

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 placed in the foodborne/waterborne team within the Communicable Disease Branch of the Epidemiology Section under the state's Division of Public Health. The state's foodborne team consists of four individuals: a public health veterinarian who supervises the team; a foodborne epidemiologist; a nurse consultant; and an administrative assistant. As a decentralized state, this group is responsible for investigating every reportable foodborne condition and reporting to CDC, gathering supplemental information requested by CDC, investigating clusters 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 through the NC Food Safety and Defense Task Force, effectively communicating with the public and health care providers, and other duties as assigned.

The Fellow's anticipated day-to-day activities include checking our surveillance system to close out events and report to CDC, investigating and reporting clusters identified by our state lab and/or CDC partners 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 with independent work. 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 work on evaluating a surveillance system and special projects.

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 software will be put on the Fellow's work laptop. R can also be made available depending on the preference of the AEF. Access to the state syndromic surveillance system could be available too if deemed necessary. Statistical and data analysis support is limited, but resources include the State Center for Health Statistics and the data team housed within the Epidemiology section. There are additional free SAS resources online and possible funding for attending a SAS analysis class.

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Projects

Surveillance Activity Title: Analysis of top 10 Salmonella serotypes to assess seasonality, geographic distribution, severity, case demographics, and trends

Surveillance Activity Description:

National characteristics of Salmonella serotypes have been described. As the tenth most populous state in the union, a clear picture of top Salmonella serotype characteristics among NC residents is needed to inform state and local partners resulting in a more targeted and timely intervention, where applicable.

Surveillance Activity Objectives:

Objectives:

- To identify top 10 Salmonella serotypes among NC residents.
- To identify the most severe Salmonella serotypes among NC residents.
- To identify if there is a geographic and seasonal distribution of particular Salmonella serotypes within NC.
- To identify at risk populations for the top 10 Salmonella serotypes among NC residents.

Expected deliverables:

- List of top 10 Salmonella serotypes among NC residents for the last 20 years.
- Graphs of seasonality by Salmonella serotype.
- Maps of geographic distribution by Salmonella serotype.
- Case demographic tables by Salmonella serotype.
- Final report summarizing findings. Ideally this report would be suitable for publication in a peer reviewed journal.

Surveillance Activity Impact:

Local and state officials will have a comprehensive look at multiple characteristics for each of the top 10 Salmonella serotypes. This information can help identify high risk areas, groups, and seasons, to improve response times and interventions for both surveillance and outbreaks. An initial, crude, geospatial analysis (2010 to 2020) of all reported Salmonella cases in NC indicates that the cases are not uniformly distributed in the state. This is not what we expected and we need to better understand serotype, severity of illness and demographic characteristics to better inform our prevention and education activities.

Surveillance System Evaluation Title: Evaluating NCEDSS as a surveillance system for salmonellosis

Surveillance System Evaluation Description:

The North Carolina Electronic Disease Surveillance System (NCEDSS) is a robust surveillance system that allows for real-time transmission of data between local and state users. This system houses surveillance and outbreak data for all NC reportable conditions. Getting data out of the system and customizing existing surveillance forms comes with many challenges. We want to know the pros and cons of NCEDSS as a surveillance system for salmonellosis. We would also be interested in what other states are using for Salmonella surveillance, what advantages those other systems provide, and what cons exists with those other systems.

Surveillance System Objectives:

Objectives:

- To evaluate the North Carolina Electronic Disease Surveillance System against CDC's Guidelines to Evaluate a Public Health Surveillance System.

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- To describe how NCEDSS compares with other surveillance systems used by other states for Salmonella surveillance and outbreak response.

Expected Deliverables:

- Meeting with Surveillance Unit to better understand the history and use of NCEDSS.
- Meeting with the foodborne team regarding their use of NCEDSS for Salmonella surveillance.
- Creating Salmonella events in NCEDSS to understand the user experience.
- List the pros and cons of NCEDSS for Salmonella surveillance.
- Comparison of surveillance system characteristics with NCEDSS.
- Assessment of Salmonella surveillance systems used by other states with comparable populations.

Surveillance System Impact:

This project will provide the foodborne program with context and opportunities for improvements to NCEDSS.

Major Project Title: Establishing baseline values for enteric pathogens

Major Project Description:

Baseline values for enteric pathogens are needed to provide a comparison to identify aberrations. These datapoints are needed by year, month, and MMWR week using 5 year median values.

Major Project Objectives:

Objectives:

- To produce a set of baseline values for enteric pathogens for comparison and identifying aberrations.
- To improve timeliness of cluster detection.

Expected deliverables:

- Fellow will provide analysis code used to create baseline values over various time periods and the final dataset.
- Fellow will provide analysis code to evaluate aberrations for various time periods.
- Fellow will produce a report for clusters identified.

Major Project Impact:

Ideally this system could serve to accurately and quickly identify aberrations in weekly case counts that may indicate an outbreak is occurring. This could be done regularly during “the season” for particular pathogens or on demand. This program has been developed in other states and we believe it would be of value in NC: Detection of Outbreak Signals Using R - PMC (nih.gov).

Additional Project #1 Title: Establish a “pipeline” (i.e. steps) for state staff to evaluate spatiotemporal relationships with enteric pathogens

Project #1 Type: Surveillance Activity

Project #1 Description:

Syndromic surveillance staff were awarded funding to identify spatiotemporal relationships for communicable disease. Their use of foodborne data identified statistically significant relationships for certain enteric pathogens. The fellow would work with that team to create a pipeline (i.e. steps) for state staff to perform the same analysis in ArcGIS.

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Project #1 Objectives and Expected Deliverables:

Objectives:

- To create a standard set of steps to allow state foodborne staff to use ArcGIS for evaluating possible spatiotemporal relationships for foodborne pathogens.

Expected deliverables:

- Create a tool (e.g. infographic, narrative, video, PowerPoint) for state staff to follow to perform this spatiotemporal analysis.
- Create a pipeline within ArcGIS to perform spatiotemporal analysis.

Project #1 Impact:

Mapping morbidity for foodborne pathogens is an important tool to see disease distribution, but this specific project has an aspect of identifying clustering, which provides a type of statistical significance, where applicable. This clustering aspect provides analytic confidence that the visual patterns are not by chance. This information can be shared with applicable jurisdictions to solicit their input on what might explain the observed clustering of specific enteric pathogens. This type of analysis has never been used by our program nor unit prior to the funding provided by CSTE to test its utility.

Additional Project #2 Title: Use of spatial analysis tools to detect clusters

Project #2 Type: Major Project

Project #2 Description:

A July 2020 MMWR article describes the use of automated spatiotemporal analysis to detect a Salmonellosis outbreak in a more timely manner than traditional notifications from laboratory results. We're interested in seeing if this same type practice could be used in NC.

Project #2 Objectives and Expected Deliverables:

Use of spatial analysis tools to detect clusters

1. Objective
 - a. To determine if spatial analysis tools to detect clusters are possible in NC given the NC data sources and public health infrastructure.
 - b. To provide counties with local public health data to aid in cluster detection and response.
 - c. To identify locations where further education or control measures may be needed.
2. Expected deliverables
 - a. Fellow will determine pros and cons of using spatial analysis tools for NC cluster detection, by end of first year.
 - b. Fellow will test the use of SaTScan (or comparable platform) to identify clusters compared to the timeliness of traditional notification sources (i.e. SLPH).
 - c. Fellow will develop standard reports for local health departments where clusters were identified, by Q2 of year 2.
 - d. Fellow will develop a Standard Operating Procedure for spatial analysis of clusters by the end of year 2.

Project #2 Impact:

Detecting clusters has a real public health impact by reducing additional morbidity and mortality. The ability to detect clusters even faster than our traditional notification channels multiplies our ability to reduce additional illnesses and possible deaths. This spatiotemporal project gives us the ability to evaluate if this is possible in NC.

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Additional Project #3 Title:

Project #3 Type: Surveillance System Evaluation

Project #3 Description: Evaluation of CDC's National Outbreak Reporting System (NORS)

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, Typhoid/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.

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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 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. These regional trainings usually include 3-4 sessions across the state during the Fall or Spring. 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.

An additional activity in this category is coordinating our “Pilot Noro Test Kit” program with our state lab partners. This effort to obtain more suspect norovirus specimens to test at the state lab has existed for two years with less than expected results. Analysis 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 about 5 hours per week during norovirus season (i.e. October - March).

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

The fellow 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 the majority 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.

Please Describe the Fellow’s Anticipated Role in the COVID-19 Response – Include Activities and Time Allocation

There are no anticipated COVID-19 response needs for this Fellow.

Please Describe Opportunities for Fellows to Work in Health Equity as well as Incorporating Diversity, Equity, and Inclusion into their Work

One of the Fellow’s surveillance activities involves describing Salmonella serotype data. This analysis should identify populations at risk by serotype, including race, ethnicity, age, gender, and geographical location.