ID: 76043471
Infectious Diseases - HAI, Infectious Diseases - Host Site Description
Harris County Public Health

Assignment Location: Houston, US-TX
Harris County Public Health
Office of Epidemiology, Surveillance, and Emerging Diseases

Primary Mentor: Ana Zangeneh, MPH
Senior Manager, Infectious Disease Epidemiology
Harris County Public Health

Secondary Mentor: Elya Franciscus, MPH
Manager, Communicable and Emerging Diseases
Harris County Public Health

Work Environment
Hybrid

Assignment Description

The Communicable and Emerging Disease (CD/ED) team which is housed in the Office of Epidemiology, Surveillance, and Emerging Diseases (OESED), is responsible for routine disease surveillance, outbreak control and prevention, and response to public health emergencies. The CSTE Fellow will actively engage in CD/ED activities and work closely with various disease groups. While CD/ED epidemiologists are generalists, they also specialize in specific disease groupings, serving as subject matter experts in areas such as vaccine-preventable diseases, meningitis, perinatal Hepatitis B, emerging diseases, tuberculosis (TB), healthcare-associated infections (HAI), foodborne illnesses, and zoonotic and vector-borne diseases. The Fellow will have the opportunity to collaborate with these specialists, gaining hands-on experience in disease surveillance, outbreak investigations, and public health response efforts. The fellow will gain hands-on experience in infectious disease surveillance, data analysis, emergency response, community outreach, and other surveillance/public health activities. The Fellow will participate in and likely have the opportunity to lead disease and outbreak investigations involving medical record review, patient interviews, questionnaire design, control measure implementation, data collection and analysis, report writing, and presentations. Additionally, epidemiologists play a key role in providing guidance and expertise in the development of disease dashboards, supporting HCPH's goal of enhancing public health data visualization, modernization, and accessibility. The Fellow will have the opportunity to contribute to dashboard building by assisting with data analysis, interpretation, and presentation. HCPH has already developed several public dashboards, and the Fellow will be involved in refining and expanding these tools to improve disease tracking and public health decision-making. HCPH has currently developed several internal and external facing dashboards, some examples are Mpox, Covid 19 Hub which is now decommissioned, Substance Use Data Hub, Mosquito and Vector-borne, Veterinary Public Health Division Data Hub, Holistic Assistance Response Team (HART) Program, Mosquito Vector Control dashboards, and several other dashboards are in the process of being developed like Wastewater, Heat and Health Impacts, and for Respiratory diseases.

As an important part of the CD/ED team, the Fellow will also participate in preparedness and response activities as time permits, and dependent upon the level of public health response required. Since HCPH is a large, urban health department, public health response may be organized under Incident Command Structure (ICS) and require interdivisional involvement.

The Fellow will have the opportunity to collaborate with various departments within OESED, including data and reporting, wastewater disease surveillance, and non-communicable diseases. Engagement with other divisions and offices across the agency will be based on the Fellow's interests and availability.

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Recently, the Tuberculosis case registry and contact investigation have been transitioned to OESED, fostering close collaboration with the Community Health and Wellness Division (CHWD). Additional divisions and offices include the Environmental Public Health Division (EPH), Veterinary Public Health Division (VPH), Mosquito and Vector Control Division (MVCD), Office of Communications, Education, & Engagement (OCEE), Community Health and Violence Prevention Services (CHVPS), Health Prevention & Coordinated Care Division (HPCCD), Office of Planning and Innovation (OPI), and Public Health Preparedness and Response Division (PHPRD).

HCPH has also adopted One Health and Health Equity approaches in public health practice. The Fellow will have the opportunity to interact with other divisions and offices across the agency according to his/her interests and availability. In addition, the Fellow will have opportunities to participate in various agency wide meetings, trainings and education, including HCPH wide and OESED townhalls, Regional Epi/BT (Bioterrorism) quarterly meetings with other local health departments in the region, Regular weekly and monthly meetings within CD/ED and OESED and tagups with other divisions and offices. Furthermore, the Fellow may engage in conferences and outreach activities organized by HCPH such as Wellness on Wheels events and outreach presentations and events at schools, hospitals, and other institutions to address a variety of health topics in the community.

HCPH's setting as the 3rd most populous county in the nation, provides important context for the depth and breadth of experience an incoming Fellow will gain, by being part of a team that provides epidemiology services to such a large, complex, and diverse urban population. Harris County has the 8th busiest international airport in the United States, which is ranked 3rd for non-stop domestic and international service. The Houston area has numerous international travelers, one of the world's busiest ports, and the world's largest medical center.

In the past, HCPH CD/ED has been involved in investigations of human rabies, Japanese Encephalitis, a large outbreak of hepatitis B associated with long-term care facilities, H1N1 influenza pandemic, and the largest national outbreak of West Nile virus (WNV) reported to date. In recent years, CD/ED has also accumulated extensive experience in response to Ebola, Zika outbreak, severe flu seasons, Hurricane Harvey, resurgence of measles in 2019 as well as the current measles outbreak in West Texas and many interesting foodborne illness clusters identified by PulseNet. The CD/ED's public health surveillance and response in the mega-shelter at NRG Center post-Hurricane Harvey was awarded the NACCHO Model Practice of 2017. Because of the diverse population and large area we serve, Epidemiologists in our department gain valuable experience by investigating a wide range of rare and emerging diseases while also playing a critical role in responding to public health emergencies.

The fellow's anticipated day to day activities:

The Fellow will apply principles of Epidemiology to day-to-day disease surveillance and control activities and respond to public health emergencies within the jurisdiction of HCPH. The areas of particular importance are the surveillance, control, data analysis and prevention of notifiable infectious conditions, including diseases related to potential bioterrorism agents, outbreak situations, and other public health emergencies or natural disasters. In the context of learning general disease surveillance, the Fellow will focus on Multidrug Resistant Organisms (MDROs), Hospital Acquired Infections (HAIs), and vaccine preventable diseases (VPD's), which have been identified as priorities in HCPH's CD/ED.

With guidance from mentors and the Communicable and Emerging Disease Manager and Senior Manager, the Fellow's day-to-day activities may include:

1. Investigating reports of notifiable conditions in Harris County residents as assigned. This process involves review of medical records, interpretation of laboratory reports, patient interviews, implementation of control measures, facility visits, and completion of surveillance forms (with other steps as necessary based on the situation or condition).

2. Providing information and Epidemiology consultations related to public health issues via telephone, mailings, and presentations to individuals, schools, child care centers, nursing homes, hospitals, health care providers, and other agencies in order to identify notifiable conditions, outbreaks, and public health emergencies and prevent the spread of disease.
3. Analysis of epidemiological data to describe disease burden and characteristics in the county and produce reports.
4. Exploration of opportunities to improve disease surveillance.
5. Conduct disease investigations and provide interventions for epidemic or unusual community health related events or outbreaks, including those related to potential bioterrorism agents and other public health issues, thus contributing to the development of the public health preparedness capacity of the unit.

Describe Statistical and Data Analysis Support, Such as Databases, Software, and Surveillance Systems Available to the Fellow

The fellow will work closely with other CD/ED staff including our MAVEN database Project Manager as well as epidemiologists within OESED who have extensive experience in data analysis, given that our office is responsible for receiving and fulfilling data requests for that agency. This additional support is available to the Fellow and includes the Data and Reporting team within OESED. The Fellow will also have access to various public health surveillance data management systems and software including Conduent Maven, the HCPH electronic health record suite (EPIC), CDC National Outbreak Reporting System (NORS), National Electronic Disease Surveillance System (NEDSS), Texas ImmTrac, and statistical softwares (STATA and R).

Projects

Surveillance Activity Title: Infectious Disease Epidemiology - General Disease Surveillance Rotation

Surveillance Activity Description:
In the first months of the fellowship (length to be determined in consultation with the Fellow and considering Epidemiology Program priorities), the Fellow will conduct Epidemiology investigations for various notifiable infectious diseases in order to gain broad experience in Epidemiology surveillance and be prepared for the future profession. A full spectrum of both common and rare notifiable conditions has been seen in HCPH's jurisdiction, including: salmonellosis, shigella, campylobacteriosis, enterohemorrhagic E. coli, cryptoporiosis, cyclosporiasis, Listeriosis, Vibrio, invasive streptococcal infection, multi-drug resistant infections, hepatitis, meningitis, chickenpox, mumps, measles, pertussis, invasive Haemophilus influenzae, Lyme disease, typhus fever, Chagas disease, Leishmaniasis, legionellosis, influenza-associated pediatric mortality, Chikungunya virus, WNV, malaria, ZIKV, dengue, and brucellosis, among others.

The aforementioned surveillance activities involve: 1) Review of medical records, interpretation of laboratory reports, testing recommendations, patient interviews, implementation of control measures, and completion of surveillance forms, with other steps as necessary based on the situation or condition. 2) Provision of information and Epidemiology consultations related to public health issues via telephone consultation, mailings, and presentations to individuals, schools, childcare centers, nursing homes, hospitals, health care providers, and other agencies in order to identify notifiable conditions, outbreaks, and public health emergencies and prevent the spread of disease.

The Fellow will work closely within the Maven database, utilizing it for disease surveillance, case investigations, and data management. Additionally, the Fellow may contribute to improving the database by identifying bugs, enhancing system functionality, and assisting in the optimization of wizards and question packages to better support epidemiologists in their work.

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Assist in spearheading the formalization of a one health workgroup. Creating a multidisciplinary team of experts to regularly meet and discuss strategies to coordinate a collaborative approach for preparedness, prevention and response to emerging disease threats in our community.

Surveillance Activity Objectives:
After this rotation, the Fellow will have a comprehensive understanding of infectious disease surveillance and its workflow in the field and have proficiency in our new electronic disease surveillance database, MAVEN.

Surveillance Activity Impact:
This rotation will be followed by surveillance activities in specific areas to allow the fellow to obtain in-depth understanding of certain conditions of public health significance.

Surveillance System Evaluation Title: Evaluation of MDRO and HAI Surveillance in Harris County

Surveillance System Evaluation Description:
Multidrug-Resistant Organisms (MDROs) became reportable in Texas only a few years ago, and reporting through the Antibiotic Resistance Laboratory Network (ARLN) remains recent and voluntary. However, MDRO cases and ARLN alerts in Harris County represent a substantial proportion of overall reports in the region. Evaluating MDRO surveillance over the past years will help identify strengths, weaknesses, and opportunities for system improvement. Additionally, efforts are underway to gain access to the National Healthcare Safety Network (NHSN) database to enhance surveillance capabilities.

Surveillance System Objectives:
The Fellow will conduct a comprehensive evaluation of MDRO and Healthcare-Associated Infection (HAI) surveillance within Harris County Public Health (HCPH) jurisdiction, utilizing the CDC's *Updated Guidelines for Evaluating Public Health Surveillance Systems.*

Surveillance System Impact:
This evaluation will allow the Fellow to assess key components of the surveillance system and their operational mechanisms. Selected attributes for evaluation include data quality, flexibility, simplicity, and representativeness. Findings and recommendations from this evaluation, along with possible implementation strategies, will contribute to the enhancement of MDRO and HAI surveillance at HCPH. Improved surveillance will strengthen data-driven decision-making, enhance early detection and response, and ultimately improve public health outcomes in Harris County. Post evaluation recommendations and possible implementation will contribute to the overall improvement of the surveillance of MDROs and HAIs at HCPH in the future.

Major Project Title: Understanding the Burden and Pattern of MDROs and HAIs in Harris County, TX

Major Project Description:
MDROs and HAIs have significant public health impacts. According to the recently published CDC Antibiotic Resistance Threats in the United States, 2019, more than 2.8 million antibiotic-resistant infections occur in the U.S. each year, and more than 35,000 people die as a result. CRE causes 13,100 hospitalizations and 1,100 deaths in 2017; Carbapenem-resistant Acinetobacter causes 8,500 hospitalizations and 700 deaths in the same year. The Multidrug-resistant Acinetobacter (MDR-A) infection rate in 2016 in Harris County is 4.5 per 100,000 persons, compared to the rate of 3.6 in Texas. Understanding the burden and pattern of MDROs and HAIs is the primary step in combating multidrug resistant organisms and infections.

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Major Project Objectives:
The Fellow will explore and analyze CD/ED MDRO surveillance data and the data from National Healthcare Safety Network (NHSN) to describe the burden (case counts and infection rates) and patterns (organisms, resistance mechanisms, and distributions) of MDROs and HAIs in Harris County. NHSN is the nation's most widely used HAI tracking system developed by the CDC. It is a secure, internet-based surveillance system that allows healthcare facilities to report HAI data, patient safety surveillance information, and antibiotic use and antibiotic resistance data. The Fellow will summarize the findings and present as appropriate.

Major Project Impact:
Healthcare associated Infections (HAI) surveillance enables hospitals to monitor the outcomes of current practice and provide timely feedback to clinicians to ensure practice improvement and better patient outcomes. Proactive identification of patterns for patients/residents infected or colonized with Multidrug Resistant Organisms, and transmission of, novel and targeted MDROs across the region will help inform targeted Specialized prevention practices to achieve the decreased transmission and spread with lower overall number of infections.

Additional Project #1 Title: Vaccine Preventable Diseases and Vaccination Profile, Harris County, TX
Project #1 Type: Surveillance Activity

Project #1 Description:
The measles outbreak in 2025 in the South Plains Region of Texas highlights the impact of resurgence of vaccine preventable diseases (VPD) and the importance of vaccination. Over 200 cases so far were identified in the outbreak. HCPH identified and investigated 15 suspect cases in 2024 alone, with all instances being classified as not a case. Despite availability and routine recommendation of these vaccines, approximately 42,000 adults and 300 children in the United States still die each year from vaccine-preventable diseases. To prevent and ultimately eradicate VPD, it is important to understand the trends of VPD and vaccination in communities for impactful interventions

Project #1 Objectives and Expected Deliverables:
The Fellow will receive trainings on VPDs and conduct epidemiological investigations of reported VPDs such as Measles, Mumps, Pertussis, etc. The Fellow will also analyze VPD data that CD/ED has collected over decades for rates and trends of various diseases. With the assistance from CD/ED and OESED Data and Reporting team, the Fellow may analyze the diseases spatially and temporally, if applicable. The Fellow will collect the data of vaccinations in Harris County, particularly for schools and independent school districts. With the guidance of mentors, the Fellow will analyze the potential association between immunization rates and VPD rates as appropriate. In addition, the Fellow may analyze outbreak data of pertussis, mumps, and chickenpox to identify patterns and make recommendations for surveillance and interventions. Ultimately, the Fellow will develop a profile of VPD and vaccination in HC to provide an overview of these analyses. The Fellow will also review literature and build experience on VPD and vaccination and explore further opportunities for epidemiological studies in this area. The Fellow may participate in immunization outreach activities of HCPH Mobile Health Events and gain first-hand experience in the field of public health services and explore potential partnerships with other programs.

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Project #1 Impact:
The Fellow will have gained valuable experience in epidemiological investigations, data analysis, outbreak response, and public health interventions, contributing to the broader goal of reducing the burden of VPDs in Harris County.

Please Describe the Fellow's Anticipated Role in Preparedness and Response Efforts – Include Activities and Time Allocation (Required Competency of Fellowship)

Harris County is no stranger to emergencies and HCPH has long experienced responding to these situations. The CD/ED team plays an integral part in the HCPH response to public health emergencies and natural disasters. In September 2005, as ICS was set up to respond to the large numbers of evacuees arriving in Harris County following Hurricane Katrina, HCPH led the Medical Branch Operation at the Astrodome/Reliant Complex. The Epidemiology Program had primary responsibility to implement a comprehensive epidemiological surveillance in all shelter areas. HCPH applied a health assessment in the clinic triage areas for all evacuees seeking care in shelter clinics. Further investigations were conducted for all evacuees suspected of having infectious diseases. Routine, preexisting surveillance systems were maintained and allowed for follow up of hospitalized evacuees. Additionally, epidemiologists rounded in all shelter areas every 12 hours to identify any infection control related issues that arose.

One example of an infection control issue was the identification of large ice chests with drinks accessible to all evacuees placed at various places in the shelters. Immediately, risk of fecal-oral transmission of infectious pathogens was identified and the practice was corrected. Volunteers were placed at all ice chests to distribute drinks as needed. In collaboration with the University of Texas School of Public Health, a daily cot-to-cot survey was implemented to assess the general health status of evacuees in the shelter areas. This effort was instrumental in quick identification of a Norovirus outbreak in the main shelter area at the Astrodome. HCPH also tracked immunizations given in the shelters, laboratory tests ordered, medical complaints, and pharmaceutical usage. In addition to these disease control efforts, environmental shelter assessments were conducted and appropriate health education messages for evacuees and response personnel were provided.

The Epidemiology Program staff stayed at shelters of last resort (for residents with significant medical conditions who were unable to evacuate) during Hurricane Ike and participated in the post-hurricane response. Epidemiology-related activities implemented as part of the post-hurricane response included shelter assessments and other active surveillance activities.

The Fellow will assist in preparedness and response efforts by supporting shelter surveillance during emergencies. This includes collaborating with epidemiologists, the Preparedness and Response Division, and Environmental Public Health during events like freeze and heat events, hurricanes, and flooding. The Fellow's role will involve collecting data and monitoring health conditions in shelters, such as warming centers during freezes and cooling shelters during heat events. Recent examples include shelter surveillance in February 2025 during freezing temperatures and in April 2024 during flooding. The Fellow will gain valuable experience in emergency response and disaster epidemiology.

The HCPH Epidemiology Program responded to the 2014-15 Ebola Outbreak by conducting passenger monitoring to more than 100 individuals arriving from West African countries including some passengers categorized under some risk that required direct active monitoring. The CDC/CSTE Applied Epidemiology Fellow assigned to our agency at that time took an active role during that response.

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Since 2015, our program began actively responding to the ongoing ZIKV emergency. From 2015 to 2017, more than 1,660 reports of suspected ZIKV in residents of Harris County were investigated.

After Hurricane Harvey in the Fall of 2017, the Epidemiology Program played a critical role in public health surveillance and response. Active surveillance was conducted in the NRG mega-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 etiologies. When indicated, disease control measures were implemented, and residents referred for further evaluation. Analyses were performed to describe the surveillance results.

CD/ED staff also participates in emergency response drills for suspected biological terrorist attacks and prophylaxis distribution, known as SNS (Strategic National Stockpile) and Point of Dispensing (POD) exercises, as well as an exercise for nuclear incidents, known as Community Reception Center (CRC), and tabletop exercises, most recently, avian influenza and measles.

Please Describe the Fellow's Anticipated Role in Cluster and Outbreak Investigations – Include Activities and Time Allocation (Required Competency of Fellowship)

The Fellow may be assigned to participate in any of the above activities should a public health emergency occur. In addition, the Fellow may participate in Community Assessment for Public Health Emergency Response (CASPER) activities conducted regularly by HCPH to assess community emergency preparedness or in response to public health emergencies. To date, HCPH has conducted numerous CASPERs since 2015 and accumulated valuable information and experience from it.

In times of emergency response, the Fellow will have responsibilities including shelter disease surveillance and/or additional disease surveillance specific to the nature of the emergency. After Hurricane Harvey, for instance, the entire Epidemiology Program participated in both shelter and community disease surveillance activities related to the hurricane and subsequent flooding. This provided unique experience to staff in disaster preparedness and response.