ID: 44496964
Infectious Diseases - Foodborne, Infectious Diseases - Host Site Description
Tennessee Department of Health

Assignment Location: Nashville, US-TN
Tennessee Department of Health
Communicable and Environmental Diseases and Emergency Preparedness

Primary Mentor: Mary-Margaret Fill, MD, MPH
Deputy State Epidemiologist
Tennessee Department of Health

Secondary Mentor: Katie Garman, MPH
Foodborne and Enteric Diseases Program Director
Tennessee Department of Health

Work Environment
Hybrid

Assignment Description

The CSTE fellow will fully integrate into the TDH's Communicable Environmental Disease Services and Emergency Preparedness (CEDEP) program. He or she will gain a detailed understanding of TN's Foodborne Diseases Active Surveillance Network (FoodNet), Foodborne Diseases Centers for Outbreak Response Enhancement (FoodCORE), Environmental Health Specialist Network (EHS-NET), Rapid Response Team (RRT), and TN's Integrated Food Safety Center of Excellence's (TN Food Safety CoE) surveillance and programmatic activities. FoodNet conducts surveillance for nine foodborne disease pathogens, and FoodCORE centers work collaboratively with CDC to develop new and better methods to detect, investigate, respond to, and control multistate outbreaks of foodborne diseases. The TN CoE is a partnership between TDH and the University of TN and serves as a resource for local, state, and federal public health professionals to respond to foodborne outbreaks. TN has been a member of FoodNet and EHS-NET since 2000, a member of FoodCORE since 2010, and developed the TN CoE in 2012 and RRT in 2023.

The fellow will be expected to participate and eventually lead all aspects of an outbreak investigation, including questionnaire design, interview training, case/control interviews, data collection and management, data analysis, after-action reviews, and report writing. Collaboration with local, regional, and state health department staff and agencies outside of TDH, such as the Tennessee Department of Agriculture, CDC, FDA, USDA-FSIS, and others, will be necessary. CEDEP staff members and fellows have been involved in numerous outbreak investigations and surveillance system projects. Our previous fellow, Claire Umstead, evaluated TDH's Vibrio surveillance system to better understand the system's strengths and weaknesses during a time of changing laboratory testing practices. Ms. Umstead worked on numerous foodborne outbreak investigations with frontline public health staff. She has also collaborated with state and local environmental health and epidemiology staff to create and implement a statewide enteric disease outbreak response protocol. Ms. Umstead completed all CSTE requirements within one year and currently serves at the Foodborne and Enteric Diseases Program's Rapid Response Team Coordinator. A previous CSTE fellow, Ms. Jane Yackley (Class XIV), collaborated with our previous State Epidemiologist (now TDH Chief Medical Officer), Dr. Jones during her fellowship on the development of a manuscript published in Foodborne Pathogens and Disease titled Foodborne Disease Outbreaks in the United States: A Historical Overview (https://www.liebertpub.com/doi/abs/10.1089/fpd.2017.2388). Ms. Yackley was also the recipient of the 2019 CSTE Alumnus Award and has served as the Direction and Coordination Officer for TDH's COVID-19 response.

Our fellow will have the opportunity to collaborate with CDC and other regional Food Safety CoEs in developing and delivering food safety training and educational materials to states and jurisdictions in need. In collaboration with the University of TN, the fellow will have the opportunity to participate in genetic sequencing projects. Our fellow will also

work with UT to develop best practices on marketing on-line outbreak response trainings for epidemiologists, nurses, disease investigators, laboratorians, and environmental health specialists.

Our fellow will also work with TDH's Surveillance System and Informatics Program (SSIP) to assist the Foodborne and Enteric Diseases Program (FED) in the implementation of either the Foodborne Diarrheal Diseases Message Mapping Guide (FDD MMG) or a recreation of the foodborne pages in the National Electronic Disease Surveillance System (NEDSS) Base System or REDCap. This will drastically change how TDH captures and manages foodborne disease surveillance data. The fellow will be instrumental in working with both FED and SSIP staff in creating new enteric disease case report forms, working with SSIP staff to create new pages in the NBS or REDCap, piloting data entry, and evaluating the MMG/updated foodborne disease pages.

We anticipate the new fellow will similarly and successfully work within the context of CEDEP. The fellow will be fully supported to complete projects and take on responsibilities that will influence statewide activities.

DAY TO DAY ACTIVITIES

- Meet with primary and secondary supervisor (preferentially in-person) weekly
- Attend weekly CEDEP meetings, including FoodNet / FoodCORE staff meetings, EHS Net and Environmental Health meetings and SSIP meetings
- Work with SSIP staff to develop and/or modify enteric disease pages in NBS or REDCap
- Revise enteric disease case report forms to model pages developed in NBS or REDCap
- Participate fully in interviewing, cluster evaluation, and acute foodborne outbreak investigations
- Become familiar with Whole Genome Sequencing (WGS) and analyzing and interpreting WGS data
- Interview enteric disease cases using a standardized surveillance interview tool
- Serve as a consultant for local and regional health department staff on questions regarding foodborne disease outbreak investigations
- Work with the Foodborne Outbreak Coordinator in managing and analyzing enteric outbreak data
- Provide data analysis and report writing support to local and regional health departments
- Attend all statewide epidemiology trainings, including monthly CEDEP conference calls and face-to-face meetings
- Conduct special studies to include aspects of study design, implementation, and analysis
- Prepare presentations and publications and deliver them at state and national meetings

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

The Communicable and Environmental Disease Services and Preparedness (CEDEP) Section of the TDH employs over 60 epidemiologists. Epidemiologists from various programs often meet and consult on how to best analyze data, set up databases, and report results. CEDEP epidemiologists also have established a Young Career Professionals group that meets routinely to review journal articles, discuss professional development opportunities, and seek career advice. Our fellow will be integrated within this epidemiology network and will be given the trainings and opportunities all epidemiologists at TDH receive. The fellow will be able to participate in SAS, GIS, REDCap, and Tableau training delivered in CEDEP. He or she will also be either introduced and/or trained on CEDEP's various surveillance systems including NEDSS, E-HARS, etc.

ID: 44496964
Infectious Diseases - Foodborne, Infectious Diseases - Host Site Description
Tennessee Department of Health

Projects

Surveillance Activity Title: A review of FoodNet performance metrics from 2019-2024

Surveillance Activity Description:
Since 2019, Foodborne and Enteric Diseases (FED) staff have developed weekly FoodNet data quality and performance metric reports for Central Office and field staff. Performance metrics include a percentage of cases interviewed and completeness of variables such as hospitalization, admission and discharge date, race/ethnicity, sex, age, symptoms, and others. Performance reports are sent to field staff monthly to encourage program performance. All metrics are also calculated by FED staff and reviewed by the FoodNet program at CDC. CDC FoodNet compares metrics among all FoodNet sites. To further improve Tennessee's metrics a multi-year comprehensive review is needed.

Surveillance Activity Objectives:
- Review each year of final performance metrics and identify new/deleted variables; these variables may need to be excluded if they were not measured during the study period (2019-2024)
- Develop a new database including performance metric data from 2019-2024
- Analyze the new database to determine areas of improvement and deficiencies
- Develop a presentation to showcase findings for CEDEP leadership (State Epidemiologist and Deputy State Epidemiologist)
- Write an abstract describing the project to present at the CSTE Annual Meeting

Surveillance Activity Impact:
It is important to be aware of needed program improvement. This analysis will provide the FED program with a better understanding of areas of improvement where additional staff training or other resources may be needed. Also, showcasing continued success with performance indicators is important to exhibit effective use of program funding during a time when resources are limited.

Surveillance System Evaluation Title: An Evaluation of Tennessee's Salmonella Surveillance Activities

Surveillance System Evaluation Description:
Since 2000, the incidence of Salmonella infection in Tennessee has ranged from 11.5 to 19.2. Over the past 20 years, Tennessee has not seen a significant decline in Salmonella cases. In 2023, the incidence of Salmonella in Tennessee was 14.4, shy of the Healthy People 2023 11.4 goal. Our fellow will conduct a temporal and geospatial review of TN's Salmonella cases to determine where prevention efforts should be focused to reach the 2030 goal of 11.4 or lower. Our fellow will also describe Salmonella cases by age, race, ethnicity, and socioeconomic status to examine possible disparities among these groups.

The fellow will evaluate the usefulness of Tennessee's Salmonella surveillance system in collecting case information and potential exposures of Salmonella infections in a timely way. The fellow will utilize the CDC Guidelines for Evaluating Public Health Surveillance Systems, with a particular focus on the following attributes:
- Simplicity: Is the case definition of Salmonella being applied appropriately? This will be assessed by reviewing the case classification based on the laboratory reports. In the absence of laboratory data, epidemiological data will be evaluated for epi-linked cases.
- Data quality: Was the data collected and recorded on the Salmonella case report form and in NBS/REDCap complete and valid?
- Timeliness: What is the time interval between the onset date/isolate date and reporting/investigation of Salmonella cases?

- Sensitivity: How does Tennessee's Salmonella surveillance system help in identifying clusters and outbreaks of Salmonella?

Surveillance System Objectives:

- Describe the number and rate of Salmonella cases in TN from 2000-2024
- Describe the top 5 Salmonella serotypes since 2000
- Compare rates among age, race, and ethnicity groups to determine the group at
- Identify and describe (i.e., race, age, serotype, international travel) cases with serious outcomes (hospitalization or death) from Salmonella infection
- Identify locations where Salmonella infections have been highest in TN since 2000 by top 5 serotypes
- Interview local public health staff and FoodCORE's Interview Team who conduct Salmonella investigations and document their process and document successes and barriers to completing the Salmonella case report form and conducting other components of the investigation (i.e., identifying cases that need test of cure to return to daycare or work)
- Interview members of the CDC FoodNet to identify successes and barriers associated with Salmonella surveillance activities
- Evaluate the completeness of the 2023 and 2024 Salmonella case report forms
- Review the last five years of the annual FoodNet Laboratory Survey to identify laboratory testing method changes
- Determine the percentage of Salmonella specimens/isolates not sent to the State Public Health Laboratory for confirmation and molecular subtyping
- Monitor Salmonella clusters in the System for Enteric Disease Response, Investigation and Coordinator (SEDRIC) and Tennessee's Foodborne Illness Complaint System
- Complete a surveillance evaluation report with suggestions on how to improve reporting and investigation of Salmonella
- Develop an abstract describing the surveillance system project to present at the CSTE Annual Meeting
- List common food and non-food exposures by Salmonella serotype
- Work with local and regional health departments to identify methods to educate populations most affected by Salmonella

Surveillance System Impact:

This project will allow Tennessee's Foodborne and Enteric Diseases (FED) program to better understand racial, ethnic, and socioeconomic characteristics of Salmonella cases reported in Tennessee. The project will also allow us to determine areas of TN where Salmonella infections by serotype are most prevalent and attributes of cases with serious outcomes (hospitalization or death). The information gained from the surveillance project will allow FED staff to describe barriers to interviewing cases and identify ways to target educational efforts toward groups at high risk for contracting Salmonella and/or developing serious complications.

Major Project Title: Root Cause Intervention Study

Major Project Description:

This Environmental Health Specialist Network (EHS-NET) study led by EHS-NET staff and our CSTE fellow will focus on the root cause identification and control measure implementation of cooling violations identified during routine food inspections. Improper cooling of Time/Temperature Control for Safety (TCS) foods is a contributing factor that has been identified in many Tennessee-specific foodborne outbreaks. Additionally, improper cooling violation observations during routine inspections have more than doubled from 2021 to 2024. Further, improper cooling was identified in the FDA

ID: 44496964
Infectious Diseases - Foodborne, Infectious Diseases - Host Site Description
Tennessee Department of Health

Retail Food Risk Factor Study as a significant time/temperature control violation observed in both fast food and full-service restaurants.

Understanding the root causes of food safety violations is essential to accurate and effective control measure implementation. Root causes of violations provide the "why" violations occur and inform long-term control measures. Root causes may be broadly categorized with internal system variables, including processes, foods, equipment, people, and economics. The root causes of cooling violations are not well studied. The goal of this study is to better understand the root causes of cooling violations through the development of an intervention tool, application of this tool within identified study locations, and evaluation of the tool's impacts on violation compliance.

Our CSTE fellow will develop an intervention tool that will allow study participants to better identify root causes and control measures of cooling violations. The tool's effectiveness will be measured against locations with similar violations but without the intervention tool.

Major Project Objectives:

- Complete an analysis of cooling violations using past restaurant inspection data
- Develop a root cause and control measure intervention tool based on cooling violation analysis; this tool will include common violation examples, associated root causes based on the 5 root cause categories (process, food, economics, people, and equipment), and root cause control measures
- Develop a post-intervention survey tool to collect violation, root cause and control measure data; this tool will focus on establishment demographics, status of root cause controls implemented, manager perceptions of root cause controls and opportunities for improvement
- Identify 100 intervention locations and 200 control locations
- Develop a study database
- Enter violation and demographic data for both study groups in the study database
- Develop a post-intervention data collection plan
- Develop data analysis plan for EHS-NET program staff

Major Project Impact:
The expected public health impact of this study is to better understand root causes of cooling violations in food service establishments in Tennessee. A better understanding of these violations will provide Environmental Health Specialists throughout Tennessee with tools and techniques to better identify these violations and educate establishments about how to prevent them. With improvements in cooling violations, the risk of illness and outbreaks will be reduced.

Additional Project #1 Title: Evaluation of Exclusion Policies for High-risk Populations
Project #1 Type: Major Project

Project #1 Description:
In 2015, Tennessee's Foodborne and Enteric Diseases (FED) program developed exclusion guidance for high-risk groups (i.e., food handlers, childcare workers and attendees, and healthcare workers) with enteric illness to provide a set of standardized guidance for exclusion, restriction, and reinstatement for the state of Tennessee. This guidance was created to provide general guidelines for local and regional health departments. However, if other actions were warranted, health departments could deviate from this guidance where they deemed necessary. The exclusion guidance aims to provide general consistency and a framework to TDH's response to enteric diseases and their affected groups. The guidance creation was led by Ashley Coatsworth (CSTE Class 12) and reviewed by the Tennessee Medical Leadership Team. The Red Book, 28th edition; Control of Communicable Diseases Manual, 19th edition; and the 2009 Food Code (effective 7/15/2015) were the resources used to develop this guidance. The document has served as a useful tool for field staff; however, we have received comments that it is too long and repetitive. The goal of this project is to review

the literature and practice of other health departments to determine updates to the current guidance and to streamline the information to make the guidance more user-friendly for field staff.

Project #1 Objectives and Expected Deliverables:

- Review the literature to see if current recommendation for restriction and reinstatement is still current.
- Interview 4-5 other state health departments to learn more about their current exclusion guidance
- Interview TDH field staff to identify challenges associated with excluding cases with enteric illness and pros and cons to the current guidelines
- Develop a plan to streamline and shorten the current document
- Identify a way to track excluded cases
- Develop a one-page reference sheet outlining updated recommendations

Project #1 Impact:
This project will further improve current guidelines to prevent the spread of enteric illness in the community. Once this project is complete, FED staff will have a better understanding of the challenges associated with excluding high-risk cases with enteric illnesses. Finally, a system will be developed to track high-risk cases with a recent enteric illness where exclusion is recommended, and overall compliance with recommendations will be monitored.

Additional Project #2 Title: Build Syndromic Surveillance Process for HUS, Norovirus, and other enteric Outbreak Surveillance
Project #2 Type: Surveillance Activity

Project #2 Description:
Syndromic surveillance uses chief complaint and discharge diagnosis data from hospitals across the state to identify trends in various health conditions. Currently, Tennessee has access to the ESSENCE syndromic surveillance system but does not routinely incorporate this surveillance avenue into enteric disease surveillance. In particular, this avenue could be useful for identifying clusters or outbreaks of pathogens where individual cases are not laboratory reportable (e.g., norovirus) and for identifying diagnoses of hemolytic uremic syndrome, where reporting.

Project #2 Objectives and Expected Deliverables:

- Receive ESSENCE access and training on building queries and dashboards
- Gather and review any existing dashboards and discuss with the team how they could be improved
- Present to the FED team on the capabilities of ESSENCE and meet with the outbreak team to identify 2-3 conditions to monitor routinely using ESSENCE
- Develop ESSENCE dashboards for selected conditions. Solicit and incorporate feedback from the outbreak team
- Meet with the outbreak team to develop a plan for incorporating these dashboards into routine surveillance activities and cross-train staff
- Write a protocol delineating the process for routine monitoring of existing dashboards and a simple ESSENCE SOP for future use
- Include any custom query conditions that may be useful in developing a new query down the line
- Optional: compare historical ESSENCE data during outbreaks, and current data during an ongoing outbreak, to determine how robustly ESSENCE may be able to assist with active case finding

Project #2 Impact:
This project will supplement existing surveillance and outbreak detection methods to monitor increases in disease activity, illness burden, and potentially identify disease cases that other reporting methods may have missed.

Developing a process to then follow up on these identified clusters/cases will also help Foodborne and Enteric Diseases and other TDH staff better understand reportable disease training needs across hospitals.

Additional Project #3 Title: New Employee Training Plan
Project #3 Type: Major Project

Project #3 Description:
Like many public health departments, TDH has experienced staff turnover in local, regional, and state public health staff since the beginning of the COVID-19 pandemic. To ensure new employees receive consistent program information, it is important to develop a new employee training plan. This plan will incorporate organizing existing training materials and resources into a set curriculum to be delivered quarterly to new employees. Training gaps will also be identified and prioritized for development.

Project #3 Objectives and Expected Deliverables:

- Update the current list of local, regional, state staff who work on foodborne and enteric disease surveillance and outbreak investigations
- Identify current new employee training materials and resources
- Work with FED staff to identify training/resource gaps and prioritize the development of these training/resources
- Develop a training curriculum for new employees
- Develop evaluation tool for new employee orientation
- Identify trainers for new employee orientation
- Schedule and host new employee orientation
- Analyze orientation evaluations and identify areas of improvement
- Identify a central location (i.e., shared drive) to house all training materials and resources

Project #3 Impact:
Ensuring all new employees receive consistent program information is essential. Consistency ensures that all new hires receive clear and accurate messages about their roles and responsibilities with foodborne and enteric disease surveillance, outbreak investigations, and the program's expectations. This minimizes confusion, misunderstandings, and mistakes. Also, having training materials in one centralized location for local, regional, and state staff to reference will reinforce job responsibilities and expectations and help answer questions as they arise. Finally, when employees feel well-informed about their responsibilities and the program's purpose, they are more likely to feel connected to the program's mission and goals, improving engagement and reducing turnover.

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

Foodborne and enteric disease outbreak preparedness and response will be a primary job function for our fellow. The fellow will be incorporated into the Foodborne and Enteric Diseases (FED) outbreak team and will be responsible for updating the program's outbreak protocol and participating in and leading foodborne and enteric disease outbreak investigations. Our fellow will be able to work with frontline public health staff, the Department of Agriculture, FDA, and other partners on local and multi-state outbreak and cluster investigations. They will participate in at least one environmental assessment of a food service establishment implicated in a foodborne illness outbreak and will assist FED environmental health specialists and FDA in conducting traceback and trace-forward activities. Our fellow will become familiar with the State Health Operations Center and receive training in Incident Command System for public health outbreak investigations. The fellow will also serve as surge capacity during any CEDEP-related outbreaks and emergency response activities outside of foodborne and enteric illness outbreaks. Time allocation: 10-15 hours/month.

ID: 44496964
Infectious Diseases - Foodborne, Infectious Diseases - Host Site Description
Tennessee Department of Health

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

Our fellow will participate in the FED Program's weekly enteric disease cluster meeting, where the Foodborne and Enteric Diseases (FED) outbreak team reviews molecular subtyping data to visualize human, animal, and environmental isolates' genetic relatedness. Our fellow will examine closely related isolates by reviewing the case report form or obtaining information on the origin of the animal/environmental isolates. After reviewing epidemiological data of genetically related isolates and reviewing the National Center for Biotechnology Information to find additional cases/isolates outside of Tennessee, our fellow will report his/her findings during the FED Program cluster meeting and will record information in a REDCap database. If a common source is discovered, moving the investigation from a cluster to an outbreak investigation, our fellow will lead (with support and guidance from CSTE mentors and FED outbreak team members) the outbreak investigation moving forward. As the outbreak investigation lead, our fellow will be asked to coordinate outbreak investigation activities among each discipline (epi, lab and environmental health) at the state and local level. They will be instrumental in developing routine situation reports and will engage with external partners such as FDA and CDC if necessary. Finally, our fellow will be responsible for developing final outbreak report and will develop an abstract/manuscript describing at least one investigation they led. Time allocation:15-20 hours/month.