Infectious Diseases-HAI

California Department of Public Health, Center of Health Care Quality/Healthcare-Associated Infections Program

Richmond, California

Assignment Description

The fellow will be an integral member of the HAI Program, working as part of our Investigation & Response team. This team’s responsibilities include providing consultation and technical assistance to local public health jurisdictions and healthcare facilities to investigate and respond to HAI and AR-related cases and clusters. The team comprises three medical epidemiologists, a nurse consultant, three to five infection preventionists, and two AR epidemiologists; the primary responsibility of the epidemiologists is specific to AR containment, and the fellow will be able to participate in and potentially lead AR-related case and outbreak investigations with support and guidance from the other Investigations & Response team staff. While the fellow’s day-to-day interactions will be with the AR epidemiologists, there will be ample opportunity to collaborate and work with members of the Prevention Epidemiology, Data & Research, and Communications & Operations teams as well as outside of the HAI Program with other CDPH communicable disease programs (e.g., Immunization, Infectious Diseases, Tuberculosis Control, Sexually Transmitted Diseases). The HAI Program is co-located with MDL which provides specialized testing, including whole genome sequencing for AR organisms, and there may be daily interaction with MDL staff to coordinate relevant laboratory testing requests and reports.

Day-to-Day Activities

With the support of mentors and other HAI Program staff, the fellow’s day-to-day activities will be as an epidemiologist focusing on AR-related activities. These include managing AR-related data and maintaining a database, interacting with local public health jurisdiction staff and healthcare facilities to investigate HAI and AR-related cases or outbreaks, coordinating with regional, state, and local public health and clinical laboratories, and attending weekly laboratory, investigations, and HAI Program staff meetings as relevant. In addition, the fellow will be given ample dedicated time to complete projects that are requirements of the fellowship. For example, there will be opportunities for in-depth data analyses for special projects that may be designed around the fellow’s own interests using data from NHSN, the California Reportable Disease Information Exchange (CalREDIE), or other sources. There will be frequent opportunities for the fellow to join HAI Program Infection Preventionists on infection control assessments at healthcare facilities. Because California is such a large state, the fellow will be exposed to a large volume and variety of outbreaks and healthcare settings. The HAI Program hosts regular webinars and educational offerings targeting diverse clinical and public health audiences, and the fellow could potentially be a presenter. Various other laboratory, epidemiology, and infectious disease related trainings, conferences and meetings occur throughout the state that the fellow could attend based on his or her interest.
Potential Projects

Surveillance Activity   Surveillance of Antimicrobial-Resistant Pathogens in California

The CDPH HAI Program, as other local and state HAI programs, is part of the CDC Antibiotic Resistance Laboratory Network (AR Lab Network). As such, the state provides specialized testing for novel or multidrug-resistant organisms including carbapenem-resistant organisms (Acinetobacter baumanii, Pseudomonas aeruginosa, and unusual Enterobacteriaceae). A subset of these pathogens test positive for specific AR genes, which results in an alert to CDC. Identification of Candida auris, an emerging drug-resistant yeast, is also an alert value. While the HAI Program maintains a database of all alert value isolates, numbering just over 500, there has not been any structured surveillance of this information. There are several ways these data could be analyzed, including by local public health jurisdiction, type of alert value (e.g., specific carbapenemase type), health facility type, and over time. These data could supplement the laboratory-reportable data that are coming in from CalREDIE (see Surveillance system evaluation description). Health facilities often ask for epidemiologic data specific to their jurisdiction, and this project could begin to address this need.

Surveillance Evaluation   Carbapenemase-Producing Carbapenem-Resistant Enterobacteriaceae (CP-CRE) Surveillance System Evaluation

On October 1, 2019, carbapenemase-producing carbapenem-resistant Enterobacteriaceae (CP-CRE) became the state’s first laboratory-reportable HAI through CalREDIE. While CRE have been locally reportable in some local health jurisdictions, there has not been a single system for collecting, reporting, or analyzing statewide data until now. The state mandates electronic laboratory reporting by all laboratories. We anticipate, given the complexity of reporting CP-CRE (multiple test types and methods, and varying laboratory testing capacity) and the experience of other states that have initiated this type of reporting, that there will be a learning curve. The new surveillance system will have been in place for just under a year once the fellow starts, and an evaluation would be a very timely and useful exercise for the Program to learn from and utilize to improve the system going forward.

Major Project   Molecular Epidemiology of NDM-Producing Enterobacteriaceae in California / Healthcare-Associated Infections-Related Risk Factor Analysis

The CDPH MDL has had the capacity for whole genome sequencing (WGS) of AR isolates since 2015. The lab has sequenced all submitted NDM-producing Klebsiella species and E. coli isolates, and the HAI Program has collected corresponding epidemiologic data for these patients. The NDM gene is prevalent in Enterobacteriaceae in regions outside of the United States, including South Asia, where some patients in our database also received healthcare. Some patients with NDM did not have history of healthcare outside of the United States, however, and likely acquired it within the healthcare system in California. The objective of the project is to understand the molecular epidemiology of these NDM isolates, including their genetic and epidemiologic relatedness and how this might help understand transmission dynamics. This would be an exciting opportunity for a fellow to explore a growing area of interest within the broader field of HAI and AR.

Another potential project would involve merging NHSN data with healthcare administrative data collected by California’s Office of Statewide Health Planning and Development (OSHPD) to examine HAI-
associated risk factors, including socioeconomic status and geography, among others. This study would make a significant contribution to understanding how HAI affect vulnerable populations in California.

**Additional Project Regional Healthcare-Associated Infections/Antimicrobial Resistance Prevention Projects**

The HAI Program partners with local health departments and networks of healthcare facilities (including hospitals, skilled nursing facilities and outpatient clinics) across a range of regional HAI/AR prevention projects. These projects involve convening partners to choose topics most relevant to their region and patient population, meeting in-person to develop and strengthen relationships, foster communication, and provide training and education sessions. During the next two years, the HAI Program will support a project to enhance antimicrobial stewardship implementation among a local network of hospitals and skilled nursing facilities in a single county, a project to improve infection control practices for ventilator-equipped skilled nursing facilities in southern California, and a collaborative focusing on reducing community-onset C. difficile infections in another county. The fellow will have the opportunity to participate in any of these collaboratives.

**Surveillance Activity National Healthcare Safety Network Antimicrobial Use and Resistance Data Analysis**

The HAI Program has access to antimicrobial use and resistance (AUR) data reported by nearly 100 California hospitals through NHSN. We have not yet analyzed antimicrobial use data at the state or regional level, so there are myriad opportunities for the fellow to dive into the data to analyze and present them in ways that may inform potential antibiotic stewardship programs or AR prevention efforts around the state.

**Preparedness Role**

HAI Program staff have responded to local health department requests for infection control and disease surveillance support at evacuation shelters during the recent wildfires, and migrant shelters at the US-Mexico border. Besides active participation in outbreak investigations, depending on the fellow’s interests, he or she may participate in healthcare facility-related preparedness activities that occur during the fellowship, such as pandemic influenza planning and development of guidelines for facilities.

**Additional Activities**

Based on the fellow’s interests, there may be opportunities to collaborate with other CDPH communicable disease programs on projects involving, for example, healthcare-associated Legionnaires’ disease or viral hepatitis.
**Mentors**

**Primary**

Erin Epson, Md

Healthcare-Associated Infections Program Medical Director and Chief

**Secondary**

Tisha Mitsunaga, DrPH, ScM

Antimicrobial Resistance Coordinator, Acting Antimicrobial Use/Resistance Epidemiologist Supervisor