Infectious Diseases, Infectious Diseases-Foodborne

New York State Department of Health, Division of Epidemiology, Bureau of Communicable Disease Control

Albany, New York

Assignment Description

The Applied Epidemiology Fellow will be assigned to the Bureau of Communicable Disease Control (BCDC), where Dr. Angie Maxted, Deputy Director of the Emerging Infections and Statewide Surveillance Program and Deputy State Public Health Veterinarian, will be the primary mentor and Amy Robbins, OutbreakNet Enhanced Coordinator, will be the secondary mentor. BCDC has broad oversight responsibility for surveillance and control of reportable and emerging communicable diseases with a few exceptions (HIV/AIDS, STIs, TB, VPDs, HAIs). The fellow will be fully integrated into BCDC’s fast-paced daily activities and will have the opportunity to work on any number of projects related to the applied epidemiology of communicable diseases. Some examples are described; project choice will be tailored to the interests of the fellow and program needs.

BCDC conducts epidemiologic investigations, routine disease surveillance, and outbreak investigation and control; responds to new or emerging infectious diseases; and provides technical assistance, consultation, training, and education to local health departments (LHDs), hospitals, long-term care facilities, physicians, other health care professionals, and the public. On a daily basis BCDC staff may be working on outbreaks of GI illness, investigations of Salmonella clusters identified by whole genome sequencing, hepatitis A investigations, handling a report of a suspected meningococcal infection, consulting with LHDs or healthcare providers about possible rabies exposures or other zoonotic diseases, influenza surveillance data analysis and report dissemination, vector-borne investigations (e.g., Lyme disease, anaplasmosis, and West Nile fever), producing surveillance reports, revising data collection tools or processes, and preparedness planning. Examples of emerging issues recently handled by BCDC include Ebola, Zika, acute flaccid myelitis, and vaping-related illnesses.

BCDC employs approximately 45 Albany-based staff and 10 field staff, including board-certified infectious disease and preventive medicine physicians, board-certified veterinarians, and PhD/DrPH- and MPH-trained epidemiologists along with nurses, statisticians, wildlife biologists, and other professionals. Strong intradepartmental relationships are maintained with 1) other Bureaus within the Division of Epidemiology (Bureaus of Immunization, Healthcare Associated Infections, Tuberculosis Control, and Surveillance and Data Systems), 2) the Center for Environmental Health, with collaborative approaches to enteric diseases and legionellosis, 3) the Wadsworth Center, which is the NYSDOH public health laboratory and a national leader with complementary foci in research, public health testing (including whole genome sequencing), and science education, and 4) the AIDS Institute, which is responsible for HIV/AIDS and sexually transmitted infections (STI) surveillance, HIV/STI/hepatitis C prevention, LGBTQ health, drug user health, and opioid overdose prevention.

BCDC is a key partner in several academic collaborations including 1) The New York State Integrated Food Safety Center of Excellence, in collaboration with Cornell University, 2) The Northeast Regional Center of Excellence in Vector-borne Diseases, in collaboration with Cornell University, and 3) CDC’s Emerging Infections Program, in collaboration with the University of Rochester. Additionally, the
NYSDOH is formally affiliated with the University at Albany’s School of Public Health, facilitating student internship and research opportunities and faculty positions for NYSDOH staff.

The work environment includes a 7.5-hour work day (37.5 hours/week) and holiday leave. The fellow’s workspace will be located within BCDC offices in the Corning Tower, Empire State Plaza, downtown Albany. Albany is part of New York's Capital District which includes the cities of Schenectady, Troy, and Saratoga Springs intertwined with suburban and rural areas. The area has nationally recognized colleges and universities as well as graduate schools in medicine, law, and pharmacy. The city provides a walkable downtown which is home to theaters, the state museum, and the state capitol; excellent transportation; and excellent four-season outdoor recreational opportunities in the nearby Adirondack, Berkshire, Catskill, and Green Mountains. The proximity to New York City, Boston, Vermont, and Montreal enhances the area’s cultural and recreational opportunities.

**Day-to-Day Activities**

In addition to project work, usual activities will include participation in routine meetings, including a weekly statewide meeting highlighting active investigations, a weekly Investigation Program meeting, and department-wide meetings on timely public health issues. The fellow will join the “Epidemiologist of the Day” (EOD) rotation, during which the fellow will field inquiries from regional offices, local health departments, or the public on subjects requiring technical assistance, and take the lead on any issues that arise on that day.

Day-to-day activities may include (depending on the fellow’s interest and projects chosen):

- Participating in the EOD rotation
- Participating in the whole genome sequence enteric disease cluster analyst rotation
- Providing surge capacity for the student enteric interview team
- Using the Communicable Disease Electronic Surveillance System (CDESS), Electronic Clinical Laboratory Reporting System (ECLRS), hospital discharge data, and other data sources
- Working with local health departments and regional epidemiologists
- Surveillance data assessment
- Statistical data analysis
- Disease outbreak investigation
- Writing scientific papers, fact sheets, brochures, and website content
- Preparing scientific and public presentations and posters, including for conferences
- Working with the public and external stakeholders on antimicrobial resistance prevention and control in NYS
- Attending training classes and exercises for public health emergency preparedness
- Attending training classes on project management and statistical software packages
- Attending scientific conferences within NYS, the region, and nationally, which could include the annual Northeast Epidemiology Conference, the CSTE Annual Conference, International Conference on Emerging Infectious Diseases, and Infectious Disease Week (ID Week)
- Working with Fellowship Primary Mentor and Secondary Mentor on most work days, with scheduled meetings to review progress at least biweekly
**Potential Projects**

**Surveillance Activity**  
The Effect of Culture Independent Diagnostic Tests (CIDTs) on Shiga Toxin-Producing Escherichia Coli (STEC)

Hospital and commercial laboratories are increasingly using culture independent diagnostic tests (CIDT), rather than culture, for STEC testing. As a result, the national case definition was modified to count CIDT positive results. In NYS cases of STEC increased from 231 in 2017 to 427 in 2018. This increase has added to the investigation burden for local health departments (LHDs) and the student interview team. Often, specimens from CIDT-positive testing are either not forwarded to the public health laboratory for confirmatory testing or the organism cannot be isolated. This impacts the ability to conduct molecular testing which allows us to identify clusters of cases.

The CSTE fellow will analyze the data for STEC to answer the following question: How does the increase in cases impact surveillance, investigation, and response? Possible analysis/projects may include:

- Reviewing test results received by commercial laboratories and following up to ensure timely submission to Wadsworth Center
- Calculating rates of isolation at Wadsworth by clinical laboratory and initial test methodology
- Determining whether cases are classified per case definition correctly
- Calculating time and resources used to interview cases
- Conducting interviews of STEC cases in conjunction with the student interview team
- Investigating clusters of STEC cases identified by whole genome sequencing
- Developing algorithms for LHDs to assist with case definition assignment and with testing requirements to allow cases to return to work in sensitive occupations (i.e. food handlers)
- Developing reports based on exposure data for confirmed vs. probable cases

Datasets to be used include: 1) The electronic clinical laboratory reporting system (ECLRS); 2) STEC surveillance data from the Communicable Disease Electronic Surveillance System (CDESS); 3) The Microsoft Access cluster database utilized to document WGS cluster investigations; and 4) Whole genome sequencing results transmitted from Wadsworth Laboratories or in the National Center for Biotechnology and Informatics (NCBI) Pathogen Browser.

**Surveillance Evaluation**  
Evaluate Novel Surveillance Methods to Better Understand the Incidence, Epidemiology, Clinical Features, and Risk Factors of Lyme and Other Tickborne Diseases

Since 2007, NYSDOH has successfully used a sampling algorithm in high Lyme disease (LD) incidence counties to estimate the true number of cases diagnosed based on positive laboratory tests. While this strategy decreases the workforce burden of investigating and classifying 100% of lab reports of LD, it does not address other issues related to case-based surveillance for Lyme and other tickborne diseases including underreporting of physician-diagnosed cases and lack of timely information that can be used to inform risk messaging. NYSDOH has previously documented underreporting of LD in cases of physician-diagnosed erythema migrans rash and encouraged local health departments to develop interventions aimed to increase provider reporting of these cases. In 2018, several Hudson Valley local health departments piloted the use of electronic medical records at a large local medical practice to identify reports LD diagnosed by erythema migrans rash. The CSTE fellow would further evaluate use of
electronic medical record data in this manner to make case-based LD surveillance data more representative of the actual burden of disease without increasing reporting burden on healthcare providers.

Case-based surveillance of LD and other tickborne diseases is also limited in its ability to detect increases in incident cases in a timely manner due to time required to gather clinical data necessary for case classification. The CDC and other high incidence states are exploring utilization of syndromic surveillance to predict the seasonal peak in tickborne disease. The CSTE fellow would explore the use syndromic surveillance to develop indicators of risk for tickborne disease and enable timely risk messaging to healthcare providers and the public. Possible indicators include tick bite visits to healthcare providers, erythema migrans rash diagnoses, and PCR positive lab reports for babesiosis and anaplasmosis.

**Major Project  Estimating Influenza-Associated Mortality Among Persons with Laboratory-Confirmed Influenza and Identifying Mortality Risk Factors**

Influenza confirmed by a clinical laboratory test is reportable in NYS, however, adult deaths related to influenza are not reportable. Because NYS records 50,000-130,000 influenza cases annually, influenza associated deaths could number in the thousands; timely information about these deaths could provide key situational awareness about influenza’s impact each season (disease severity) and identify risk factors for mortality. Unfortunately, current methods of estimating deaths associated with influenza involve counting death certificates with influenza or pneumonia listed as a cause of death; however, use of influenza alone is poorly sensitive and pneumonia is poorly specific. Additionally, although pediatric influenza-associated mortality is nationally notifiable, we suspect underreporting by healthcare providers and medical examiners.

We propose using existing influenza case report data (e.g., patient identifiers and address, ordering healthcare provider and facility information, and laboratory result information including influenza type/subtype) and death certificate data. This project will involve retrospectively matching cases of influenza, as reported electronically by laboratories, against NYSDOH’s vital records database by personal identifiers to identify deaths within 30 days after a positive influenza test result. Causes of death will be extracted for further analysis, e.g., characterization of the mortalities as related to respiratory or cardiovascular conditions vs. an unrelated cause of death, demographics, or socioeconomic indicators based on residence. Results of this project will provide a more accurate estimate of influenza-associated deaths within NYS, improve national reporting of pediatric deaths, and provide needed demographic and cause-of-death information for patients who died shortly after an influenza diagnosis. Methods developed from this project could be used to monitor the severity of an influenza season in relation to previous seasons by influenza type/subtype, age group, and other factors; thus, the fellow would collaborate with the Influenza Surveillance team to implement close-to-real-time monitoring of deaths during the 2021-2022 influenza season.

**Surveillance Evaluation  Evaluation of the New York State Rabies Reporting System (RRS)**

In NYS, outside of NYC, animal exposures for which rabies postexposure prophylaxis (RPEP) is initiated are reportable to local public health authorities. With pre-approval by a local health department (LHD), RPEP is administered at no cost to the exposed person if the exposure is consistent with NYSDOH and national guidelines. Healthcare expenditures associated with RPEP administration are reimbursed by the LHD after billing third party insurance. NYSDOH subsequently reimburses the LHD for costs of RPEP...
incurred. An electronic surveillance system was created, the Rabies Reporting System (RRS), to function as the repository for human RPEP events and animal rabies testing, including cost and reimbursement data. The fellow would be asked to evaluate RRS to assess limitations of the system and its data. The fellow would have the opportunity to be part of a team developing system modifications, if needed, and training materials for LHD staff. Additional analyses could include: 1) describe the epidemiology of RPEP events in NYS; 2) determine the completeness of RPEP reporting into the RRS using other data sources; and 3) identify areas in which prevention messages could be targeted by mapping locations of exposures.

Additional Project Hepatitis C: Enhanced Surveillance Among Women of Childbearing Age

In 2018, New York State launched the Governor’s statewide initiative to eliminate hepatitis C. Under the initiative, the NYS Department of Health initiated processes to increase hepatitis C testing and treatment to reach hepatitis C elimination statewide by 2030 and strengthen surveillance activities to monitor progress towards the elimination. In recent years, surveillance data has shown a drastic change in the distribution of newly reported cases of hepatitis C by sex and age. In 2008, most newly reported cases were identified among ‘baby boomers’, persons born between 1945-1965. Since 2013, and described as associated with the current opioid epidemic, most newly diagnosed cases are identified in the 15-35 age group. In 2017, females comprised 40% of newly reported cases and approximately 60% of those cases were among women of childbearing age. Vertical transmission can occur in 5-10% of births, yet pediatricians are not routinely aware of maternal hepatitis C infection status and children are rarely tested. The fellow will collaborate with the ‘Hepatitis C Surveillance team’ and the ‘Surveillance in Pregnancy and for Infants with Congenital Exposures team’ to develop enhanced surveillance of women of childbearing age. The fellow may be involved with one or more of these activities: 1) assess trends, risk factors, barriers, and outcomes among women of childbearing age using surveillance data, 2) collaborate to identify and review processes used by other states to conduct enhanced surveillance for hepatitis C in women of childbearing age, 3) review laboratory and case surveillance reports to design a process to determine pregnancy status among women of childbearing age with hepatitis C infection, 4) collaborate on the development of a data matching protocol with vital records to identify children born to hepatitis C positive mothers, 5) based on clinical laboratory reports for hepatitis C, conduct an analysis of providers to assess gaps in reporting of pregnancy status, and 6) through collaborations with the surveillance teams and the local health departments, pilot approaches to complete a full case investigation, including patient and/or provider interviews when a pregnant woman is identified.

Preparedness Role

Several BCDC staff, including Dr. Maxted, work closely with the NYSDOH Office of Health Emergency Preparedness on infectious disease preparedness planning and response. The fellow will be trained on the Countermeasure Data Management System (CDMS) that is used in point-of-distribution (PODs) for hepatitis A and other outbreak responses, both to enter attendees to PODs and to develop the health screening tools used during the PODs. The fellow will have the opportunity to complete FEMA study courses on the Incident Command System and participate in drills and exercises that occur periodically throughout the state. Additionally, the fellow can participate in outbreak response activities or evaluate prior response activities. Recent activities have included joint tabletop exercises with multiple agencies for statewide avian influenza preparedness planning, and response activities (e.g., standing up call
centers, issuing testing and clinical guidance) for Zika virus, hepatitis A outbreaks, and the 2018-2019 measles outbreak.

**Additional Activities**

The fellow will have opportunities to work on communicable disease outbreaks and emerging diseases in conjunction with BCDC staff, other NYSDOH staff, and partners, such as Cornell University and other state agencies.

Other potential projects include:

- Leading enhanced cyclosporiasis surveillance during May-August
- Develop waterborne disease surveillance reports and calculate performance measures
- Perform a match of death certificate data to cases of listeriosis
- Develop training materials for health care providers on best practices for hepatitis B testing
- Update surveillance guidance and algorithms for testing and case-classification
- Evaluate the impact of changes to the national surveillance case definition on disease incidence rates and ability to detect trends over time for select vector-borne disease
- Review and update algorithms used for SatScan cluster analysis for legionellosis and other conditions
- Implement, train, and evaluate a new foodborne complaint system that is under development
- Incorporate an evaluation component for online trainings on the New York Food Safety Centers of Excellence website
- Review, modify, or create disease-specific pages in the communicable disease surveillance system for low-incidence zoonotic diseases
- Assist subject matter experts to analyze and review electronic laboratory reporting data for a variety of communicable diseases; develop business rules for mapping lab data to the surveillance system (CDESS); and assess data quality following implementation

The fellow’s projects will include opportunities to fulfill all the CSTE Fellow assignment deliverables.

**Mentors**

**Primary**  
Angie Maxted BS, MS, DVM, PhD  
Deputy Dir., Emerging Infections & Statewide Surveillance Program; Deputy State Public Health Vet

**Secondary**  
Amy Robbins BA, MPH  
Senior Epidemiologist and OutbreakNet Enhanced Coordinator