Infectious Diseases-Foodborne, Infectious Diseases

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

 Brooklyn, New York

Assignment Description

The CSTE fellow will be fully integrated into the Bureau of Communicable Disease at the NYC DOHMH and assigned to the Enteric, Waterborne and Health Education Unit. They will have their own analytic, surveillance, and educational projects to work on daily. The fellow's main assignment will be with foodborne and waterborne disease surveillance and outbreak investigations. They will gain a detailed understanding surveillance and outbreak investigations, as the unit investigates an average of 150 clusters and outbreaks each year. The fellow will participate in all aspects of the investigations, with the goal of being able to manage them independently. The fellow will have the opportunity to participate in all aspects of the FoodCORE-funded activities, including attending monthly conference calls and annual Vision meetings, participating in CDC site visits, and assisting with FoodCORE-specific surveillance initiatives and projects. The fellow will also participate in waterborne disease cluster review and response, including internal cluster review meetings and presenting surveillance reports to environmental health and laboratory colleagues.

Day-to-Day Activities

- Attend weekly outbreak meetings in BCD to discuss current acute issues for all diseases that BCD tracks.
- Attend biweekly foodborne cluster and outbreak meetings with colleagues from Environmental Health and the Public Health Laboratory to discuss all active investigations.
- Attend biweekly Legionella unit meetings and cluster response meetings.
- Attend quarterly in-person meetings with Environmental Health and the Public Health Laboratory staff to discuss shared projects.
- Assist with reviewing legionellosis reports and present summary data on cases to cluster review group.
- Assist with reviewing parasitic disease surveillance and developing reports to assist in surveillance reporting.
- Investigate hepatitis A cases and arrange post-exposure prophylaxis for close contacts.
- Work with FoodCORE-funded MPH students to help oversee cluster and outbreak investigations.
- Assist with quarterly training of MPH students from NYC public health schools who provide surge capacity to conduct data collection in large outbreak settings.
- Investigate clusters and outbreaks of foodborne disease, which will include interviewing patients, developing databases for data entry, data analysis, and preparing final reports. Visits to restaurants or stores to review food preparation practices and collecting invoices with Environmental Health staff will also be part of some investigations.

- Analyze surveillance data and cooling tower data to assist in assessing the impact of cooling tower regulations on the rates of Legionnaires' disease and cooling tower maintenance in NYC.
- Analyze building data to help determine characteristics of buildings that may influence exposure of residents to Legionnaires' disease.
- Conduct special studies, to include aspects of study design, implementation, data collection, and analysis.
- Prepare presentations and publications for meetings and conferences.

Potential Projects

Surveillance Activity   Investigating Foodborne and Waterborne Disease Outbreaks

Because the fellow will be fully integrated into the foodborne and waterborne illness program, they will gain a detailed understanding of foodborne and waterborne disease surveillance and outbreak investigation within the agency. Clusters and outbreaks in NYC are identified from a variety of sources, including reports from patients or providers, analysis of disease reports, and laboratory testing results. The DOHMH receives investigates approximately 30 foodborne outbreaks, over 100 WGS-identified foodborne clusters, six parasitic waterborne disease clusters, and several legionellosis clusters each year. The fellow will take primary responsibility for investigating some of these outbreaks and clusters, having the opportunity to oversee and become involved in all aspects of the investigations. This will include developing questionnaires, conducting outbreak interviews, analyzing outbreak data (including creating maps incorporating epidemiologic and laboratory data), and writing final reports. For multi-jurisdictional outbreaks, the fellow will participate in multistate calls with other states, CDC, the Food and Drug Administration (FDA), the U.S. Department of Agriculture (USDA), and other relevant agencies. They will have the opportunity to go on restaurant inspections and other field and site visits, conduct hazard analysis critical control points (HACCP)-based food preparation reviews, and take the NYC food safety training that is offered to restaurant operators.

Surveillance Evaluation   Evaluating the Impact of Culture-Independent Diagnostic Testing on Cyclosporiasis Surveillance

Cyclospora is a gastrointestinal parasite that causes watery diarrhea, with consumption of imported food items as the most common cause of infection in the U.S. In NYC, we have seen an increase in cyclosporiasis reports (from 10-20 cases annually prior to 2014-2015, to 50-200 cases annually during 2015-2019) with the integration of a new syndromic-based culture-independent diagnostic tests (CIDT) in clinical laboratories. These tests, commonly referred to as multiplex polymerase chain reaction panels, include targets for multiple pathogens causing gastrointestinal illness in one test to determine the cause(s) of a patient's gastrointestinal symptoms. The fellow will evaluate the increase in use of CIDT among NYC hospital and commercial laboratories on cyclosporiasis surveillance, and compare the clinical, exposure, and demographic factors of cases that are diagnosed by CIDTs versus the traditional ova and parasite exam. Time allowing, there is also the possibility of extending this analysis to other parasitic diseases, such as cryptosporidiosis, giardiasis, and/or amebiasis.

Major Project   Evaluating Foodborne Disease Cluster and Outbreak Detection

The NYC DOHMH has robust cluster/outbreak detection methods. The NYC DOHMH Public Health Laboratory (PHL) performs whole-genome sequencing (WGS) on all Shiga toxin-producing E. coli, Salmonella, and Listeria clinical isolates (as well as select other pathogens) and communicates matches to BCD. BCD has also implemented several advanced aberration detection methods for identifying clusters and outbreaks, such as spatio-temporal and temporal-only cluster analysis using SaTScan, a building analysis where patients' geocoded addresses match addresses of congregate settings, and a rare Salmonella serotype alert that notifies epidemiologists of two or more cases with clinical isolates subtyped with the same rare serotype, among others. The fellow would conduct an evaluation of BCD's various analytic detection methods, including determining how often the cause of the cluster of illnesses is identified, and the time between cluster detection and taking public health action, by method. Based on this evaluation, the fellow would also help to update and rework foodborne cluster detection and investigation protocols. The fellow would be involved in data collection, data management, and data analysis of this project.

Additional Project   Symptomatic and Asymptomatic Food Handler Testing During Restaurant-Associated Outbreak Investigations In New York City

There are approximately 24,000 restaurants in NYC and DOHMH receives approximately 5,000 foodborne illness complaints each year, with about 30 complaints resulting in investigation of a foodborne outbreak associated with a restaurant annually. When a food poisoning complaint is received and an outbreak investigation initiated, the investigations include interviewing cases and controls to determine a common food or exposure, collecting stool specimens from ill patrons, inspecting the restaurant, and requiring bacterial and viral stool specimen testing of all food handlers (symptomatic and asymptomatic) involved in food preparation on the date of exposure. Not all health departments test asymptomatic food handlers, so the frequency of asymptomatic shedding among food handlers is unknown. The fellow would analyze past outbreak investigation data to determine how often food handlers who submitted stool for testing had a positive result and how often those results related to the investigated outbreak's etiology. The fellow would work closely with colleagues in Environmental Health and the Public Health Laboratory to evaluate the utility of food handler stool testing.

Surveillance Evaluation   Evaluation of the Impact of NYC Cooling Tower Regulations on Rates of Legionnaires' Disease In NYC

In response to a large outbreak of Legionnaires' disease in NYC in 2015, NYC enacted cooling tower regulations in the summer of 2015. These regulations require cooling tower owners to test their cooling towers for the presence of Legionella and require DOHMH to inspect the cooling towers. This intervention in a cooling tower-dense city is being evaluated to determine the impact of the regulations on the rates of Legionnaires' disease in NYC and changes to the operation of cooling tower systems. This project is funded by CDC and involves working with environmental health colleagues, CDC staff, and staff from a control city in another jurisdiction. The fellow will help determine the effect of the cooling tower regulations by examining changes in rates of Legionnaires' disease before and after the implementation of the regulations, assessing the impact of clinical testing for legionellosis over time, and assessing whether cooling tower characteristics have an impact on colonization of the cooling tower.

Preparedness Role

The NYC DOHMH has responded to numerous citywide and national emergencies, including the initial outbreak of West Nile virus in 1999, the response to the 9/11 terrorist attacks and anthrax investigation in 2001, the outbreak of Ebola in West Africa in 2014, and most recently the outbreak of measles in 2019, among others. All employees are assigned to an Emergency Preparedness Committee for purposes of planning for and responding to emergencies. The fellow will be assigned to the Surveillance and Epidemiology Team and will be expected to participate in the DOHMH response in the event of an emergency and in all drills and meetings required by the unit. Prior fellows have had the opportunity to participate in point-of-distribution (POD) clinics to disseminate hepatitis A vaccine to patrons of restaurants, participate in POD clinics to test animal shelter staff for influenza after identification of a novel strain in cats, and support investigations of measles cases to ensure rapid identification of contacts at high risk for developing illness.

Additional Activities

Various seminars and trainings are held within BCD and elsewhere in the agency, including a monthly Epi Grand Rounds, regular brown bag sessions, and trainings. Fellows are encouraged to attend any of the presentations and trainings that are of interest. The fellow will also be encouraged to participate in health education activities, such as healthy swimming outreach at NYC pools or rabies education in schools, as well as other acute disease investigations that come up in the Bureau or in other parts of the agency, such as the measles outbreak that was recently investigated in NYC.

Mentors

Primary   Robert Fitzhenry, PhD

                  Director of Waterborne Diseases

Secondary   HaeNa Waechter, MPH

                  Foodborne Disease Epidemiologist