Infectious Diseases-HAI, Infectious Diseases

New York City Department of Health and Mental Hygiene, Division of Disease Control

 Long Island City, New York

<u>Assignment Description</u>

The CDC/CSTE fellow will be fully integrated into the Bureau of Communicable Disease (BCD) at the NYC DOHMH and assigned to the Antibiotic Resistance and Prevention Unit (ARPU). BCD is responsible for surveillance of over 70 reportable diseases and the ARPU was funded in 2016 to support detection and surveillance of antibiotic resistance threats, namely carbapenem-resistant Enterobacteriaceae (CRE). The fellow will be assigned independent analytic, surveillance, and educational projects related to tracking and detecting emerging drug resistant threats. The fellow's core assignment will focus on describing the epidemiology and strengthening surveillance for CRE and other high-priority healthcare-associated infections (HAI). The fellow will be fully integrated into all aspects of the Antibiotic Resistance Laboratory Network (AR Lab Network) supporting the detection of novel antibiotic resistance mechanisms and informing local infection control response efforts. S/he will have the opportunity to participate in general activities of BCD including attending weekly outbreak meetings and serving in the rotation as Research Scientist of the Week to investigate any new or ongoing public health issues in NYC. The fellow will have the opportunity to work on various projects related to surveillance and epidemiology of infectious disease pathogens.

<u>Day-to-Day Activities</u>

- Attend weekly ARPU and BCD specific meetings to discuss current and ongoing acute issues for diseases under surveillance
- Attend monthly meetings with lab counterparts at the NYC Public Health Laboratory (PHL) to discuss detection of novel resistance mechanism and enhance the voluntary isolate submission program
- Investigate AR Lab Network alerts for patients infected with organisms for which no current treatment options exist (pan-resistant) or those infected with resistance mechanism rarely identified in the U.S. Tasks include: interviewing patients using a standardized case investigation form and recommending infection control measures
- Use epidemiologic and laboratory data to identify and investigate clusters of HAIs including interviewing patients, medical chart abstractions, data analysis, and preparing final reports
- As needed, conduct on-site visits to facilities to evaluate infection control practices
- Participate in HAI and antibiotic resistance outbreak investigations in the outpatient (ambulatory care) setting. Activity will also include drafting a field investigation report of findings
- Increase and maintain subject matter expertise on infection control prevention practices for healthcare settings by conducting literature reviews and completing relevant trainings
- Provide data analysis support for NYC reportable diseases
- Develop and execute epidemiologic studies including developing data collection tools, study design, data analysis and interpretation of findings

- Prepare scientific posters and presentations at local, state, and national conferences
- Participate in multi-state calls with CDC and other jurisdictions including representing the agency on Task Force and relevant workgroups

Potential Projects

Surveillance Activity   Enhance Outpatient HAI/AR Detection and Response Efforts

NYS DOH has jurisdiction over reporting containment of hospital-acquired infections in NYC inpatient facilities, so NYC DOHMH's purview is response in outpatient clinics in addition to surveillance of bacterial diseases reportable for all NYC residents. Between August 1, 2018 and July 31, 2019, BCD provided infection control and/or epidemiologic assistance in response to 288 communicable disease clusters or breaches but relies on these instances being identified via routine surveillance, provider reporting, public complaints, or NYS DOH notification. Recently, BCD and ARPU staff have begun strategizing about methods for enhancing NYC DOHMH's HAI/AR detection (e.g., utilizing emergency department syndromic surveillance) and response efforts, including the development and maintenance of a multiple drug resistant organism (MDRO) containment plan for NYC. The fellow will be provided with trainings (internal and external) in order to support and coordinate these activities, including an assessment of the landscape of outpatient facilities in NYC in terms of setting type, infection prevention and control practices, and risks posed to patients. S/he will also lead or support response efforts for the containment of MDROs as well as other infectious disease outbreaks as needed (e.g., measles), including conducting on-site infection prevention and control visits and other capacity-building initiatives.

Surveillance Evaluation   Evaluate the Timeliness and Data Quality Of Reported CRE Infections

In April 2018, DOHMH amended the NYC Health Code requiring laboratory reporting of CRE infections for all residents. Since the Health Code amendment, 35 clinical and reference laboratories have begun routinely report CRE infections to DOHMH. Detection of new and unusual antibiotic resistant threats depends on rapid identification of looming threats. However, the timeliness of reporting and completeness of CRE susceptibility data has not been examined. The fellow will conduct a surveillance evaluation to assess the completeness and timeliness of reporting to shorten response times to disease threats. The fellow will be involved in data analysis and drafting of a surveillance report for this project.

Major Project   Investigate CRE Identified in The Community Setting Among NYC Residents

The NYC Public Health Laboratory is funded through the AR Lab Network to characterize CRE isolates submitted from laboratories (clinical and commercial) that conduct testing for NYC residents. While CRE has become prevalent in several U.S. regions, NYC is considered the epicenter for this group of highly concerning, multidrug resistant pathogens. In 2018, DOHMH received 1,121 reports of laboratory confirmed CRE infection and tested 239 isolates for carbapenemase resistance genes. Transmission of CRE in inpatient settings has been studied and described, but prevalence of and risk factors for CRE in the community is largely unknown. The fellow will have the opportunity to investigate patients reported with CRE who have no known connection to healthcare settings to determine risk factors for CRE acquisition in community settings. S/he will have the opportunity to conduct data collection through patient interviews, data management and analysis for this project. To prevent transmission within the household and during patient care, the fellow will also communicate any infection prevention

recommendations to the patient, family members and clinical providers responsible for the patient's care. In order to use data for action to prevent HAIs, the fellow will create and update protocols for evaluating infection control breaches and implement an algorithm for determining which outpatient facilities warrant onsite infection control inspections.

Additional Project   **Use National Healthcare Safety Network (NHSN) to Establish Antimicrobial Use and Resistance Benchmarks For NYC**

In 2019, NYC DOHMH amended a Data Use Agreement with CDC/NHSN to obtain access to data reported by NYC facilities within the MDRO Module and Antibiotic Use and Resistance (AUR) module. As part of local efforts to reduce antimicrobial resistant infections through antimicrobial stewardship, the fellow will support analysis of AUR Module data to facilitate creating NYC specific benchmarks of antimicrobial usage and resistance, as requested by frequent collaborators at prominent local hospitals. The fellow will also support ongoing analysis of these data to assess the quality of CRE data reported by laboratories in response to the recently passed Health Code mandate.

Additional Project   **Develop and Refine the NYC Antibiogram Mobile Phone Application**

To support clinical providers with empiric treatment decision making, DOHMH secured local antibiotic susceptibility data for pathogens of clinical relevance to develop a citywide antibiogram for urinary tract infections (UTIs) occurring in the outpatient setting. The citywide antibiogram was published on the DOHMH website and wall charts were made available to local healthcare facilities. In response to data needs within clinical settings, DOHMH created a mobile phone application to allow on the fly access to antibiogram data. The fellow will assist with managing data needs related to the app, including but not limited to, conducting environmental scans to update clinical treatment guidelines for pathogens of clinical relevance, and conducting data analysis to establish local antibiotic susceptibility profiles for new pathogens that will be uploaded to the app. The fellow will also be responsible for evaluating usage and uptake of the mobile phone application 1-year post release. S/he will have the opportunity to join and lead NYC Antibiogram Advisory Group calls consisting of an interdisciplinary team of infectious disease physicians, microbiologists and pharmacists who guide this work with their expertise. The fellow will draft a report or make an oral presentation at a regional or national meeting.

Preparedness Role

At the NYC DOHMH, we investigate high burden outbreaks of infectious diseases requiring activation of our Incident Command System (ICS). Previous CSTE Fellows have assisted with outbreaks of multi-drug resistant shigellosis, Legionnaires' disease, measles, and West Nile virus. The fellow will have the opportunity to participate in emergency response trainings, exercises, and events related to these diseases as they arise. S/he will also become familiar with the State Health Operations Center, Incident Command System, and agency-wide response plans.

Additional Activities

Complete a rotation at the NYC Public Health Laboratory to learn the procedures for antimicrobial susceptibility and resistance mechanism testing.

Mentors

Primary   Ellen Lee, MD

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Secondary   Kenya Murray, MPH, CPH

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