

ID: 87739188

One Health, Infectious Diseases - Foodborne - Host Site Description

Virginia Department of Health

Assignment Location: Richmond, US-VA
Virginia Department of Health
Division of Surveillance and Investigation

Primary Mentor: Eleanor Labgold, PhD, MS
State Public Health Entomologist
Virginia Department of Health

Secondary Mentor: Kelsey Holloman, MPH
Foodborne Disease Epidemiology Program Manager
Virginia Department of Health

Work Environment

Hybrid

Assignment Description

The Virginia Department of Health's Office of Epidemiology is responsible for a broad range of disease surveillance and control activities in Virginia. The fellow would work mainly within the Office's Division of Surveillance and Investigation (DSI), which is responsible for the surveillance, control, and prevention of foodborne and enteric diseases, respiratory and vaccine-preventable diseases, and zoonotic and vector-borne diseases. The Fellow will become a member of the DSI team of epidemiologists and attend relevant meetings. Some of the projects will be focused on surveillance, others will involve conducting or supporting investigations, and some projects will illustrate the complementary nature of surveillance and investigation activities. Opportunities also exist to work on healthcare associated infections, antibiotic use and resistance, vaccine preventable illnesses, and to participate in emergency preparedness exercises and activities.

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

Databases/Surveillance Systems

Virginia Electronic Disease Surveillance System (VEDSS): The Division of Informatics and Information Systems (DIIS) manages VDH's primary surveillance system (VEDSS) and ancillary data systems, including the onboarding and receipt of electronic messages from providers and laboratories for disease reporting. VEDSS also provides a platform upon which program-specific modules can be built to meet state and program area requirements. For diseases/conditions that DSI is responsible for conducting surveillance for, DSI serves as the data owner of these VEDSS data. DSI Regional Epidemiologists serve as VEDSS trainers for local health district (LHD) staff, ensuring that LHD communicable disease programs have a sufficient number of VEDSS users to review, enter, and submit notifications on reportable conditions. The Regional Epidemiology teams also use VEDSS data to create regional reports for LHDs in their jurisdictions to identify trends in reportable conditions.

Virginia Outbreak Surveillance System (VOSS): The Virginia Outbreak Surveillance System (VOSS) is a DSI-managed data system for tracking outbreak investigations, documenting outbreak records, and providing outbreak information. Data from these outbreak investigations are used to inform response strategies, measure disease trends, allocate resources appropriately, monitor effectiveness of prevention and control measures, and assess public health impact.

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Electronic Surveillance System for the Early Notification of Community-based Epidemics (ESSENCE): ESSENCE is a Virginia enhanced (syndromic) surveillance tool for early recognition and monitoring of disease events, including outbreaks and potential bioterrorism events, in near real time. While originally developed to detect outbreaks and bioterrorism events, it is now used for surveillance of infectious and chronic diseases, injuries, mental health conditions, and environmental exposures. ESSENCE provides graphic and tabular displays of chief complaints and discharge diagnoses from hospital emergency departments, urgent cares, and provides school absenteeism rates. Aberration detection algorithms identify unusual patterns for epidemiologic review. ESSENCE is available to public health department staff responsible for syndromic surveillance.

National Healthcare Safety Network (NHSN): NHSN is a CDC surveillance tool for healthcare-associated infections. NHSN provides facilities, health departments, tracking system, states, regions, and the nation with data needed to identify problem areas, measure progress of prevention efforts, and ultimately eliminate healthcare-associated infections. NHSN now serves over approximately 25,000 medical facilities tracking HAIs.

SEDRIC: The System for Enteric Disease Response, Investigation, and Coordination (also known as SEDRIC) is a secure, cloud-based platform for foodborne and animal contact outbreak investigations. SEDRIC helps streamline and coordinate outbreak investigations by combining epidemiologic, laboratory, and traceback data in real time.

Software

R: R is a common programming language and software for statistical analysis at VDH. R software is available at no cost to VDH staff. A wide variety of free resources, trainings, and extension packages are available for R.

SQL: SQL is a common programming language at VDH. SQL Server Management Studio (SSMS) is available at no cost to VDH staff.

Research Electronic Data Capture (REDCap): REDCap is a mature, secure web application for building and managing online surveys and databases. REDCap can be used to rapidly develop a variety of projects using either the online designer or the offline method using a data dictionary, which can be later loaded into REDCap. This system provides automated export procedures for data downloads to Excel and common statistical packages (SPSS, SAS, Stata, R), as well as a built-in project calendar, a scheduling module, ad hoc reporting tools, and advanced features, such as branching logic, file uploading, and calculated fields.

Power BI: Power BI is a data visualization tool available to staff at VDH at no cost. Power BI is newer to VDH. If you need assistance with Power BI, the Data Learning Collective will provide assistance.

Projects

Surveillance Activity Title: Chagas Surveillance in Pregnant Persons

Surveillance Activity Description:

Chagas disease is a parasitic disease caused by infection with *Trypanosoma cruzi*. This parasite is spread by infected fecal matter from Triatomine insects, and is endemic in areas of Mexico, Central, and South America. Although U.S.-acquired cases are extremely rare, there are an estimated 300,000 persons living in the United States with a Chagas infection (mostly chronic infections). Long-term complications for Chagas infections include gastrointestinal or respiratory illness and/or abnormalities. Congenital Chagas (passed from pregnant parent to fetus) is also a concern.

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Chagas disease is not a nationally notifiable condition, nor is it reportable in Virginia. Multiple health agencies (CDC, NIH) recommend that clinicians screen pregnant persons coming from endemic regions for Chagas disease. The Virginia Department of Health would seek someone to assess this recommendation (such as, determine how many other states or jurisdictions have made this recommendation, assess how many people this might affect in Virginia, etc.) and potentially assist with its implementation within the Commonwealth (such as, draft a Health Alert Network message to clinicians alerting them of the new recommendation, creating educational materials for clinicians.)

Surveillance Activity Objectives:

- Experience in surveillance of a voluntary/non-reportable condition
- Complete online training in VEDSS (Virginia's NBS system)
- Describe current knowledge of Chagas cases as reported to VDH
- Describe population at-risk
- Assess and implement screening recommendations

Surveillance Activity Impact:

Although most congenital infections are believed to be asymptomatic, complications can range from low birthweight, premature birth, and later development of organ damage. Implementing surveillance recommendations to screen pregnant persons with risk would avert congenital transmission of Chagas, as well as offer a treatment intervention opportunity to the infected parent.

Surveillance System Evaluation Title: Rabies Surveillance in Virginia

Surveillance System Evaluation Description:

The processes involved in rabies surveillance in Virginia are multi-faceted. The Division of Surveillance and Investigation is currently responsible for receiving animal bite reports, coordinating with LHDs, assessing human exposure risks and determining if post-exposure prophylaxis (PEP) is necessary, and communicating with federal partners (i.e., CDC and USDA). DSI works closely with the state public health laboratory (the Division of Consolidated Laboratory Services, DCLS) and with the Office of Environmental Health to test animal samples for rabies.

Surveillance System Objectives:

- Participate in intra- and inter- agency rabies work groups
- Summarize and describe work-flow and data-flows across the surveillance system parts
- Training in and access to REDCap database
- Training in and access to the Environmental Health Database (EHD) database
- Evaluate PEP data collection and storage processes
- Identify areas of difficulty and recommend improvements

Overall: to assist in summarizing a more standardized best practices approach to rabies investigations across jurisdictions to include more consistent responses, and more streamlined data reporting to include not only animal and human exposure information but also human PEP administration information (reportable condition). The goal is to have each jurisdiction respond to rabies investigations consistently and by using best practices and also allows animal and human exposure data and human PEP data to be housed in an easily accessible, user-friendly, secure database. Ideally, this data would be easy to retrieve and summarized in a user-friendly report format.

Surveillance System Impact:

Animal bite reports and suspected encounters with rabid wildlife in Virginia are not uncommon. As rabies requires rapid public health action to assess the exposure, potentially test the animal, and administer PEP (which is reportable in Virginia), a well-functioning surveillance system is crucial for optimal public health impact.

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Major Project Title: Enteric Disease Cluster and Outbreak Investigation

Major Project Description:

Whole Genome Sequencing (WGS) enteric disease clusters identified in Virginia, that exceed established thresholds, are investigated by the FDET to identify potential sources associated with illness. The FDET is also actively involved in the investigation of multistate enteric disease clusters and outbreaks. Exposure details are collected from cases and promptly shared with other state and national public health partners (CDC, FDA, USDA FSIS) to ensure rapid identification of potential harmful products. The FDET also works closely with VDH local health district epidemiology and environmental health partners, and the Virginia Rapid Response Team (RRT) during investigations to provide subject matter expertise, discuss traceback requests, and increase communication among all partners.

Major Project Objectives:

The CSTE AEF will receive training to assist the FDET with assessing and investigating potential enteric disease clusters and outbreaks. This will include case follow-up, exposure history review, data collection and analysis, participating in cluster and outbreak investigation meetings, attending weekly Virginia RRT meetings, and traceback activities. The AEF will also learn and utilize various data management systems used during enteric disease cluster and outbreak investigations including VEDSS, REDCap, and the CDC System for Enteric Disease Response, Investigation, and Coordination (SEDRIC).

By the end of the first year, the AEF will begin to offer technical assistance and provide updates to local health department staff related to investigations. A data analysis summary of enteric disease cluster investigations, with measurement metrics to include the number of clusters/outbreaks investigated, investigation outcomes, vehicles identified, and other endpoints will be completed by the AEF.

Major Project Impact:

Conducting enteric disease cluster and outbreak investigations is a critical public health function that protects the health of Virginians.

Additional Project #1 Title: Analysis of the National Healthcare Safety Network (NHSN) Antimicrobial Use and Resistance (AUR) Module

Project #1 Type: Surveillance System Evaluation

Project #1 Description:

The NHSN AUR Module provides a mechanism for Virginia acute care hospitals to report and to analyze antimicrobial use (AU) and/or antimicrobial resistance (AR) data to inform benchmarking, reduce antimicrobial resistant infections through antimicrobial stewardship, and interrupt transmission of resistant pathogens at individual facilities or facility networks. The Virginia Department of Health has access to data submitted to the NHSN AUR module from Virginia hospitals. The fellow will work with the Antimicrobial Resistance and Antimicrobial Stewardship Program Manager to learn how to extract and analyze data from the AUR module.

AU Option

- One output measure included in NHSN's AU Option is the Standardized Antimicrobial Administration Ratio (SAAR). The SAAR is a risk-adjusted benchmarking measure of antibiotic use that can help inform stewardship efforts by enabling hospitals to see how their antibiotic use compares to other facilities. The fellow will analyze different types of SAARs based on antimicrobial groupings and locations in addition to comparing SAARs for hospitals with different bed sizes and geographic locations.

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AR Option

- The AR Option collects patient-level, deduplicated, isolate information, including antimicrobial susceptibility testing results, for >20 organisms from cerebrospinal fluid, lower respiratory tract, blood, and urinary specimens. Two output measures included in the NHSN's AU Option is the Standardized Resistant Infection Ration (SRIR) and the Pathogen-specific Standardized Infection Ration (pSIR). The SRIR and pSIR are risk-adjusted benchmarking metrics used to analyze antimicrobial resistance and infections associated with specific pathogens. The fellow will analyze SRIR and pSIR and compare these metrics for hospitals with different bed sizes and geographic locations. The fellow will also extract antibiogram data included in the NHSN AR Option to summarize statewide susceptibility patterns.

Project #1 Objectives and Expected Deliverables:

- Complete training on NHSN
- Describe antimicrobial prescribing trends utilizing data from the NHSN AU option
- Describe antimicrobial resistance trends utilizing data from the NHSN AR option
- Work with antibiotic stewardship programs at acute care hospitals to identify needs
- Create facility-specific reports using NHSN AUR data

Project #1 Impact:

Tracking and reporting antimicrobial use and resistance to the NHSN AUR Module can provide valuable data for public health and antimicrobial stewardship at the state level. Additionally, the AU Option within the AUR Module enables facilities to benchmark antimicrobial usage and make meaningful comparisons, allowing them to identify areas for improvement and implement targeted interventions to optimize antimicrobial prescribing. The data obtained from NHSN supports public health surveillance and can be shared with facilities to implement targeted patient interventions. A statewide analysis of AU and AR trends identifies areas where additional antimicrobial stewardship efforts may be targeted to improve antimicrobial use and decrease antimicrobial resistance.

Additional Project #2 Title: Tick Surveillance in Virginia

Project #2 Type: Surveillance Activity

Project #2 Description:

The vectorborne team conducts active tick surveillance across the Commonwealth every year, and manages a passive surveillance system for tick submissions, to inform risk of tickborne disease. The Fellow can work with the State Public Health Entomologist to be trained in tick identification, tick ecology, tick preservation, and tick collection methods to assist with both active and passive surveillance processes. The Fellow can be trained in GIS mapping and data visualization to analyze and present this type of data.

Project #2 Objectives and Expected Deliverables:

- Identify ticks of public health importance
- Conduct active tick surveillance methods
- Training and use of REDCap to record passive submissions
- Create site-specific reports with tick findings

Project #2 Impact:

Tickborne disease cases have been steadily rising across the United States, and the emergence and expansion of tickborne disease remains a significant public health challenge.

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

The Office of Epidemiology plays a prominent role in emergency preparedness and response activities. Staff work closely with the VDH Office of Emergency Preparedness and healthcare associations in Virginia to conduct a wide range of activities, which the Fellow will have an opportunity to participate in, including serving as part of the 24-hour on-call rotation for the Office of Epidemiology, emergency preparedness exercises and drills, and responding to public health emergencies. The Fellow will complete National Incident Management/Incident Command System trainings, including the opportunity to complete the NIMS/ICS 300 training in-person. Recent past Fellows have helped conduct enhanced surveillance related to a Vice-Presidential debate hosted on a Virginia college campus, and following a major hurricane that affected Virginia. There will likely be more surveillance opportunities surrounding mass gatherings or natural disasters in the future. Following the COVID-19 pandemic, there is an increased focus on preparing long-term care facilities and other healthcare settings for infectious disease responses. The Fellow may also choose to join a local chapter of the Medical Reserve Corps, which will provide for additional exposure to emergency preparedness trainings and exercises.

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

The CSTE AEF will receive training to assist the FDET with assessing and investigating potential enteric disease clusters and outbreaks. This will include case follow-up, exposure history review, data collection and analysis, participating in cluster and outbreak investigation meetings, attending weekly Virginia RRT meetings, and traceback activities.