drawn from Houston's local instance of the national syndromic surveillance data system. With a minimal amount of computing power and data skills, other cities could replicate what Houston has done and create their own tool to predict which illnesses are most likely to increase during an extreme heat event and then develop targeted outreach materials to prevent those illnesses. Unique characteristics of local weather patterns and population characteristics may well discover different sub-groups most at risk on high heat days in other regions or other cities. Houston has blazed a path that other cities could follow to find a data-driven approach to greater public health regardless of the weather.

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