ID: 57439025
Infectious Diseases - Foodborne, Infectious Diseases - Host Site Description
North Carolina Department of Health and Human Services

Assignment Location: Raleigh, US-NC
North Carolina Department of Health and Human Services
Health and Human Services/Public Health

Primary Mentor: Carl Williams, DVM
Public Health Veterinarian
NC Division of Public Health

Secondary Mentor: Nicole Lee, MPH
Foodborne Epidemiologist
NC Division of Public Health

Work Environment
Hybrid

Assignment Description

The fellow would be primarily placed in the foodborne/waterborne team within the Communicable Disease Branch of the Epidemiology Section under the state's Division of Public Health. Secondarily, the fellow would be assigned to work with the vaccine-preventable disease (VPD) team, within the same Division, Branch, and Unit. The state's foodborne team consists of four individuals: a public health veterinarian who supervises the team; a foodborne epidemiologist; a nurse consultant; and a temporary administrative assistant. The state's VPD team consists of four individuals as well: a medical director, two epidemiologists, and a nurse consultant. As a decentralized state, these groups are responsible for entering paper and faxed labs, closing every reportable condition after investigation and reporting to CDC, gathering supplemental surveillance variables requested by CDC, investigating clusters and outbreaks of illness identified by our state lab and/or CDC, providing training to local health departments, providing technical assistance to local health departments, maintaining relationships with partners such as the NC Food Safety and Defense Task Force, effectively communicating with the public and health care providers, and other duties as assigned. Both the foodborne/waterborne team and VPD team are very small given the large population size of North Carolina, resulting in a lot of work to be distributed among a small group. Having a CSTE Fellow on board would be an asset to our small teams, allowing for a Fellow to quickly integrate and take ownership of projects.

The Fellow's anticipated day-to-day activities include entering positive lab results, checking our surveillance system to close out events and report to CDC, being responsible for investigating and reporting clusters identified by our state lab and/or CDC partners, including creating summaries for state team, participating in national calls, fulfilling CDC's data requests, and working with local health departments to obtain outbreak investigation information. Additional day-to-day activities include assisting with technical assistance requests and working on special projects regarding modernizing our surveillance and data analysis practices. These activities will evolve as the Fellow gains an understanding of our systems and comfort completing independent tasks. Initial activities will include shadowing to understand processes and talking with staff about what we all do and how it all fits together. As the fellow progresses in their knowledge there will be more advanced work including evaluating a surveillance system and special projects. There are also efforts to increase data modernization, visualization, and collaboration across both the unit and branch that we expect the Fellow will be a participant of.

ID: 57439025
Infectious Diseases - Foodborne, Infectious Diseases - Host Site Description
North Carolina Department of Health and Human Services

Describe Statistical and Data Analysis Support, Such as Databases, Software, and Surveillance Systems Available to the Fellow

The Fellow will have access to the state surveillance system called NCEDSS (NC Electronic Disease Surveillance System) after completing training. SAS and R software will be made available depending on the preference of the Fellow. Access to the state syndromic surveillance system, NC-DETECT, will also be available if deemed necessary. Other software such as ArcGIS, PowerBI, and Tableau may be made available as projects are defined. Statistical and data analysis support is currently readily available with multiple colleagues within the MCU serving as resources to the Fellow. Additional resources include the State Center for Health Statistics and the data team housed within the Epidemiology section. The State of North Carolina recently launched LinkedIn Learning access to employees, which the Fellow will also have access to.

Projects

Surveillance Activity Title: Annual Report for Enterics and Vaccine Preventable Diseases (VPDs) Surveillance and Outbreaks

Surveillance Activity Description:
Annual reports are updated and posted to the NCDHHS once data are finalized each year. All programs within the Medical Consultation Unit revamped their annual reports in 2025, but there are still improvements that can be made. The annual reports mostly analyze data from the North Carolina Electronic Disease Surveillance System (NCEDSS), but there are other supplemental data sources to explore, such as REDCap, where additional projects are created and used to aid in foodborne outbreak investigation. The Fellow would be responsible for updating the surveillance data, expanding the report to include outbreak data and other variables determined to be of significance, as well as interpreting the data. The annual reports need to include appropriate language to interpret the content for a variety of audiences as they are public-facing reports

Surveillance Activity Objectives:
Objectives: To provide updated surveillance data for the 2026 and 2027 annual reports. To expand the annual report to include outbreak data. To provide interpretation language for the annual report's content.

Expected deliverables: Final annual report that includes updated surveillance graphs, outbreak data, and data interpretation language.

Surveillance Activity Impact:
Local and state officials and the public will have a comprehensive look at multiple characteristics for each of the pathogens included in the annual reports, as it will be posted on the main NC DHHS data pages and referenced in press releases, updates, and presentations. This information can help identify high risk areas, groups, and seasons, to improve response times and interventions for both surveillance and outbreaks.

Surveillance System Evaluation Title: Outbreak Surveillance, Reporting and Data Management

Surveillance System Evaluation Description:
Local Health Departments report all outbreaks of communicable diseases. A REDCap project is used by local health departments for initial notification and review. Then, an outbreak event is created within North Carolina's Electronic Disease Surveillance System (NCEDSS). NCEDSS allows for case events to easily be linked to the outbreak, as well as for additional linelists and resources to be shared within the outbreak event. This fosters easy sharing between LHDs and the state. There is also an ability to change the scope of the outbreak as it continues to unfold. The outbreak package is

standard for all reported outbreaks, and once outbreaks have concluded, they must be finalized and closed by state staff. Additional reporting to CDC is required for certain diseases, and gastrointestinal outbreaks must be reporting to CDC's National Outbreak Reporting System (NORS). These multiple systems create multiple opportunities for duplicative work among multiple groups, human transcription error, and missed notifications. We want to know if there are opportunities to be more efficient with our limited local and state resources. We would also be interested in what other states are using for their outbreak surveillance to understand if there may be lessons learned that we could implement.

Currently during large responses, such as measles and H5N1, contact tracing is done via REDCap project. This includes interview conversation tracking, as well as active monitoring for symptoms. There have been conversations regarding integrating those efforts into NCEDSS for better data management, which could also be explored during the evaluation.

Surveillance System Objectives:
Objectives: To evaluate the existing surveillance systems utilized for outbreaks in North Carolina against CDC's Guidelines to Evaluate a Public Health Surveillance System. To describe how North Carolina's outbreak surveillance compares with other outbreak surveillance systems used by other states.

Expected Deliverables: Obtain a history of the purpose of our current outbreak surveillance structure. Meet with subject matter experts from our unit to understand their program's use of outbreak surveillance systems. Meet with the foodborne team regarding their use of NORS for outbreak surveillance. Create outbreak events in existing surveillance systems to understand the user experience. List the pros and cons of existing NC outbreak surveillance systems, and suggestive alternatives based on those findings. Assessment of outbreak surveillance systems used by other states with comparable populations. Suggest alternatives based on findings that support more efficient ways to report, respond, and investigate outbreaks.

Surveillance System Impact:
Both local and state staff express frustration with the duplicative tasks of outbreak surveillance. This evaluation's potential to identify areas to streamline the process would impact time and effort required by state and local staff. Reducing duplicative work and transcription errors increases time available for more high impact work for both local and state staff, who both have limited resources.

Major Project Title: Geospatial analysis of disease incidence, clusters, and outbreaks

Major Project Description:
Public health has learned that many diseases occur more frequently in certain demographics, as well as in specific communities. Having the ability to geographically analyze data allows for local health departments to better plan, intervene, and stop the spread of communicable diseases. Better understanding who and where diseases are likely to occur leads to up-stream public health policy and disease prevention and control.

Major Project Objectives:
Objectives: Map the geographic distribution of both enteric and vaccine-preventable disease incidence. Identify spatial and temporal patterns, clusters, and pockets of disease burden at appropriate geographic scales. Asses spatial variation in vaccine coverage over the last decade. Examine the relationship between disease burden and social vulnerability, using the social vulnerability index (SVI). Demonstrate the utility of GIS tools for data-driven public health decision-making. To identify enteric pathogens with spatial and temporal clustering using ArcGIS or other mapping software. To build standard operational procedures for state staff to use to evaluate spaciotemporal relationships with enteric pathogens. Geographically analyze vaccine coverage rates and incidence of vaccine preventable diseases (VPDs) over the last decade.

Deliverables: Integrated datasets. Maps and other visualizations that summarize the analyses. Written summary report.

Major Project Impact:
Geographic distribution of illnesses is an additional visualization to possibly help identify factors contributing to what we see. It is often said, "A picture is worth a thousand words." These deliverables will support targeted and equitable public health interventions.

Additional Project #1 Title: The Effect of Culture Independent Diagnostic Tests (CIDT) on Public Health Surveillance and Action
Project #1 Type: Surveillance Activity

Project #1 Description:
CIDTs have become more widely used for their quick turnaround time, minimal expense, and broad testing capabilities. The unfortunate consequence is the absence of a bacterial isolate needed to find out the species of various pathogens to apply appropriate control measures. Applying additional control measures to a person whose infection wasn't consequential could result in additional frustration for individuals due to lost wages from childcare and workplace exclusions. This analysis involved identifying trends in the proportion of cases with laboratory sequencing results over time. This analysis also involves working with various communicable disease programs to understand the impact of CIDTs on their surveillance and outbreak response efforts.

Project #1 Objectives and Expected Deliverables:
Objectives: To identify trends in CIDT use and sequencing results over time for high consequence pathogens from various program areas (e.g., foodborne/waterborne, vaccine preventable diseases, etc.) within the Medical Consultation Unit.

Expected deliverables: Report outlining findings and recommendations. Present to the Laboratory Response Forum with findings, to demonstrate the value in forwarding CIDT specimens to the state lab of public health for additional testing. Present to local health departments via the Technical Assistance and Training Program (TATP) Webinars to share findings and provide context to requests from the state teams to have specimens forwarded to the state lab of public health.

Project #1 Impact:
From a foodborne/waterborne perspective, we have strong control measures for individuals in high-risk settings who are positive for typhoidal Salmonella and shiga toxin-producing E coli (STEC). Having additional laboratory testing results to further indicate the type of Salmonella and STEC would ensure we're apply control measures appropriately rather than keeping individuals out of work and/or childcare needlessly awaiting following up test results. When additional laboratory tests are not performed on certain pathogens, this creates unnecessary surveillance events in many cases, causing wasted time among existing limited resources. We might inappropriately apply control measures when the species is unknown. This project provides evidence for public health action that will affect our laboratory partners, local health department colleagues, and NC citizens infected with reportable conditions needing an additional layer of laboratory analysis to inform if and what type of control measures need to be applied.

Additional Project #2 Title: Vital Records Data Surveillance
Project #2 Type: Surveillance Activity

Project #2 Description:
Data that may be supplemental to VPDs are captured through multiple surveillance systems in North Carolina. The North Carolina State Center for Health Statistics is home to all vital records data within the state and includes death certificate

data. In North Carolina's Electronic Surveillance System (NCEDSS), there are variables that track spontaneously delivery for persons who were recently pregnant, as well as if the individual died and if that death was in relation to the disease being investigated. We hope to merge the data from these two systems and validate birth or death instances that may have been previously unaccounted for.

Project #2 Objectives and Expected Deliverables:
Objectives: Describe inconsistencies between NCEDSS and vial records data systems. Highlight patterns of errors that may impact disease mortality surveillance. Implement a data correction process.

Expected deliverables: Validated merged dataset. Data quality assessment summary. Error and discrepancy analysis. Data correction and future validation recommendations. Final report of findings.

Project #2 Impact:
This project will improve the accuracy and transparency of public health mortality surveillance data and will support data quality improvement. Enhancing the reliability of our reportable data will ultimately increase confidence in public health and public health data systems. Ensuring the accuracy of these variables will contribute to additional surveillance regarding the severity of illness associated with certain pathogens.

Additional Project #3 Title: Evaluation of CDC's National Outbreak Reporting System (NORS)
Project #3 Type: Surveillance System Evaluation

Project #3 Description:
CDC's National Outbreak Reporting System (NORS) houses GI outbreaks reported by state and local jurisdictions. Surveillance system evaluations usually apply to individually notifiable conditions, but NORS could be evaluated as a surveillance system of outbreaks.

Project #3 Objectives and Expected Deliverables:
Objectives: To identify how well NORS aligns with CDC's guidance regarding characteristics of a good surveillance system.

Expected deliverables: Review of the NORS user manual to gain an understanding of the system. Outbreak data entry for various pathogens and transmission types. Export of NORS data to assess utility. Utilize CDC's surveillance system evaluation criteria to apply to this evaluation.

Project #3 Impact:
This project could inform how states can better utilize NORS and improve the quality and timeliness of the data they report.

Additional Project #4 Title: Integration of CDC supplemental forms into North Carolina's Electronic Disease Surveillance System (NCEDSS)
Project #4 Type: Major Project

Project #4 Description:
CDC requests supplemental surveillance forms for four foodborne pathogens: Listeria, Vibrio spp, Thyphoid/Paratyphoid, and Cyclospora. This presents a problem with duplicative data entry and surveillance questions that are not the same as North Carolina's surveillance forms in NCEDSS. The ability to have CDC's supplemental surveillance forms as part of our NCEDSS system would save countless person-hours in multiple areas including reducing the number of questions used to

interview cases, reducing the time to transfer supplemental forms to NCEDSS and CDC, creating one place for all surveillance information to be housed.

Project #4 Objectives and Expected Deliverables:
Objectives: To integrate CDC supplemental forms for Listeria and Vibrio species into the North Carolina Electronic Disease Surveillance System

Expected deliverables: Comparison of NCEDSS existing surveillance datapoints to CDC surveillance forms. Create printable surveillance forms to mirror electronic form in NCEDSS. Meet with surveillance unit staff to discuss logistics and turn around times. Test the updated surveillance forms in the NCEDSS testing platform. Provide training to local health department nurses on new forms in NCEDSS. Create an export file that can be used to bulk upload surveillance data to CDC's SEDRIC database.

Project #4 Impact:
This will save countless person-hours for local and state health department staff. Time saved can be redirected to less administrative and more applied public health activities.

Please Describe the Fellow's Anticipated Role in Preparedness and Response Efforts – Include Activities and Time Allocation (Required Competency of Fellowship)

The foodborne team provides outbreak response training to local environmental health specialists and communicable disease nurses, multiple times a year in various formats. The Fellow can coordinate and update the regional trainings that our team has developed and given across that state. Coordination would include developing a registration survey, working with the foodborne team to update and present content, and creating, distributing and analyzing an evaluation. This may take about 80 hours over the course of months. Additionally, CDB hosts a communicable disease conference every other year and there is generally an outbreak investigation portion in either a pre-conference session or as part of a plenary. The Fellow would help coordinate and present content. Moreover, the Fellow will be expected to lead outbreak investigations after contributing to various roles to gain experience in outbreak response.

An additional activity in this category is coordinating our "Pilot Noro Test Kit" program with our state lab partners. The purpose is to increase the number of specimens being sent to the state for norovirus testing. Analysis of these specimens identifies circulating strains in NC and compares those to other states and the national picture. There is none to minimal time needed during the summer but requires about 5 hours per week during norovirus season (i.e. October - March).

The VPD program has a high likelihood of needing to implement a response. Measles in particular, would create a need for an incident management team (IMT) to stand up, in which the Fellow would be expected to participate. Needs would range from data analysis, contact management, and call center needs. As VPDs continue to increase and vaccine coverage continues to decrease, preparedness efforts are ongoing, and the Fellow would be an active participant in hot washes, post response.

Please Describe the Fellow's Anticipated Role in Cluster and Outbreak Investigations – Include Activities and Time Allocation (Required Competency of Fellowship)

The Fellow will immediately be invited to participate in outbreak response calls and activities to gain experience prior to leading outbreak investigations. During the Fellow's 2nd year, this person will be responsible for managing cluster notifications received from NC state lab (NC SLPH) partners and/or CDC. This includes maintaining the cluster database, investigations, reporting results to state foodborne and lab teams, providing updates to CDC's national database, and

participating in national calls to provide investigation updates. This activity will take most of the Fellow's time during peak enterics season (i.e. May - September). Weekly time allocated to this activity ranges from as little as 5 hours during off peak season to as much as 30+ hours during peak season.

Approximately 50-100 gastrointestinal outbreaks are reported to the state health department annually. These outbreaks provide ample opportunities for a Fellow to become involved in response efforts.

As VPDs continue to increase and vaccine coverage continues to decrease, outbreaks are inevitable. The Fellow would be expected to participate in local outbreak investigations and consultations as needed.