

ID: 58915984

Infectious Diseases, Infectious Diseases - HAI - Host Site Description

Cook County Department of Public Health

Assignment Location: Forest Park, US-IL
Cook County Department of Public Health
Communicable Disease Prevention and Control

Primary Mentor: Demian Christiansen, D.Sc., M.P.H.
Unit Director
Cook County Department of Public Health

Secondary Mentor: Kelley Bemis, M.P.H.,
Program Manager, Surveillance and Informatics
Cook County Department of Public Health

Work Environment

Hybrid

Assignment Description

The CSTE AEF fellow will be assigned to the Communicable Disease Prevention and Control (CD) Unit and will work across the unit in programs that fit with the fellow's unique talents and interests. Although we cover a large area of more than 700 square miles and nearly 2.3 million residents, including some of the country's wealthiest and poorest communities, our unit is small and close-knit. We are located in Forest Park, IL, adjacent to the City of Chicago and serviced by the "L" and major expressways. The CD Unit is responsible for case investigations, cluster and outbreak detection, and routine surveillance activities covering more than 65 communicable diseases and conditions, as well as emerging infections and conditions that can be monitored through syndromic surveillance. Our unit is dynamic, and we strive for excellence, innovation and transparency with an emphasis on teamwork. The fellow's day-to-day activities will include making progress on the projects outlined below, with flexibility to align with their interests and abilities. Their work may also include investigating communicable diseases reported through the Illinois Disease Surveillance System (IDSS); developing reports and dashboards in IDSS; assisting in the investigation of outbreaks as they arise; working as part of a team on various quality improvement projects in the CD Unit; assisting with syndromic surveillance, data analysis, cluster detection, and the production of weekly and other periodic surveillance reports. The fellow may also conduct ad-hoc research projects to advance public health practice in the CD Unit and interface with staff at hospitals, provider practices, and long-term care facilities to provide education and outreach.

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

The fellow will have access to every system our staff uses. This includes the Illinois Disease Surveillance System (IDSS), Illinois Comprehensive Automated Immunization Registry Exchange (I-CARE), Electronic Surveillance System for the Early Notification of Community-based Epidemics (ESSENCE) through the National Syndromic Surveillance Program (NSSP), SAS, R, Python, ArcGIS, and the System for Enteric Disease Response, Investigation, and Coordination (SEDRIC), among others.

ID: 58915984

Infectious Diseases, Infectious Diseases - HAI - Host Site Description

Cook County Department of Public Health

Projects

Surveillance Activity Title: Seasonal Surveillance - Respiratory Diseases (RSV, Influenza, COVID) and West Nile Virus

Surveillance Activity Description:

The Communicable Disease Unit produces weekly surveillance reports for diseases of seasonal importance - respiratory illnesses in the fall and winter months and West Nile Virus in the spring and summer. To create these weekly reports, a similar process must be followed for both diseases. Raw surveillance data must be collected from multiple sources (sentinel laboratories and providers, syndromic data, and reportable disease data for respiratory viruses; mosquito abatement districts, climate data, and reportable disease data for West Nile Virus). Data must then be cleaned and analyzed, culminating in setting a weekly activity level and recommendations for the community. Finally, the activity level and supporting data are disseminated via PDF reports and online, interactive web applications.

Surveillance Activity Objectives:

In conducting this activity, our goal is for the fellow to become familiar with multiple types of surveillance data, including developing a sense of benefits and drawbacks to different kinds of information. We also want the fellow to get comfortable using multiple sources of information to create a coherent picture of disease activity in the community (i.e., setting an activity level). Finally, the fellow will gain experience in formatting surveillance data for dissemination to a broad audience. Expected deliverables are the weekly reports.

Surveillance Activity Impact:

Multiple members of our community use data from these reports to take public health actions. To name just a few examples, infection preventionists use the activity level from our flu reports to inform when to implement visitor restrictions, mosquito abatement districts use them to make decisions about where and when to conduct abatement activities, and media use them to time stories geared towards protective action for the general public.

Surveillance System Evaluation Title: Electronic Case Reporting of Reportable Diseases

Surveillance System Evaluation Description:

Electronic case reporting (eCR) is the automated exchange of public health data between electronic health records and public health agencies. It enables the automatic transfer of information related to reportable disease cases, reducing the burden of manual reporting on health care providers and supporting more timely public health investigations. eCR participation was required for hospitals participating in the Centers for Medicare and Medicaid Services' Promoting Interoperability Program, starting in 2022. However, many public health agencies are still preparing their data systems to receive these reports and integrate them into existing surveillance systems. In Illinois, eCRs are expected to begin arriving in the state's reportable disease database for local health investigation in the summer of 2024. For this evaluation, the fellow will conduct an analysis to determine the types of diseases reported to the Illinois Disease Surveillance System (IDSS) through eCR for suburban Cook County residents, determine which hospitals are sending these reports, and to assess the quality of data contained therein.

Surveillance System Objectives:

The fellow will compile data on the volume of eCR reports in IDSS, by disease type and hospital. The fellow will develop data quality metrics and systematically review eCR reports to determine whether those metrics have been met. When issues are identified, the fellow will make recommendations to improve data quality. In the process, the fellow will become familiar with eCR technology and concepts as well as gain skills in assessing data for completeness and accuracy. Analyses will be repeated periodically to monitor quality on an ongoing basis.

ID: 58915984

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Cook County Department of Public Health

Surveillance System Impact:

eCR has the potential to significantly improve public health operations by making case investigations more efficient and timelier. However, realizing this potential is dependent on the quality and comprehensiveness of data transferred in electronic case reports. By routinely assessing eCR participation and data quality, CCDPH can make specific recommendations to improve the utility of this technology in our jurisdiction.

Major Project Title: Multidrug-Resistant Organisms (MDROs) in Long-term Care Facilities (LTCFs) - Web-based application development and automated facility-based surveillance reports

Major Project Description:

In Illinois, select multidrug-resistant organisms (MDROs) are currently reported to the Cook County Department of Public Health (CCDPH) through electronic laboratory reporting (ELR) and/or manual lab provider reports (LPR) via the Illinois-National Electronic Disease Surveillance System. ELR submissions, and to a lesser extent, LPRs, frequently lacking important exposure and healthcare information, including potential associations with long-term care facilities. The CCDPH Infection Prevention team needs this exposure information to inform interventions to curb the spread of healthcare-associated infections (HAIs).

In addition to being entered into I-NEDSS, these cases are also reported into the Extensively Drug-Resistant Organisms (XDRO) Registry, but for a different purpose. The XDRO registry was specifically designed for healthcare facilities to look up whether a patient being admitted was previously reported and may need specific precautions implemented on admission. Unfortunately, neither CCDPH nor other local health departments have full access to this registry. To further complicate matters, I-NEDSS is being replaced with a newer Salesforce-based system, and there are no plans to integrate the XDRO registry with the new system.

In addition to these systems, the Centers for Medicare and Medicaid Services (CMS) regulates healthcare facilities, which are required to report HAIs, blood transfusion typing errors, and important healthcare process measures such as healthcare personnel influenza vaccine status and infection control adherence rates to the National Healthcare Safety Network (NHSN). We are in the process of securing access to these data.

The AEF fellow's major project will be geared around integrating data from these different systems. The AEF will receive training in use of these systems, run reports and explore creation of a web-based application for internal CCDPH use that will help to guide priority setting for facility interventions where applicable.

Major Project Objectives:

Our goal is for the fellow to become familiar with multiple types of surveillance data, including developing a sense of the benefits and drawbacks to different kinds of information. We also want the fellow to get comfortable using multiple sources of information to create a coherent picture of disease activity in general and individual reports aimed to stimulate practice improvement at facility level. Expected deliverables are the weekly updated MDRO web-based application and selected automated facility-based surveillance reports, and ideally, a script that could be run again in the future to repeat the analysis on a routine basis. Through this project, the fellow will have a chance to hone several important skills in applied epidemiology, data analysis, and in presenting results.

Major Project Impact:

Our unit values include innovation, excellence, and transparency and, in that vein, we have taken a number of steps to make communicable disease data more accessible to our partners over the past several years.

ID: 58915984

Infectious Diseases, Infectious Diseases - HAI - Host Site Description

Cook County Department of Public Health

CCDPH is proactively engaging with LTCFs and has various projects aimed to reduce the transmission of MDROs and improve Infection Control and Prevention Practices, this major project would allow us to identify MDROs transmission trends in our jurisdiction and tailor response for facilities at higher risk.

Additional Project #1 Title: Daily Reportable Disease Cluster Detection Using SatScan

Project #1 Type: Surveillance System Evaluation

Project #1 Description:

In the winter of 2019, CCDPH developed a daily, automated cluster detection program using R and SatScan to look for potential outbreaks of reportable diseases including Salmonella, Campylobacter, Pertussis, Legionella, and several others. The program triggers an automatic alert to epidemiologists for further investigation when a statistically significant cluster is detected. We had begun to collect data on how the program was performing when the COVID-19 pandemic began and the project was put on hold. However, the program was adapted for detecting COVID-19 clusters and showed promise as a supplement to traditional outbreak detection through public reports or connections made by astute epidemiologists. In late 2023, the program was re-started and we began collecting data to formally evaluate its use. For this evaluation, the fellow will be responsible for running the cluster detection program, disseminating alerts to program leads, supporting program leads to investigate potential clusters, and collecting data to formally evaluate the program (e.g., calculating sensitivity and specificity).

Project #1 Objectives and Expected Deliverables:

The fellow will work with epidemiologists in the General Communicable Disease and Vaccine-Preventable Disease programs to investigate clusters as they are detected by the program over a defined period. The fellow will collect data on which detected clusters represented true outbreaks, as well as outbreaks discovered through other means that were not detected by the program. The expected deliverable will be a report summarizing these data, as well as a qualitative assessment, along with recommendations for how the program could be improved, if appropriate. In conducting this work, we expect the fellow to gain experience in cluster investigation, get to know staff throughout the CD Unit, and become familiar with the strengths and limitations of various outbreak detection methods.

Project #1 Impact:

Epidemiologists need to be able to connect dots, which is a major reason many infectious diseases are reportable in the first place. Connecting the dots can lead to cluster identification and outbreak detection--and if done early enough--prevent them from growing larger, reducing morbidity and mortality. However, public health departments have been stretched thin by declining budgets and the demands of the pandemic. Spatio-temporal cluster detection has the potential to help fill in the gaps that might be missed by traditional surveillance, but staff time is required to maintain the program as well as investigate detected clusters. This evaluation will help answer how CCDPH can make sure we are making the most of this technology and putting our staff time to good use.

Additional Project #2 Title: Development of Guidelines for Syndromic Surveillance Use

Project #2 Type: Surveillance Activity

Project #2 Description:

CCDPH uses syndromic surveillance data (both emergency department data and inpatient data) for monitoring several conditions of public health importance. From 2005 to 2019, CCDPH operated a local syndromic surveillance system. In 2019, this system was sunset and CCDPH began using the National Syndromic Surveillance Program's Biosense Platform (NSSP). Historical data from CCDPH's local system was transferred to NSSP; however, required and optional variables differed between the two systems. In addition, some local hospitals have had long data flow interruptions or other data quality issues that have the potential to affect comparisons over time. To better understand potential surveillance artifacts and bias in CCDPH's syndromic surveillance history, the fellow will perform a series of data analyses examining

ID: 58915984

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Cook County Department of Public Health

trends in visit counts as well as assessing availability of priority fields over time. Analyses will be performed at the hospital, public health district, and jurisdiction level.

Project #2 Objectives and Expected Deliverables:

Through this project, the AEF fellow would gain experience working with syndromic surveillance data, including understanding its strengths and limitations. The fellow would also strengthen their data analysis skills and gain experience summarizing, visualizing, and reporting results. Expected deliverables would include a report that contains overall guidelines for the use of syndromic surveillance going forward (e.g. "If using the discharge diagnosis field, do not use data earlier than 2016").

Project #2 Impact:

CCDPH is a heavy user of syndromic surveillance data and relies on it for situational awareness and decision-making for multiple conditions. The development of data use guidelines will allow us to quickly stand up surveillance for new conditions/syndromes, as well as document potential sources of bias to improve trend interpretation.

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

The AEF fellow will complete the ICS-100 and ICS-200 NIMS courses upon starting their fellowship and are encouraged to take additional NIMS courses that suit their interest level (e.g. ICS-300 & 400, IS-700 & 800). The fellow will also participate in any tabletop exercises conducted by our Emergency Preparedness and Response Unit and gain exposure to this unit's roles and responsibilities through COVID-19 response activities. We estimate these activities will account for a few hours per month of the fellow's time.

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

As described in the cluster detection evaluation project detailed above, we anticipate the AEF will work with epidemiologists in our general communicable disease and vaccine-preventable disease units to investigate clusters detected through our SatScan program. These activities may include interviewing patients and reviewing interview data to identify potential common sources of exposure. We also expect the AEF to be involved in any large or unusual outbreak response activities (e.g. measles, novel pathogen), which could include interviewing cases and contacts or contact symptom monitoring. Finally, the fellow may support program areas with general case investigation activities, as time and interest allow. We estimate these activities to account for between 5-20% of the fellow's time, with flexibility to suit the fellow's interest level.

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

The fellow's role in the COVID-19 response is highly flexible to their talents and interests. We have needs in the areas of data analysis, case and outbreak investigation, and communicating guidance to stakeholders. We are happy to involve the fellow in any of these areas. Therefore, time allotted to COVID-19 response activities could be as little as a few hours per month to a few hours per week, depending on the fellow's interest.

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

We believe in taking a health equity lens to all aspects of the work we do in communicable disease. In the area of data analysis, our standard is to assess trends for disparities among multiple dimensions including age, race, ethnicity, and

ID: 58915984

Infectious Diseases, Infectious Diseases - HAI - Host Site Description

Cook County Department of Public Health

poverty level and to ensure important public health messages related to disparities are communicated well (e.g. visualized in impactful ways). During outbreak and case investigations, we stress the importance of culturally appropriate messaging and providing support and resources whenever possible. Our CD program areas also undertake disease prevention projects, which often involve exploring upstream causes of disparities and brainstorming ways to address them. We expect the AEF would play a role in these areas.