ID: 74146548
Infectious Diseases, One Health - Host Site Description
Kentucky Department for Public Health

Assignment Location: Frankfort, US-KY
Kentucky Department for Public Health
Division of Epidemiology and Health Planning

Primary Mentor: Allison Siu, DVM, MPH
CDC Career Epidemiology Field Officer
Kentucky Department for Public Health / CDC

Secondary Mentor: Kathleen Winter, PhD, MPH
State Epidemiologist / Director, KDPH Division of Epidemiology and Health Planning
Kentucky Department for Public Health / University of Kentucky College of Public Health

Work Environment
Hybrid

Assignment Description

The CSTE Fellow will be working at the Kentucky Department for Public Health (KDPH) located in Frankfort, Kentucky. Frankfort is the capital of Kentucky and is approximately 30 minutes from Lexington and 60 minutes from Louisville. The Fellow will serve under the Division Director's Office of the Division of Epidemiology and Health Planning. The Division of Epidemiology provides surveillance, reporting, and outbreak response for all infectious diseases, and some other conditions and outcomes, such as opioid overdose, injury, healthcare associated infections, and any outbreak of a health condition, and also houses the Office of Vital Statistics.

The CSTE Fellow may choose initiatives in any field within public health and is encouraged to select projects in two main focus areas: infectious disease epidemiology and One Health, but can consider any number of other opportunities within the department. The Fellow can expect to have a multifaceted experience and will have the opportunity to choose from a variety of epidemiologic activities, spanning the gamut of infectious disease outbreaks to harm reduction/syringe exchange program initiatives to surveillance activities to preparedness to vital statistics. We have identified a menu of key initiatives from which the fellow can select projects to give the widest exposure to applied public health and epidemiology (see *Potential Fellow Projects* description boxes below) but also match the fellow's areas of interest and career goals.

The CSTE Fellow's day-to-day activities will vary with each project but will generally be related to KDPH ongoing work and CSTE Fellow projects related to infectious disease surveillance, reporting, and investigation of outbreaks and response, and disease prevention projects. A typical day could involve meeting with mentors, meeting with KDPH or other state and local staff individually or in groups, responding to urgent public health issues, or interacting with Regional Epidemiologists or other staff at local health departments, hospital infection preventionists, or external partners. Interactions outside of KDPH could be via telephone, email, videoconference, webinars, or in-person meetings. Daily activities will also include analyzing data, participating in field investigations, preparing surveys or reports, and preparing findings for conference presentations or manuscript publication. We have had numerous, high-level, public health responses in the past years, so involvement in department incident command structure will likely be a part of this experience.

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

The Fellow will have access to statistical analysis software including SAS, R, Excel, and REDCap data collection software. Several staff members are versed in using each of these analysis software and are available to assist the fellow. Microsoft Access and Microsoft Office programs are available to all staff. Disease-related information is collected and stored in a number of electronic surveillance systems including the National Electronic Disease Surveillance System (NEDSS), the National Outbreak Reporting System (NORS), and our previous NEDSS-compliant system, the Kentucky Electronic Public Health Record System (KYEPHRS). The Kentucky Health Information Exchange (KHIE) gathers and houses clinical data from healthcare facilities across the state. KHIE is integrated with public health surveillance and immunization registry data collection and electronic case reporting is being implemented for notifiable disease conditions. The fellow may become an active user of these systems and can gain experience using Business Objects software to retrieve data from them. Additionally, surveillance tracking usage and other factors for syringe exchange programs has been implemented using the REDCap system. The Fellow would be enrolled in EPI-X, the CDC Epidemic Information Exchange, and can become a user in the National Healthcare Safety Network (NHSN). Several current staff are well-versed in R as well, so the fellow may have the opportunity to work in that software as well.

Projects

Surveillance Activity Title: Using Syndromic Surveillance to Enhance Wastewater Interpretation of Viral Activity

Surveillance Activity Description:
The Kentucky Wastewater Surveillance System (KYWSS) currently collects weekly sampling data from 22 sites on SARS-CoV-2, RSV, and influenza. As a potential early warning signal for spread of respiratory disease, wastewater surveillance of viral activity can prompt epidemiological follow-up when activity significantly changes. Rigorous interpretation of wastewater surveillance requires integration with data collected from visits to healthcare facilities if available. This surveillance project would join data from ESSENCE (Electronic Surveillance System for the Early Notification of Community-Based Epidemics) to related KYWSS target viral activity. These data include emergency department visits and hospitalizations linked to diagnostic codes that represent infectious respiratory diseases. However, we have not yet used these two data sources together to improve our understanding of patterns of respiratory activity (e.g., high wastewater viral activity for SARS-CoV-2 preceding a large number of emergency department (ED) encounters for COVID-19). A system which implements recurring analysis and interpretation of the combined data will improve Kentucky's public health decision making regarding respiratory illness.

Surveillance Activity Objectives:
Surveillance Activity Objectives
1. Integrate respiratory activity surveillance data from disparate sources, including from ESSENCE and KYWSS.
2. Examine correlations between wastewater and ED trends and contextualize respiratory activity to improve epidemiological interpretation of Kentucky's wastewater surveillance data.
3. Examine differences in respiratory activity by different social contexts (e.g., race, ethnicity, rural/Appalachian region, etc.).

Surveillance Activity Deliverables
1. Coding/code scripts (R, python) to combine respiratory surveillance metrics for continued investigation.
2. A reproducible report with epidemiological investigation and interpretation of integrated syndromic and wastewater respiratory activity.
3. Coding/code scripts (R, python) that would support forecast of disease activity informed by wastewater trends.

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Surveillance Activity Impact:
This project could improve public health practitioners' ability to characterize viral respiratory activity in Kentucky in a more holistic manner, rather than focusing on different indicators of respiratory burden separately.

By linking and examining these data sources, such a project could increase actionability of wastewater surveillance data. Future endeavors may include wastewater informed forecasting of viral respiratory burden and standardized public health responses and communication.

Surveillance System Evaluation Title: Assessment of Quality of Outpatient Data for Syndromic Surveillance

Surveillance System Evaluation Description:
The Electronic Surveillance System for the Early Detection of Community-Based Epidemics, or ESSENCE, is an online surveillance system housed by the CDC that allows public health practitioners to access data collected by healthcare facilities on visits made by patients to those facilities. KDPH uses ESSENCE data in multiple ways, such as the identification of trends of diseases and conditions in healthcare settings (e.g., COVID-19, carbon monoxide poisonings), and sometimes as a source of data during public health investigations. Because these data are used to inform both KDPH staff's and the public's knowledge about the state of various health conditions, making sure these data are as complete, accurate, and representative of all Kentucky health facilities as possible is important. Considerable work has been done to find and respond to issues with the quality of data available on ESSENCE for emergency department (ED) visits, or encounters. However, the quality of data on visits to clinics, urgent care facilities, and other outpatient settings has not been systematically assessed. This project would allow the fellow to build on previous efforts made to examine ED data quality and to specifically focus on identifying issues with and proposing recommendations for clinical and outpatient data in the ESSENCE database.

Surveillance System Objectives:
Objectives:
1. Based on previous work done to examine ED data quality and/or an exploration of outpatient data in ESSENCE, develop a list of metrics (e.g., timeliness of data, number of outpatient facilities sending data) that can be used to determine the quality of data on outpatient encounters.
2. Develop and execute a plan to quantify these metrics and identify areas of improvement for outpatient data quality.
3. Communicate findings and discuss possible solutions for data quality issues with staff at KDPH, the Kentucky Injury Prevention and Research Center (KIPRC), the Kentucky Health Information Exchange (KHIE), and other groups as needed. KIPRC is a program within the University of Kentucky that conducts surveillance of various conditions (particularly injuries) using ESSENCE data, and KHIE is the organization that sends KY facility data to the CDC for availability within ESSENCE.
4. Identify ways to make outpatient data quality reporting a sustainable, ongoing progress.
5. If interested, join ESSENCE-related workgroups hosted by CSTE and the National Syndromic Surveillance Program (NSSP) at the CDC to learn more about using these data from other federal, state, and local partners.

Project Expected Deliverables:
1. Code that is institutionalized to calculate data quality metrics for outpatient data.
2. A report that summarizes findings of initial assessment of outpatient data quality and describes recommendations for next steps to improve outpatient data quality.
3. A plan for implementing a sustainable, ongoing process for assessing and providing public health partners information on outpatient data quality.

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Surveillance System Impact:
Since this project will allow the fellow to identify issues and develop recommendations for strengthening the validity of clinical and outpatient data in ESSENCE, it could play an important role in ensuring that future public health programs in Kentucky can reliably use outpatient data to identify and respond to public health issues in the state.

Major Project Title: Development, Implementation, and Evaluation of the Rapid Actionable Data for Opioid Response in Kentucky (RADOR-KY) System

Major Project Description:
The Kentucky DPH in collaboration with the University of Kentucky (UK) can provide a unique opportunity for the CSTE fellow to gain experience in advanced analytical skills in public health surveillance methodology with application to drug overdose surveillance, advanced epidemiological analyses for monitoring trends in drug overdose mortality and morbidity, identifying existing and emerging hotspots, development of epidemiological tools for near-real time opioid overdose surveillance using timely EMS and syndromic surveillance data. The CSTE fellow will work with a team of state health department epidemiologists and UK researchers developing and implementing the Rapid Actionable Data for Opioid Response in Kentucky (RADOR-KY) - an automated data system that brings together timely data from multiple state agencies and uses advanced informatics algorithms for fast data processing, analysis, and dissemination to inform state agencies in resource allocation decisions and local communities on their use of opioid settlement funding to address the opioid overdose epidemic. The system is designed as a modern public health surveillance system with >100 measures supporting evidence-based practices for opioid overdose prevention and control, using >10 population-based data sources from state agencies. The CSTE fellow can work on all aspects of the surveillance system, including dissemination of data briefs, using data for program development, developing epi alerts for emerging outbreaks, and conducting a formal RADOR-KY evaluation as a public health surveillance system. There are many opportunities for presentations and publications as well as hands-on experience with community engagement. The CSTE fellow can work with a collaborative team of UK-FDA-NCHS epidemiologists who developed a new version of the CSTE Epi Tool for literal text analysis of death certificates. The new tool, DMI2EpiTool is currently being tested by three state epidemiologists and members of the CSTE Overdose Subcommittee. The CSTE Epi fellow can lead the next step of the project that will involve an epidemiological multi-state study that will use the DMI2EpiTool to describe the polydrug involvement in drug overdose deaths.

Major Project Objectives:
Project Objectives:
1. Lead a collaborative project among state epidemiologists and members of the CSTE Drug Overdose Subcommittee focused on the testing of the CSTE epi tool analyzing drug overdose death certificates.
2. Establish partnerships with local community partners and offer trainings on navigating and using the RADOR-KY system to inform local community drug overdose prevention and response efforts.
3. In partnership with the RADOR-KY team, conduct an evaluation on the RADOR-KY data system.

Project Expected Deliverables:
1. Produce data briefs from the RADOR-KY system to disseminate to interested stakeholders.
2. Develop epi alerts from emerging outbreaks based on stakeholder needs.
3. In conjunction in RADOR-KY leadership, develop an evaluation plan for RADOR-KY using CDC's Guidelines for Evaluating Public Health Surveillance Systems.
4. Create an evaluation report that includes a list of recommendations for improving the RADOR-KY system.

Major Project Impact:
The RADOR-KY system is innovative in its ability to present hotspots related to opioid overdoses and predict the trend of overdoses at the local level. The evaluation will allow the RADOR-KY team to make the system as useful as possible by

determining how the data are being used for opioid prevention and response at the local level and what else needs to be included in the system for the most effective response.

Additional Project #1 Title: Enhancing Surveillance of Zoonotic Pathogens in Animal Laboratory Reports
Project #1 Type: Major Project

Project #1 Description:
The Kentucky Zoonosis program receives daily animal laboratory reports from IDEXX. Currently, these reports are reviewed and archived without clinical context or systematic follow-up. This project aims to improve the utilization of animal laboratory reports received from IDEXX for public health surveillance, particularly in identifying potential zoonotic disease risks. A CSTE fellow will develop a structured approach to analyze a year's worth of data, identifying trends and potential concerns such as Campylobacter or Salmonella in companion animals.

Project #1 Objectives and Expected Deliverables:
Objectives:
1. Establish a Systematic Review Process - Develop and implement a structured approach for reviewing, categorizing, and analyzing animal laboratory reports from IDEXX, focusing on zoonotic pathogens of public health concern.
2. Enhance Zoonotic Disease Surveillance - Identify and investigate potential linkages between reportable zoonotic diseases in animals and corresponding human cases by collaborating with public health officials and existing surveillance systems.
3. Develop Data-Driven Insights - Conduct a one-year retrospective analysis of animal laboratory reports to identify trends, emerging threats, and opportunities for improving communication between veterinary and public health sectors.

Deliverables:
1. Standardized Review and Follow-Up Protocol - A documented workflow for reviewing, categorizing, and responding to concerning laboratory findings, including coordination with reportable disease surveillance teams.
2. Annual Surveillance Report - A comprehensive summary of animal laboratory findings over a one-year period, highlighting key trends, potential human health implications, and recommendations for future surveillance efforts.
3. Stakeholder Communication Plan - A framework for improving communication between veterinary diagnostic labs, local health departments, and public health officials to ensure timely awareness and response to potential zoonotic threats.

Project #1 Impact:
The fellow will establish protocols for daily review and follow-up, coordinating with public health officials to determine if cases warrant further investigation. Additionally, they will explore potential human-animal case linkages by communicating with reportable disease surveillance systems. The project will enhance zoonotic disease monitoring capacity, contribute to One Health efforts, and provide actionable insights for public health interventions.

Additional Project #2 Title: Chronic Hepatitis C Surveillance Improvements
Project #2 Type: Major Project

Project #2 Description:
All hepatitis Virus (HCV) testing is required to be reported in Kentucky, including both positive and negative test results. This was designed to allow tracking of individuals at risk for HCV or test positive for HCV and allows characterization of acute vs. chronic hepatitis C infection when a negative test is followed by a positive test (acute) or two positive RNA tests are separated by at least 6 months (chronic). Maintaining a complete and reliable registry of all chronic HCV individuals allows quick differentiation of acute vs. chronic cases when new positive electronic lab results are received at KDPH as well as targeting of intervention and treatment for those most likely to transmit HCV to others. This project

would assess the current surveillance system, which relies only on electronic lab reports, in order to develop improvements and recommendations for enhancements that could yield more complete and accurate data on individuals with chronic HCV.

Project #2 Objectives and Expected Deliverables:
Objective:
Evaluate and develop recommendations for current chronic HCV disease registry system

Deliverables:
1.Report on improvement and usage recommendations for a chronic HCV disease registry
2.Potential for work to develop further enhancements or processes to register chronic HCV individuals based on the findings of this project

Project #2 Impact:
1.Improved surveillance for chronic HCV and availability of data for analysis of people with chronic hepatitis C infection in Kentucky
2.Improved identification of chronic HCV cases in order to locate and treat

Additional Project #3 Title: Establishing an Antibiotic Use Surveillance System for Federally Qualified Health Centers
Project #3 Type: Major Project

Project #3 Description:
This project aims to develop a surveillance system to monitor antibiotic use within Federally Qualified Health Centers (FQHCs), which serve a high proportion of Medicaid and Medicare patients. By collecting and analyzing antibiotic prescribing data, this initiative will provide valuable insights into prescribing patterns, potential disparities in access to appropriate treatments, and antimicrobial stewardship opportunities.

The CSTE fellow will work closely with the Kentucky Department of Public Health (KDPH) to design and pilot a data collection framework, assess feasibility, and compare antibiotic use trends between FQHCs and traditional outpatient practices with a lower percentage of Medicaid/Medicare beneficiaries.

Project #3 Objectives and Expected Deliverables:
Objectives:
1. Develop an Antibiotic Use Surveillance Framework –Establish a data collection system to monitor antibiotic prescribing patterns in Federally Qualified Health Centers (FQHCs), ensuring consistency and accuracy in reporting.
2. Assess Antibiotic Prescribing Practices – Compare antibiotic use in FQHCs to traditional outpatient practices to identify potential differences related to Medicaid/Medicare patient populations.
3. Support Antimicrobial Stewardship Efforts – Provide data-driven insights to inform targeted interventions, improve prescribing practices, and enhance antimicrobial resistance prevention strategies.

Deliverables:
1. Pilot Antibiotic Use Surveillance System – A structured data collection and reporting framework implemented in select FQHCs to assess feasibility and accuracy of antibiotic prescribing data.
2. Comparative Analysis Report – A comprehensive analysis comparing antibiotic prescribing trends between FQHCs and traditional outpatient settings, highlighting disparities and potential areas for intervention.
3. Policy and Stewardship Recommendations – A set of actionable recommendations for public health officials and healthcare providers to improve antibiotic stewardship and address health equity concerns in outpatient settings.

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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)

Incoming fellows can engage in preparedness projects and activities throughout the tenure of their fellowship and are encouraged to participate in emergency public health response activities. In recent history, Kentucky has experienced several large-scale natural disasters and outbreak investigations requiring public health response, including the largest hepatitis A outbreak in the nation, the lung injury and vaping response, COVID19, and investigation into illnesses caused by consumption of psychedelic mushroom candy products. Previous fellows have been integrated into all aspects of emergency public health response ranging from pre-event planning, to training, to fulfilling Emergency Operations Center roles, to field data collection during actual responses (e.g. 2014 Ebola Response, 2010 H1N1 pandemic, 2009 KY Ice Storm), planned mass gatherings (e.g. 2010 World Equestrian Games and annual NASCAR Sprint Cup events), and training exercises (e.g., joint KY/Tennessee preparedness CASPER surveys, US Public Health Service Training Missions). The CSTE fellow may also participate with local health department preparedness operations for annually-scheduled large-scale events (e.g., the Kentucky Derby in Louisville). The Fellow's role in emergency preparedness can be as large or as small as the fellow desires: time allocation would likely be at least 10% but could be upwards of 50% if another pandemic or large-scale public health emergency occurs.

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

The AEF can assist Infectious Disease Branch staff in the detection and investigation of outbreaks of any sort. The AEF will learn how to perform various activities during the outbreak investigation, including how to: assign outbreak numbers; participate in and potentially lead outbreak investigation; develop and modify case definitions; create line lists and epidemic curves; and perform descriptive and analytic statistics to determine risk factors in given outbreaks. The AEF will learn how to coordinate the investigation of outbreaks: create and implement ad hoc investigation forms and guidance documents for local health departments, help coordinate testing of specimens (if collected); manage all investigation forms (line list, epi curve, reporting forms); ensure all documentation of the outbreak is submitted to the Reportable Diseases Section once the outbreak is deemed over; ensure that the outbreak is accurately entered into the National Outbreak Reporting System (NORS)(if applicable); and track the course of the outbreak investigation to ensure that control measures are implemented and effective. Finally, the AEF could work with Infectious Disease Branch staff to develop an outbreak management database in REDCap, which would have long-lasting impact in state public health operations. Time allocation would be variable based on the fellow's interests and the emergent issues at hand, and again can be as large or small as the fellow desires.