Infectious Diseases
Harris County Public Health and Environmental Services, Disease Control and Clinical Prevention
Houston, Texas

Assignment Description
The Epidemiology Program is within the Disease Control and Medical Epidemiology Section of the Disease Control and Clinical Prevention Division (see included organizational chart). The Epidemiology Program is responsible for routine disease surveillance, outbreak control and response, and response to public health emergencies. On a routine basis the Epidemiology Program receives over 10,000 reports on a yearly basis, investigates about 2,500 cases of Notifiable Conditions each year, and referrals another 2,000 to surrounding jurisdictions. Since the fellow's activities will focus on tuberculosis it is important to highlight some details of HCPHES TB Elimination Program.

TB is a disease of great public health concern in Harris County, the 3rd most populous county in the nation. Reflective of its diverse urban population, the rate of TB disease in Harris County was 7.4 cases per 100,000 population in 2014, almost 60% higher than the Texas rate, and more than double that of the U.S. In 2014, HCPHES treated 125 patients with active TB, including one patient with MDR TB, and provided Directly Observed Therapy (DOT) to all cases, as well as 38 TB suspects. HCPHES utilizes a systematic approach to identification and evaluation of TB contacts. This includes reviewing existing case information, determining infectious period, developing a detailed investigation plan, conducting field visits, interviewing and testing contacts, and evaluating all activities to ensure compliance with state and national TB control policies. Generally, 20 - 30% of contacts identified through this process require further treatment for up to nine months.

In 2014, prophylactic treatment was started on 401 contacts and immigrants diagnosed with or at high risk for Latent TB Infected (LTBI). Currently, HCPHES TB staff provide DOT and Directly Observed Preventive Therapy (DOPT) to 163 patients, contacts, and suspects each week. This year, HCPHES led the nation in its operationalization of Video Directly Observed Therapy (VDOT), an innovative and cost-effective technology that allows for remote TB treatment. So far, over 50 patients have been enrolled. Significant public health savings have been matched by patient-centered improvements in autonomy, privacy, travel / dosing flexibility, and adherence. Other epidemiologic and public health uses of VDOT are being considered. A user-friendly VDOT Implementation Guide has been developed and widely circulated to serve as a resource for state and local health departments interested in implementing VDOT (www.hcphesvdot.org)

As part of the Epidemiology Program team, the Fellow will participate in other Epidemiology Program activities as his/her availability allows and depending on the level of the response. Since HCPHES is a large urban health department, at times the Epidemiology response involves many areas of the department and is organized under the Incident Command Structure (ICS). The Fellow will also have the opportunity to interact with other HCPHES divisions and offices according to his/her interests and availability. These are the Environmental Public Health (EPH), Veterinary Public Health (VPH), Mosquito Control (MC) and Operations & Finance Divisions and the Offices of Policy and Planning, Public Health Preparedness and Response, and Communication, Education, and Engagement.
The Greater Houston area is home to the Texas Medical Center “the largest in the world” with renowned medical facilities providing the potential for great opportunities for professional development and collaboration (http://www.texasmedicalcenter.org). The Epidemiology Program maintains a close working relationship with the University of Texas School Of Public Health and other public health partners in Harris County. HCPHES will provide support to the Fellow to attend appropriate local meetings and trainings.

**Day-to-Day Activities**

The Fellow will apply principles of Epidemiology to disease control activities and respond to public health emergencies within the jurisdiction of HCPHES. Of particular importance is the prevention and control of notifiable conditions and communicable disease with a special emphasis on TB. The Fellow will also respond to disease related to potential Bioterrorism agents, outbreak situations, and other public health emergencies or natural disasters.

On a daily basis the Fellow will:

- Investigate reports of notifiable conditions in Harris County residents including TB as assigned. This process involves review of medical records, interpretation of laboratory reports, patient interviews, implementation of control measures, contact investigation, and the completion of surveillance forms (with other steps as necessary based on situation or condition).
- Provide information related to preparedness and other public health issues via telephone consultation, mail outs and presentations to individuals, schools, child care centers, nursing homes, hospitals, health care providers and other agencies to ensure readiness for responding to Bioterrorism, other outbreaks of infectious disease, and other public health threats and emergencies.
- Participate in investigations and provide intervention for epidemic or unusual community health related episodes or outbreaks, including those related to potential Bioterrorism agents and other related public health issues which develop the public health preparedness capacities of the section.
- Produce special reports and statistical analysis of epidemiological investigations to ensure readiness for responding to Bioterrorism, other outbreaks of infectious diseases, and other public health threats and emergencies.

**Potential Projects**

**Surveillance Activity**  Development of a strategy for targeted TB testing

Activities included for this project are as follows:

- Conducting review of the literature to understand current standard in targeted testing,
- The strategy must be data driven - utilize results of data analysis (including quantitative and geospatial) to inform strategy
- Present a propose budget to conduct such testing.
**Surveillance Evaluation**

Evaluation of the HCPHES TB surveillance System

Selected attributes of the surveillance system included in this evaluation are data quality, flexibility, simplicity and representativeness. Follow up with recommendations and possible implementation as appropriate.

**Major Project**

Conduct an analysis of contact investigations conducted by HCPHES TB program in the last 5 years.

This report will provide an understanding of the number of such investigations by setting type (household and non-household) conducted and the number of individuals tested, the number of infections identified, and the number of individuals referred for testing and treatment. This report will provide an estimate of the impact of the TB program in Harris County excluding Houston.

**Additional Project**

TB genetically linked cluster investigation

The Fellow, under the guidance of the HCPHES mentors, will work with the state of Texas TB program epidemiologists to conduct cluster investigations of genetically linked TB cases. Given that the State of Texas TB program has identified a growing number unique TB clusters there is interest in understanding any epidemiological links among individuals associated with specific clusters.

**Additional Project**

Creation of a comprehensive plan for data collection, cleaning, analysis and reporting.

Currently the TB Program manages its data in a fractured way, utilizing spreadsheets, paper records, and components of an electronic medical record (EMR). The Fellow will develop an understanding of the current data flow and understand the data requirements to fulfill programmatic measures, individual clinical measures, funding requirement measures and other measures desired to enhance current TB Program understanding of disease burden, presence of comorbid conditions such as Diabetes Mellitus and HIV, contact investigation, measures of impact, and other findings. If possible, explore the feasibility of proposing informatics project(s) to enhance current reporting to the State as required.
Preparedness Role

Harris County is no stranger to emergencies and HCPHES has long experience responding to these situations. The Epidemiology Program plays an integral part in the HCPHES response to public health emergencies and natural disasters in Harris County. In September 2005, as part of the Incident Command Structure (ICS) set up to respond to large numbers of evacuees arriving in Harris County following Hurricane Katrina, HCPHES lead the Medical Branch Operation at the Astrodome/Reliant Complex.

The Epidemiology Program had primary responsibility to implement a comprehensive epidemiological response in all shelter areas. HCPHES applied a health assessment in the clinic triage areas for all evacuees seeking care in shelter clinics. Further investigation was conducted for all evacuees suspected of having infectious diseases cared for on-site or sent for hospital care. 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 might arise. An example of this was the identification of large ice chests with drinks placed at various places in the shelters with access to all evacuees. 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 tally 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. HCPHES was also able to track 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.

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, disease surveillance in shelters, and other active surveillance activities. The Epidemiology Program staff also participates in emergency response drills for suspected biological terrorist attacks and prophylaxis distribution (point of dispensing (POD) exercises).

More recently our department has participated in passenger monitoring for individuals arriving from Ebola-affected countries in West Africa. The Fellow will respond alongside the Epidemiology Program staff in all emergency response trainings and any responses that may occur.
**Additional Activities**

Large outbreak investigation - actively participates in a large-scale outbreak investigation. This activity will allow the Fellow to learn how to conduct and outbreak investigation and control the spread of illness in an outbreak. This knowledge can be used in conducting TB surveillance and control.

The Fellow will conduct the following activities:
- Design an interview questionnaire or other data collection tool
- Collect data from patient interviews, medical records and laboratory reports
- Create a database for an outbreak
- Use statistical software to analyze and characterize epidemiologic data
- Interpret findings from epidemiologic studies, including recognition of the limitations of the data and potential source of bias and/or confounding
- Recommend control measures, prevention programs, or other public health interventions based on epidemiologic findings

**Mentors**

**Primary**
Diana Martinez, MPH, PhD  
Epidemiology Program Manager/Senior Epidemiologist

**Secondary**
Dana Wiltz-Beckham, Doctor of Veterinary Medicine  
Interim Program Manager