ID: 35040237
Environmental Health, Occupational Health - Host Site Description
Nebraska Department of Health and Human Services

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

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: Derry Stover, MPH
Epidemiologist III
Nebraska Department of Health and Human Services

Work Environment
100% In-person

Assignment Description

The environment where we live, work, and play can affect our health. Nebraska public health officials are committed to exploring the connection between the environment and health. Our goal is to use applied epidemiology approaches and data surveillance systems to inform public health actions, with the ultimate goal of reducing the burden of environmentally related health conditions.

The NDHHS Epidemiology Unit provides an ideal training opportunity for an Applied Epidemiology Fellow. The Unit is responsible for studying the epidemiology of infectious diseases, non-infectious diseases, and environmental public health. Our staff investigates disease outbreaks and exposures to support public health actions and policies to improve the health and safety of Nebraskans. The Epidemiology team consists of State Epidemiologist, a CDC Career Epidemiology Field Officer (CEFO), EIS Officer, and more than 15 other program-specific epidemiologists.

The Fellow will work as part of this team with particular focus on health conditions that are related to environmental and occupational health. The Fellow will primarily work with programs for Environmental Public Health Tracking, Childhood Lead Poisoning Prevention, Occupational Health Surveillance, and Wastewater Surveillance. The Fellow will also work alongside and on collaborative projects with infectious disease programs such as fungal disease, foodborne disease, vectorborne, and zoonotic diseases. The Fellow will also work with teams at the University of Nebraska Medical Center College of Public Health to study climate and health, environmental exposures, and water/air quality.

The training and skill development of the Fellow will be the primary responsibility of the primary and secondary 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 will be involved with several day-to-day activities, including: 1) Develop an understanding of and familiarity with environmental health surveillance concepts and datasets, 2) Refine data processing and data management skills, 3) Learn and understand how to assess and evaluate surveillance systems, 4) Analyze and interpret data, 5) Prepare epidemiology reports, 6) Designing and planning environmental health surveillance programming, and 7) Developing protocols, guidance documents, work plans for environmental health surveillance. The training goals for the Fellow will be defined by Centers for Disease Control and Prevention (CDC)/Council of State and Territorial Epidemiologists (CSTE) Applied Epidemiology Competencies (AECs). At the completion of the fellowship, the Fellow will function as a well-qualified Tier 2, midlevel epidemiologist and will be highly employable in a wide range of public health settings.

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

The Epidemiology Fellow's work space will include a cubicle equipped with a desktop/laptop PCs with Microsoft Office, Outlook Email, R, SAS, EpiInfo 7, Tableau, PowerBI, ArcGIS, and other data software as needed. Databases include reportable disease and laboratory data, hospital discharge data, birth and death registries, syndromic surveillance data, workers' compensation claims, poison center data, air and water quality data, environmental data, and other data sources. Because of the organizational structure of the agency, the Fellow will have ready access to staff and data in the Epidemiology Unit and other programs related to other areas of public health, including chronic disease epidemiology, material and child health epidemiology, data from other state agencies. In addition, NDHHS Epidemiology Unit has a unique working environment where epidemiology, health statistics and public health informatics are under the same group that always provide tremendous technical and support to the Fellow.

Projects

Surveillance Activity Title: Surveillance and Investigation of Chemical Poisonings and Exposures

Surveillance Activity Description:
Each year, hundreds of Nebraskans experience poisoning and illnesses due to exposures environmental contaminants and chemicals. One example is carbon monoxide, where Nebraska has one of the highest mortality rates for carbon monoxide poisoning. Other examples include exposures to heavy metals (e.g. lead, arsenic), nitrate, pesticides, and industrial chemicals. Nebraska reportable disease regulations require doctors to report poisonings. However, there has been little work conducted in this area and there are several unknowns related to how environmental exposures impact human health in our state.

For this project, the Fellow will participate in epidemiological investigations and patient interviews for occupational and non-occupational poisonings and chemical exposure reports. This project will expose the Fellow to various exposure and poisoning data sources including laboratory reports, hospitalizations and emergency department visits, deaths, syndromic surveillance, and poison center reports. One focus will be on carbon monoxide poisoning, where the Fellow will design and develop data collection forms, investigations guidelines and tools for local health departments for investigating cases. The Fellow will investigate cases and develop training materials. The Fellow will also receive data analysis training in order to analyze poisoning data with a goal to write a report summarizing findings.

The Fellow also will have the opportunity to assist the Nebraska lead poisoning and occupational health surveillance programs in investigating and studying childhood and adult lead poisoning, and would include participating in home inspections for lead. The Fellow will also have the opportunity to assist the DHHS team in the investigation of infectious diseases attributed to environmental factors as needed, such as waterborne disease outbreaks. Activities may include interviewing patients, contacting health care providers, working with local health departments and other agencies in response to case reports.

Surveillance Activity Objectives:
The main objective is to use surveillance data to increase our understanding of the trends and burden of chemical poisonings in Nebraska. Deliverables will include the development of guidelines and health recommendations for health departments and citizens. We expect the Fellow to summarizing their findings by creating at least 1 data report on the topic (e.g. carbon monoxide or lead poisoning). The Fellow will create a poster or a abstract submission to a conference, such as the CSTE Annual Conference.

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Surveillance Activity Impact:
Through investigations and analysis of surveillance data, public health recommendations and interventions can be developed to prevent future illnesses to environmental contaminants.

Surveillance System Evaluation Title: Evaluation of Nebraska Blood Lead Surveillance System

Surveillance System Evaluation Description:
Lead poisoning and exposure is still a public health problem across the U.S., and results in impacts to child health and development. Nebraska's surveillance system for lead poisoning involves the collection of blood lead level laboratory results. All blood lead tests are required to be reported to Nebraska DHHS. The Fellow will have the opportunity to conduct a surveillance system evaluation of Nebraska's lead poisoning surveillance system using CDC's Updated Guidelines for Evaluating Public Health Surveillance Systems.

The Fellow will 1) engage with stakeholders to participate in the evaluation, 2) describe the surveillance system, 3) design the evaluation, and 4) gather credible evidence of the surveillance system including the data quality, simplicity, representativeness, and timeliness. The Fellow will write a report summarizing the findings of the evaluation. Additionally, the Fellow will work with lead poisoning prevention staff to develop and calculate performance measures as it relates to CDC lead poisoning prevention program grant requirements.

Surveillance System Objectives:
The objective is to evaluate and enhance the blood lead poisoning surveillance system. The Fellow will write a report summarizing the findings of the evaluation and will develop performance measures. The Fellow will present findings to the team and will work with staff to incorporate recommendations and make changes to the surveillance system.

Surveillance System Impact:
Through evaluation and recommendations, the evaluation will help Nebraska DHHS take measures to enhance the surveillance system. When complete, this work will help public health identify and respond to children and families with lead exposure.

Major Project Title: Assessing the Burden and Trends of Asthma in Nebraska

Major Project Description:
The disease of asthma is linked with environmental factors, and the prevalence of asthma in Nebraska is high. Nebraska DHHS has robust data sources to assess the epidemiology of asthma in Nebraska. The Fellow will identify and assess surveillance data in order to lead a project that describes the burden, trends, and epidemiology of Asthma in Nebraska. The Fellow will analyze and interpret data for asthma-related deaths, hospitalizations, and emergency department visits. One important analysis will be an studying asthma prevalence using data from the Nebraska BRFSS Asthma Call-Back Survey, which is a large health survey of Nebraskans. The Fellow will learn how to perform survey analysis and will explore unanswered questions that will help establish a baseline understanding. This project will also expose the Fellow to syndromic surveillance data, in which real-time emergency department data can be assessed and compared to air quality data to detect geographic and temporal trends and predictors of negative respiratory health outcomes. The Fellow will develop an asthma surveillance report that summarizes the epidemiology of burden and trends. The Fellow will be the agency's main asthma point of contact and will work with community-based organizations. The Fellow will present findings to the Nebraska Asthma Coalition and local health departments, and will develop recommendations for public health prevention.

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Major Project Objectives:
The main objective is to use existing data sources to increase our understanding of asthma in Nebraska, including environmental factors that can impact the disease. The deliverables include developing an asthma surveillance report that summarizes the epidemiology of asthma, a statistical analysis from the BRFSS Asthma Call Back Survey, and a presentation to summarize the results. The Fellow will be the agency's main asthma point of contact and will present findings to community-based organizations and doctors interested in asthma. Finally, the Fellow will develop prevention and educational tools that can be used by public health workers and the general public.

Major Project Impact:
The project will benefit public health by increasing our understanding of the burden of asthma. Government and community organizations will be able to use the data summarized by the Fellow to develop strategies for prevention, such as developing priorities based on geographic regions, apply for funding, and work to inform the public on risks and public health actions.

Additional Project #1 Title: Studying Environmental Fungal Pathogens and their Impact on Public Health in Nebraska
Project #1 Type: Surveillance Activity

Project #1 Description:
Fungal pathogens, like Histoplasma and Coccidioides, live in the environment and can cause infections and disease burden in people, but there are gaps in our knowledge and the epidemiology. For example, histoplasmosis is an infection caused by a fungus that lives in soil. Nebraska has seen an increase in reports of histoplasmosis over the past 5 years, but there is limited information on what risk factors are contributing to the disease. There are also unanswered questions on health care provider awareness and testing practices. The CSTE Fellow assist with conducting case investigations of mycotic (fungal) diseases and assist in the participation of a new CDC program called FungiServ. The Fellow will design a survey for healthcare providers and will investigate the epidemiology of fungal pathogens through data analysis of hospital discharge data. A final product will be a surveillance data report and draft education for patients and providers.

Project #1 Objectives and Expected Deliverables:
- Conduct investigation interviews with patients and health care providers.
- Conduct descriptive statistical analysis and produce a surveillance report.
- Create a healthcare provider survey to assess knowledge and testing practices of mycotic diseases and summarize the findings.
- Draft guidance or education for patients and health care providers

Project #1 Impact:
Analysis of these data will help better define the timing and distribution of cases throughout the state to determine if undetected clusters or outbreaks might have occurred. The work will lead to a better understanding of healthcare provider practices and trends in fungal diseases, and it will help DHHS develop strategies for disease control and prevention.

Additional Project #2 Title: Surveillance of Heat-related Illness, Temperature, and Geographic Analysis
Project #2 Type: Surveillance Activity

Project #2 Description:
A changing climate means more Americans are at risk for experiencing health effects of environmental conditions, especially heat. Each year, hundreds of Nebraskans suffer from heat illness and the number of heat-related illnesses is increasing.

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This project will focus on investigation and surveillance of heat-related emergency department visits and hospitalizations using data from the Nebraska Environmental Public Health Tracking Program. The Fellow will analyze data to explore the trends of heat illness, the causes, and populations effected and compare with environmental temperature data. The Fellow will receive training in GIS, and will use GIS software to create different maps showing the geographic distribution of illnesses. The Fellow may work with GIS staff to develop maps and prevention information. The results will be summarized and shared with the public health community, including organizations like the National Weather Service and local health departments.

Project #2 Objectives and Expected Deliverables:

- Conduct surveillance data analysis to increase our understanding of heat-illness in Nebraska
- Use GIS to explore geographic trends and epidemiology of heat illness.
- Create a GIS data product, such as an interactive web map or StoryMap.
- Present findings to community partners.

Project #2 Impact:
Expanding surveillance of heat-illness in Nebraska will mean creating new opportunities to develop tailored prevention recommendations. If we can identify populations who are at higher risk, such as like workers or older adults, we can inform our partners to target specific interventions around these high-risk populations. These interventions can include issuing health alerts during heat waves and triaging services like cooling centers.

Additional Project #3 Title: Enhance Plans for Community Assessment for Public Health Emergency Response
Project #3 Type: Major Project

Project #3 Description:
Rapid needs assessments (RNAs), like the Community Assessment for Public Health Emergency Response (CASPER), are designed to provide public health leaders and emergency managers information about a community so they can make informed decisions. RNAs use a valid sampling methodology to collect information at the household level and can be used in disaster or non-disaster settings. This project would involve helping DHHS prepare for conducting a CASPER or another type of RNA. The AEF would receive training on CASPER and RNA methods, work with Emergency Preparedness to conduct an assessment of emergency response capacity, and collaborate with a local health department to design and perform a mock or pilot CASPER or other RNA. The Fellow would use statistical sampling strategies and methodologies, coordinate with GIS program, and design data collection forms.

Project #3 Objectives and Expected Deliverables:

- Learn CASPER/RNA methodology and principles.
- Develop a flow-chart and/or other processes for conducting a CASPER or other RNA in Nebraska.
- Design data collection forms.
- Assist state and local health department with designing a methodology and plan for conducting a CASPER/RNA in Nebraska.

Project #3 Impact:
Collecting information in a community during an emergency or non-emergency situation is an important aspect of public health. The recent train derailment and chemical spill in Ohio signifies the need to have the right tools for responding to community environmental health disasters. In Nebraska, two RNAs have been conducted using methods designed for the unique needs of the jurisdictions (not CASPER methodology), but no traditional CASPER has been conducted. This project would help DHHS build the capacity to respond to a disaster or other event so that policy leaders and emergency managers have a process built for a future disaster or public health emergency.

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Additional Project #4 Title: Wastewater Surveillance for Infectious Diseases
Project #4 Type: Surveillance Activity

Project #4 Description:
The Nebraska Wastewater Surveillance System (NeWSS) was established in 2021 and is a partnership between CDC, NDHHS, University of Nebraska, Nebraska Public Health Laboratory, local health departments, and wastewater treatment plants. Wastewater surveillance is a public health tool to monitor the prevalence of infectious disease pathogens in a community. NeWSS is currently monitoring for respiratory viruses, including Influenza A, Influenza B, Respiratory Syncytial Virus (RSV), and SARS-CoV-2. Testing these samples can give insight into the trends of respiratory viral diseases in communities. An AEF fellow will receive training in wastewater surveillance processes and learn about how wastewater surveillance works, including a tour of the Nebraska Public Health Laboratory. The Fellow would conduct at least one surveillance activity such as 1) a correlation analysis between wastewater respiratory pathogens and clinical indicators (e.g. hospital or laboratory testing data); 2) develop program performance measures to identify and improve timeliness and data quality, 3) additional data visualizations to better interpret wastewater data.

Project #4 Objectives and Expected Deliverables:
- Receive training and learn the science of wastewater surveillance.
- Develop skills in at least one data visualization software such as PowerBI or Tableau.
- Create a report summarizing the results of the analysis on correlation, data quality, and/or data visualizations.

Project #4 Impact:
Wastewater surveillance is an innovative, novel and rapidly-developing tool to track infectious diseases in the community. This project would support the program by helping provide information that can supplement existing surveillance system. Through building capacity, this project would advance our ability to use wastewater surveillance to provide an early warning to public health officials about increases or decreases of viruses within a community that could help with more effective resource deployment. This is especially true for rural areas in Nebraska where healthcare access is limited and clinical surveillance data is unavailable.

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 environmental and occupational health events, including emergency response activities related to naturally occurring and intentional events which have actual or potential impact on citizens, workers' and responders' 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 will access this training and participate in such exercises as needed.

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

In the past decade, several major disease outbreaks have an environmental source or related to environmental/occupational exposure. It is anticipated that the Fellow will collaborate and participate in outbreak and cluster investigations that are related to environmental health. These could be environmental contaminates like chemicals, heavy metals, or pesticides. This work will also include supporting our waterborne disease, foodborne disease, and other infectious disease programs during outbreaks that are environmentally or occupationally related, including infectious agents like legionella and waterborne enteric agents like campylobacter and cryptosporidiosis.