

ID: 60176109

Infectious Diseases - HAI - Host Site Description

Washington State Department of Health

Assignment Location: Shoreline, US-WA
Washington State Department of Health
Office of Communicable Disease Epidemiology - Healthcare-associated infections and antimicrobial resistance section

Primary Mentor: Marisa D'Angeli, MD, MPH, FAAP
Medical Epidemiologist
Washington State Department of Health

Secondary Mentor: Audrey Brezak, MPH
MDRO Epidemiologist
Washington State Department of Health

Work Environment

Hybrid

Assignment Description

The CSTE AEF will be placed in the Antimicrobial Resistance Team within the Healthcare-associated infections and antimicrobial resistance section, which is within the Office of Communicable Disease Epidemiology at the Washington State Department of Health. The fellow will be involved in the surveillance, prevention, and response of emerging antimicrobial resistant pathogens, specifically carbapenemase producing organisms and *Candida auris*. The fellow will be trained to identify and investigate new cases of AR, which will be one of their main responsibilities during the fellowship. Day-to-day activities will include liaising with healthcare partners and LHJs to investigate cases, reviewing lab results, maintaining line lists, going onsite to healthcare facilities to conduct infection control and response assessments, guiding LHJs on outbreak recommendations, developing guidance, interviewing cases, reviewing genomic data and linkages, as well as importantly maintaining dedicated time to work on projects and professional development activities that the fellow is interested in.

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

The fellow will be able to access all databases, software, and surveillance systems that the MDRO Epi team generally has access to. This will include data analysis in R, data visualization in PowerBI and Tableau, MAVEN-based surveillance system, and mapping in ArcGIS. There are Git and R user help groups at the DOH that can help problem-solve as well.

Projects

Surveillance Activity Title: Conduct CPO and *C auris* surveillance and response

Surveillance Activity Description:

Candida auris is an emerging drug resistant fungal infection that leads to significant disease, particularly among individuals with long and frequent hospitalizations or residents of long-term care facilities. This is a newly identified pathogen in Washington in the summer of 2023, and we are working to contain the spread of this pathogen despite multiple introductions. Carbapenemase-producing organisms are another important antibiotic resistance threat our team works on that the fellow also would have the opportunity to work on. When a case of either of these multi-drug resistant organisms (MDRO) is identified, there are significant containment efforts that are required, including response screening and enhancing infection control. The Fellow would work with the MDRO team, LHJs, and affected facilities on

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response screenings, prospective surveillance, and infection prevention and control recommendations. The day to day work of the fellow would be to respond to cases, track outbreaks, liaise with LHJs, maintain line lists, guide healthcare facilities through MDRO education and implementing infection prevention and control recommendations, and maintain case and outbreak reporting for the Washington Disease Reporting System.

Surveillance Activity Objectives:

This project will support current MDRO Epi work and fill in gaps to address identified challenges of data maintenance, investigation, and reporting arising due to an increase in cases. The fellow will be expected to create data summaries to monitor and report out on current outbreaks and state MDRO epidemiology, as well as assist with quarterly internal QA to ensure our surveillance system accurately reflects case investigations. The fellow could prepare a summary of MDRO cases and epidemiology to present at the CSTE conference, and will be expected to present at internal meetings weekly as well as section meetings at least semi-annually.

Surveillance Activity Impact:

With an increase in cases and change in national containment guidance, additional case finding, screening, and investigation efforts have substantially increased. We are seeking a dynamic fellow to assist us diving into this work to contain emerging antimicrobial resistance in Washington. With the recent emergence of C auris in Washington, we are at a critical juncture to contain it's spread, and have one epidemiologist dedicated to both CPOs and C auris (who was a CSTE AEF), so we are hopeful to train up additional new epis as subject matter experts in this field.

Surveillance System Evaluation Title: Evaluating surveillance platforms for antimicrobial resistance information exchanges

Surveillance System Evaluation Description:

Carbapenemase-producing organisms (CPO) and Candida auris are emerging public health threats. For these notifiable multi-drug resistant organisms (MDRO), Washington State Department of Health (WA DOH) has transitioned from traditional point-in-time surveillance at diagnosis to a more comprehensive longitudinal approach by implementing an antimicrobial resistance information exchange (ARIE) system. With this transition, we aim to improve timely awareness of MDRO cases admitted to healthcare facilities and to communicate the need for rapid infection control interventions. We have piloted the use of a system that relies on PointClickCare contracting with healthcare facilities in Washington in 2023 to send antimicrobial resistance information alerts, and had a student intern evaluate this system over the summer. At CSTE conference, Melissa Judson in New Mexico discussed using syndromic surveillance to identify admissions of CRE cases, which inspired us to connect with our syndromic surveillance team to conduct a matching process for our cases. We have met with the syndromic surveillance team and have constructed a match, such that the fellow can evaluate the use of syndromic surveillance data versus our PointClickCare data for our ARIE alerts for the future.

Surveillance System Objectives:

We expect the fellow to conduct a formal SSE guided by the classic 1988 guidelines: <https://www.cdc.gov/mmwr/preview/mmwrhtml/00001769.htm>, evaluating both systems for their Simplicity, Flexibility, Acceptability, Sensitivity, Predictive value positive, Representativeness, and Timeliness. This will help inform our use of these systems and which to implement in our program for ARIE notifications for public health action going forward. We anticipate the fellow will write up a CSTE abstract and publish a manuscript on this work.

Surveillance System Impact:

We will be able to identify and implement an ARIE system that can more rapidly and effectively communicate with our healthcare partners when CPO and C auris cases are admitted and there is action to take, reducing the spread of antimicrobial resistance in Washington

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Major Project Title: Evaluating colonization screening data in Washington: impacts of international admission screening and updated containment guidance

Major Project Description:

When a case of CPO or C auris is identified, there are significant containment efforts that are required, including response screening. The containment guidance which provides public health jurisdictions recommendations on breadth and timing of screening was updated in 2023. We have already seen this has significantly impacted our screening case detection - with 1 screening case identified through containment responses in 2019 compared to 19 in 2023! We would like the fellow to evaluate the data we have, to ascertain when possible, numbers of those screened and rates of screening positivity by facility type, proactive/reactive status, organism and when applicable carbapenemase type.

Aside from response screening, we have been working with our local hospitals on an initiative to promote screening amongst high-risk patients who have had international healthcare or overnight healthcare in another state where C auris is spreading. One of our hospitals has been doing this for a number of years and has identified quite a number of cases particularly who had international healthcare. We would like to evaluate the screening positivity for hospitals engaging in this screening of patients depending on identified risk factors.

Major Project Objectives:

The fellow's work on this project will help us better understand this increase in screening cases and how we can more effectively identify cases and present data that is compelling to our healthcare partners when there is evidence screening should occur. We expect the fellow to present this analysis to our HAI Advisory Committee as well as to prepare an abstract for submission to CSTE.

Major Project Impact:

Screening is a time and resource-intensive intervention for containment responses. We hope to learn from this disaggregation of screening data where there may be highest yield screening opportunities and where we may have opportunities to encourage screening (such as in acute care, where we still see many facilities decline screening or only screening a few patients).

Additional Project #1 Title: Integrating whole genome sequencing and epidemiology data to track carbapenemase producing organism cases and outbreaks

Project #1 Type: Surveillance activity

Project #1 Description:

In September 2023, the Washington antimicrobial resistance program started to receive routine bioinformatic analyses of whole genome sequencing data for carbapenemase producing organism (CPO) cases meeting sequencing criteria and those sequenced upon request. With a historical isolate database of ~400 cases, each new case that is sequenced is analyzed to see if there are genomic matches to previously identified WA cases. Currently, we are getting emails with these sequencing results, but would like to develop a system to better integrate our epi and this new genomic data source. We would like for the fellow to focus on integrating this genomic data into current investigations and databases, establish best practices for communicating results to LHJs and healthcare facilities, and to support visualization of these data to inform education, prevention and response activities.

Project #1 Objectives and Expected Deliverables:

This project will result in the development of a combined database housing genomic and epidemiology data for CPO cases and integration of WGS data closer to real-time in our CPO investigations. The fellow will be responsible for identifying additional cases linked to the outbreak clusters, and investigating them to identify epidemiologic links. We

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hope the fellow will be able to use tools such as Auspice, MicrobeTrace, and/or MicroReact to visualize outbreaks identified from whole genome sequencing analyses and annotate with relevant epidemiologic data.

Project #1 Impact:

By increasing our understanding of how cases are genomically linked, we can better learn how spread of these emerging pathogens is happening in Washington State, and to identify points of intervention. We also hope to evaluate the containment Tiers for emerging pathogens by looking at the genetic diversity of our carbapenemase producing organisms and to identify the most appropriate Tier based whether spread was identified in a single facility, multiple facilities in a single transfer network, or across multiple transfer networks. This will inform our level of public health response for these emerging organisms, which has not previously been assessed through linking genomic and epidemiologic data.

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

The fellow will have ample opportunities for involvement in preparedness and response efforts. For preparedness, we have been conducting many tabletops for C auris, from tabletops with facilities to LHJs to DOH IPs. This is likely 10% of a fellow's time. For response, we have lots of MDRO response activities available with almost 100 cases in 2023, and would like the fellow to conduct 40% of their time on response efforts. Plenty to share with a AEF!

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

The fellow will be heavily involved in cluster and outbreak investigations. They will be responsible for responding to new cases of antimicrobial resistance at least weekly, taking call once adequately trained once per week, conducting investigations, interviewing patients, identifying epi-linkages, developing recommendations for outbreak response in partnership with healthcare facilities and local health jurisdictions. Approximately 40% of this role will be around cluster and outbreak investigations.

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

Able to receive updates via morning meetings from HAI Epi team which covers COVID, monthly health officer calls which cover current public health topics including COVID. They could also shadow an ICAR responding to a COVID outbreak in a healthcare setting.

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

A major gap in our data for our MDRO cases has been race and ethnicity. With the new syndromic surveillance match, we will be able to populate these variables into our line lists, and to be able to have meaningful summaries of our data rather than simply "high degrees of missing." We propose the CSTE AEF will be the first to look at these data this summer and to help inform our understanding of this epi and additional opportunities for in Washington state.