ID: 59291219
Infectious Diseases, Infectious Diseases - Foodborne - Host Site Description
Nebraska Department of Health and Human Services

Assignment Location: Lincoln, US-NE
Nebraska Department of Health and Human Services
Office of Epidemiology

Primary Mentor: Bryan Buss, DVM, MPH, DACVPM
CDC Career Epidemiology Field Officer (CEFO) and Nebraska State Public Health Veterinarian
Nebraska Department of Health and Human Services

Secondary Mentor: Jeff Hamik, MS
Vector-Borne Disease Surveillance Coordinator & Public Health Entomologist
Nebraska Department of Health and Human Services

Work Environment
100% In-person

Assignment Description

Because of the tremendous public health and medical burden of infectious diseases, and because of the great potential for prevention and reduction of morbidity and mortality, Nebraska public health officials have prioritized the understanding of the epidemiology and control of infectious diseases in our population. As we increasingly focus our resources on controlling and reducing health care costs, we believe that all sectors of society will need and want a thorough understanding of the distribution and determinants of infectious diseases in our population. Our agency's goal is to be the leading provider of this information. We are extremely excited about the opportunity to supplement our current team with an Infectious Disease Epidemiology Fellow and believe this person will help us effectively advance this agenda. For a qualified applicant, the mentors will recommend employment opportunities to agency leadership upon the successful completion of the fellowship.

The Nebraska Office of Epidemiology provides an ideal training opportunity to an Infectious Disease Epidemiology Fellow. This office is responsible for studying the epidemiology of reportable infectious diseases and investigating infectious disease outbreaks. The infectious disease epidemiology team consists of State Epidemiologist, a CDC Career Epidemiology Field Officer (CEFO), Health Associated Infections Medical Director, Emerging Infectious Disease Epidemiologist, EIS Officer, and 28 other program-specific epidemiologists.

The Fellow will work as part of this team with particular focus on enteric, vector-borne, and zoonotic diseases. The team members are located in close proximity to each other in various parts of our integrated Health & Human Services agency. The training and skill development of the Fellow will be the primary responsibility of the primary mentor. All team members will be at the disposal of the Fellow to provide expertise in selected aspects of epidemiology and programmatic activities. The Fellow will be authorized to access and analyze data sets/surveillance systems in all of these areas.

The Fellow's anticipated day-to-day activities will include:

- Develop an understanding of and familiarity with enteric, vector borne, and zoonotic disease surveillance datasets
- Refine data processing and data analysis skills
- Understand how to assess surveillance systems
- Analyze and interpret data
- Prepare epidemiology reports

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

The Fellow will have access to Nebraska Electronic Disease Surveillance System (NEDSS) where laboratories and healthcare providers throughout the state are required by rules and regulations to report cases of reportable diseases to our office by ELR; Syndromic Surveillance dataset which includes inpatient and outpatient visits; NESIIS which contains statewide immunization records. The other datasets include vital records, an E-code database derived from the hospital discharge data, and death certificate data. The agency has a wide array of statistical support software such as SAS and R and can provide mentoring and consultation from doctoral-level statisticians when required. Use of other tools such as ArcGIS and Tableau are also maximized for data visualization and reporting. Further, we have close relationships with the Departments of Epidemiology and Biostatistics at the UNMC College of Public Health, Omaha, Nebraska.

Projects

Surveillance Activity Title: Enterics Disease Surveillance Annual Report

Surveillance Activity Description:
The Enteric Disease Surveillance Annual Report project is a comprehensive initiative aimed at monitoring and analyzing the occurrence and trends of enteric disease cases and outbreaks within the State of Nebraska over the course of the previous year. Enteric diseases primarily affect the gastrointestinal system, posing a significant public health concern. The activity involves systematic data collection from various sources, including healthcare facilities, laboratories, and local public health departments to compile a detailed overview of the incidence and distribution of enteric diseases and outbreaks. The annual report provides valuable insights into the epidemiology of these diseases and identifies potential risk factors to inform and improve public education for the prevention foodborne illness. This report will include condition-specific case numbers, the number of outbreaks investigated by the NE DHHS Enterics team and local health departments, and a breakdown of Norovirus season trends and percent positivity of laboratory tests. Nebraska participates in 3 norovirus surveillance projects funded by ELC: The National Respiratory Enteric Virus Surveillance System (NREVSS), NoroSTAT, and CaliciNet. By presenting a thorough analysis of the data, the surveillance activity will highlight notable outbreaks, both local and multistate, while informing our stakeholders about the burden of enteric diseases in the state to ultimately enhance community well-being. This first report will stand as a template for all future annual enteric disease surveillance reports.

Surveillance Activity Objectives:
The Fellow will create an annual report for enteric disease surveillance for internal and external distribution to provide a summary of enteric investigations. This initial report will be considered the template for all future reports.

Surveillance Activity Impact:
This annual report will serve to highlight the burden of enteric disease in Nebraska and the trends of disease throughout the years to inform education on foodborne illnesses and public health policy. This project will be a much-needed pilot activity since the foodborne/enterics program has not historically had a comprehensive annual report published internal or externally.

Surveillance System Evaluation Title: Evaluation of Enteric Disease Exposure Questionnaires

Surveillance System Evaluation Description:
The Enteric Disease Exposure Questionnaires are a new series of surveys in the REDCap software. Nebraska enteric staff developed modernized questionnaires using existing variables combined with CDC variables from case reports such as Cyclospora and Cryptosporidium to collect in-depth and enhanced exposure data for 11 enteric conditions:

(campylobacter, cryptosporidium, cyclospora, salmonella, salmonella Typhi and paratyphi, STEC, shigella, vibrio, and yersiniosis) during routine case interviews that the enteric NEDSS investigation pages do not currently collect. When a new laboratory report that is positive for an enteric condition is uploaded into NEDSS, the patient demographic information will be sent into a new REDCap record. Questions specific to each condition are branched to appear based on the selection of "Yes" to the patient having that condition. The interview is then conducted using the condition-specific exposure questions to allow us to collect detailed information on patient exposures. All 19 local health departments will be trained on how to use the REDCap system for this project.

Surveillance System Objectives:
Evaluation of this system would require complete review and testing of all condition-specific questionnaires (both in REDCap and paper forms) for ease of use, proper questioning and language, and accurate data extraction/exportation of reports for analyses. Develop or edit data output into a dataset that is usable for end users such as local health departments and state enteric staff.

Surveillance System Impact:
A thorough evaluation of this project will be necessary to evaluate the usability and accuracy of surveillance for enteric diseases. Collecting systematic and enhanced data from sick individuals will improve outbreak detection and rapid response for local and state health departments. The ability to quickly identify sources, risk factors, and affected populations enhances the quickness of public health officials in implementing control measures, such as informing federal partners like CDC, FDA, USDA, or Food Safety and Inspection Service (FSIS) and communicating to the public through press releases and food product recalls.

Major Project Title: Estimate the economic burden associate with West Nile Virus in Nebraska

Major Project Description:
Per the CDC, a total of 56,575 West Nile virus (WNV) cases have been reported in the United States from 1999 - 2022 making it the most reported arboviral infection in the country. Of the total reported cases, 26,984 have been classified as the severe neuorinvasive form that can lead to significant morbidity and death. In Nebraska, WNV is considered hyper-endemic with the state reporting cases every summer/fall typically ranking in the top 5 states in reported cases. Since WNV was first detected in 2002 in Nebraska, a total of 4,201 cases have been reported statewide ranking fourth overall in the United States. Out of the >4,200 Nebraska cases, 923 have been classified as the neuroinvasive form. Despite the number of cases reported nationally, very few studies have looked at the economic burden in different states. To better estimate the economic burden associated with WNV in Nebraska, the Fellow will conduct a retrospective study to determine long-term costs of patients hospitalized with WNV disease. Using hospital discharge data, the Fellow will first identify diagnosed cases of WNV and then use private insurance and Medicaid data to estimate the cost incurred by hospitalized WNV cases within the state. Additionally, a representative sample of the hospitalized patients will be contacted for follow-up regarding outpatient medical and home care costs incurred after the initial hospitalization. All costs will be adjusted to current costs using the US Consumer Price Index.

Major Project Objectives:
The Fellow will use hospital discharge and insurance data, along with patient interviews to estimate the costs and economic burden of WNV in Nebraska. Once completed, the Fellow will use the findings of the study to assess the cost-effectiveness of prevention and intervention strategies and help guide public health decisions.

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Major Project Impact:
Data from this project will provide a better estimate on the economic burden associated with WNV in Nebraska. In return the information provided will help assess cost-effectiveness of prevention countermeasures and various intervention strategies which are important in helping guide public health decisions and in seeking/securing external funding opportunities.

Additional Project #1 Title: Enhanced surveillance for invasive Aedes mosquitoes
Project #1 Type: Surveillance Activity

Project #1 Description:
Introduction of invasive Aedes mosquitoes (Aedes aegypti and Aedes albopictus) are a public health concern in Nebraska. Historically, Aedes albopictus was first detected in Nebraska in 1992 in an isolated scrap tire pile in rural Douglas Co. Additional detections were made in Cuming Co. in 1992-1996 and Lancaster Co. in 2000. No further reports of detections of Aedes albopictus in Nebraska were documented until 2013, when it was again detected in routinely used CDC light traps in Richardson Co. as part of NDHHS's WNV/mosquito surveillance network. Since this detection, Aedes albopictus has been detected every year onwards in Richardson Co. with additional detections in Douglas Co., Lancaster Co., and Jefferson Co. and is most likely established in areas of the state. During 2018, a single Aedes albopictus specimen was collected from a routine CDC light trap in urban Douglas Co. (city of Omaha) for the first time. Additional specimens have since been collected in 2019 and 2020 at different sites within Omaha. Then during 2019, Aedes aegypti was discovered for the first time in York County, Nebraska. This led to a response effort between NDHHS and the local health department to try and eliminate the mosquito and determine how it was introduced. A second detection of this species occurred in 2020 in Jefferson County, Nebraska and led to a public health response between NDHHS and the local health department there. While the potential of these mosquito species to serve as local vectors for diseases like chikungunya, dengue, and Zika (among others) is low, a potential still exists. Additionally, these mosquitoes are notoriously difficult to eliminate due to their peri-domestic nature once established. Therefore, determining presence or absence of these species in areas is important to prevent establishment within the state and reduce disease risk posed by these invasive mosquitoes. As a proposed project, the Fellow will conduct enhanced invasive Aedes mosquito surveillance within areas determined to be at high risk for their introduction. This will be accomplished through GIS and mapping to identify high risk locations and field work where mosquito traps (CDC light, BG Sentinel, and Ovicups) will be set out and retrieved. Furthermore, the Fellow will also learn to identify mosquito species as part of the field work experience and coordinate with CDC and other academic collaborators to conduct genetic testing. If invasive Aedes are detected, the Fellow will also help in response activities related to vector control and attempted elimination. The data gathered from this project will be used to better determine the areas of risk and establish range.

Project #1 Objectives and Expected Deliverables:
The Fellow will learn how to use GIS and develop mapping skills as part of this project. Additionally, the Fellow will learn how to identify preferred habitat of invasive Aedes mosquito species and set traps in these areas. As part of this field work experience the Fellow will also learn mosquito identification techniques. Finally, if invasive Aedes are detected, the Fellow will help in response activities related to vector control and attempted elimination that might be implemented.

Project #1 Impact:
The data gathered from this project will be used to enhance understanding of areas of risk and establish range of these mosquito species within Nebraska. These data can then be utilized by state and local public health and vector control personnel in mosquito management work and help assess potential disease risk these mosquito species might pose to Nebraska.

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Additional Project #2 Title: Enteric Disease Data Dashboard
Project #2 Type: Major Project

Project #2 Description:
The Enteric Disease Data Dashboard will be an innovative project designed to create a comprehensive and user-friendly public-facing platform for visualizing and analyzing data related to enteric diseases highlighting data from Data Nexus, a tool to visualize, analyze and download community data, focused on improving accessibility and understanding of enteric disease trends, the dashboard will serve as a valuable tool for public health officials, researchers, and the general public.

Project #2 Objectives and Expected Deliverables:
Use or modernize existing Data Nexus data pulled from our NEDSS surveillance system to create a public facing dashboard to add to the NDHHS foodborne illness webpage. Work with our web communications team to test and ensure the dashboard is working appropriate and data are displaying accurately. Develop a system to have data run on a routine basis (frequency currently unknown, either weekly or monthly).

Project #2 Impact:
By developing and maintaining an accessible dashboard, this activity will enhance public awareness and education, with a goal to promote transparency and trust between the public and health officials.

Additional Project #3 Title: Norovirus Season Weekly Report
Project #3 Type: Surveillance Activity

Project #3 Description:
The Norovirus Season Weekly Report activity is a focused and timely report dedicated to monitoring and reporting on the prevalence and patterns of norovirus infections and outbreaks in Nebraska on a weekly basis from November to April. Norovirus is a highly contagious virus that causes gastroenteritis, leading to symptoms such as vomiting and diarrhea. This project involves the systematic collection of data from healthcare facilities, childcare facilities, schools, laboratories, and local public health departments to track the incidence of norovirus cases and outbreaks throughout norovirus season. The report highlights fluctuations in norovirus activity, identifies potential clusters, and assesses the burden on public health. By providing frequent updates to our stakeholders, the project aids in early detection of clusters, enables timely public health responses, and facilitates the implementation of preventive measures through the encouragement of utilizing our Norovirus Outbreak Toolkit. The weekly nature of the report enhances its utility in real-time decision-making, contributing to the overall management and control of norovirus infections within Nebraskan communities and facilities.

Project #3 Objectives and Expected Deliverables:
The Fellow will create a template for a weekly norovirus report to be updated and distributed to facilities and local health departments during norovirus season (November to April). Data will be used from NEDSS, our infectious disease surveillance system.

Project #3 Impact:
This report will provide timely updates on the burden of norovirus in the State of Nebraska during norovirus season to inform preventative measures to reduce the occurrence of clusters in facilities.

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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 Fellow will be expected to respond to acute and emergent problems related to infectious disease epidemiology, including emergency response activities related to naturally occurring and intentional events which have actual or potential impact on infectious disease morbidity/mortality. Nebraska's Bioterrorism Preparedness Program offers training and exercises to ensure Nebraska's preparedness in the event of an incident or attack involving biological, chemical, radiological or other agents of bioterrorism. The Fellow can access this training and participate in such exercises.

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

The Fellow will assist with foodborne disease outbreak investigations. Depending on the number and frequency, there will likely be opportunity for the Fellow to take the lead on an outbreak investigation which includes case identification, interviewing cases, data analysis, and writing a report.

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

The Fellow will not be involved in routine, ongoing COVID-19 surveillance activities. If an unprecedented surge in cases is detected, the Fellow might be involved with response activities. If we have detections of the SCV-2 virus in animals, and particularly with domestic or captive zoo animals, the Fellow will be involved with investigations or even be asked to lead such activities.

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

The Fellow will help to improve data quality with all the projects listed above including better race and ethnicity data.