

**ID: 88187724**

**Infectious Diseases – HAI - Host Site Description**

**Arizona Department of Health Services**

**Assignment Location:** Phoenix, US-AZ  
Arizona Department of Health Services  
Preparedness

**Primary Mentor:** Rachana Bhattarai, PhD  
HAI Surveillance and Stewardship Epidemiology Program Manager  
Arizona Department of Health Services

**Secondary Mentor:** JulieAnna Rivas, MPH  
HAI Prevention and Response Program Manager  
Arizona Department of Health Services

**Work Environment**

Hybrid

**Assignment Description**

The Applied Epidemiology fellow (AEF) will be located in the Division of Preparedness; Bureau of Infectious Disease Services (BIDS); Office of Healthcare-Associated Infections (OHAI) which includes the HAI Surveillance and Stewardship Program and the HAI Prevention and Response Program. The OHAI is responsible for surveillance of targeted multidrug-resistant organisms (MDROs) such as Carbapenem-Resistant Enterobacterales (CRE), Carbapenem-Resistant *Acinetobacter baumannii* (CRAB), Carbapenem-Resistant *Pseudomonas aeruginosa* (CRPA), and *Candida auris* (C. auris) along with other HAIs including but not limited to Methicillin-resistant *Staphylococcus aureus* (MRSA), Legionellosis, Fungal Meningitis, Viral Hemorrhagic Fevers, and *Streptococcus pneumoniae*.

The HAI Surveillance and Stewardship Program strengthens antimicrobial stewardship across Arizona by implementing data-driven strategies to improve antimicrobial prescribing practices among healthcare providers throughout the state. The team collaborates with local health departments and facilities to identify barriers to NHSN reporting, provide technical assistance, and analyze NHSN data reported by healthcare facilities to support surveillance and prevention efforts.

The HAI Prevention and Response Program directly supports local health jurisdictions during suspected and confirmed outbreaks by providing technical assistance, timely communication of guidance and resources, and training. The Prevention and Response Program joins initial consultations with healthcare facilities, in partnership with local health jurisdictions, to provide specialized knowledge and skills related to addressing Multidrug-Resistant Organisms (MDRO) transmission during suspected or confirmed outbreaks. The Prevention and Response Program works closely with the HAI Office Chief and the HAI Public Health Advisor to fill the growing need to support onsite and remote infection control assessments. Together, the teams strategize and implement training and opportunities for counties to increase their specialized knowledge and skills to evaluate transmission risks and provide effective initial consultation with healthcare facilities to address MDROs, suspected outbreaks, or infection control breaches.

The AEF will collaborate with both programs within the OHAI to address priority tasks that vary from mitigation planning, outbreak control, contact tracing, analyzing test and tracing data, messaging and providing epidemiologic support for local and tribal health departments. Orientation will include Agency orientation classes, training on Incident Command Structure, HIPAA and data security, communicable disease surveillance protocols, MEDSIS (NEDSS), rules and statutes, case investigation/contact tracing, and meetings with all staff members. The primary and secondary supervisor will conduct weekly meetings to provide guidance, assist with barriers or troubleshooting, and to ensure completion of

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the fellow's projects and learning objectives. The fellow will also be paired with an existing staff member to provide mentorship, integrate the fellow into the Office and make introductions to fellow employees.

The fellow will primarily assist with MDRO surveillance and outbreak response activities but the fellow's day to day activities will also include active participation as a team member within the OHAI. The fellow will benefit from support from Office and Program mentors and staff while working on projects and investigations related to the safety and public health concerns in Arizona. These activities will include, but are not limited to:

- Conducting surveillance for targeted MDROs; Updating data dashboards; Maintaining quality data within the database; Developing reports; conducting in depth data analysis
- Conducting surveillance and monitoring HAI/AR threats via disease reports and calls with regional and national partners to identify outbreaks and risk factors
- Assisting with HAI disease case and outbreak investigations, by participating in healthcare facility outreach, data collection, data analysis, and intervention recommendations
- Responding to inquiries from the local health jurisdictions, public, academic partners and health care providers in Arizona
- Developing and implementing response and prevention activities aimed at reducing transmission of pathogens in the population overall
- Communicating and coordinating with various partners (Arizona State Public Health Laboratory, Antimicrobial Resistance Laboratory Network, local health departments, tribes, and CDC)
- Utilizing the incident command structure during public health emergencies as needed, including widespread infectious disease outbreaks

Primary responsibilities of the fellow will depend on chosen projects and current HAI surveillance and outbreak response needs within the state. The fellow will participate in weekly HAI program huddles, OHAI staff meetings, state laboratory and epidemiology meetings, and routine calls with local health department partners. The fellow will also have an opportunity to help participate in the annual Arizona Department of Health Services Infectious Disease Training & Exercise.

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

ADHS has an IT department that would be available to assist the fellow with computer and database issues. In addition to MS Office, GIS software, and Google Suites, the fellow would have access to SAS and Snowflake for statistical analysis. Epidemiologists within the Bureau routinely use the statewide electronic disease surveillance system (MEDSIS), the state immunization registry (ASIIS), vital records datasets (birth and death data), hospital discharge database (HDD), and the National Health Safety Network (NHSN). In addition, the fellow can request access to several other databases, including population-based survey results, such as BRFSS and HIV/STD data. The fellow would also have the opportunity to use and be trained on PowerBI.

There are several epidemiologists in the Bureau who are proficient in statistical analyses using SAS. Informal SAS training is provided periodically to epidemiology staff in the Bureau. The agency also has a Bioinformatics Division that provides training and resources on a variety of topics including surveillance systems, whole genome sequencing, data analysis, etc.

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## **Projects**

### **Surveillance Activity Title: Surveillance of dialysis events to support hemodialysis facilities**

#### *Surveillance Activity Description:*

The fellow will assist in the surveillance of dialysis events reported by hemodialysis facilities. This will be accomplished by analyzing National Healthcare Safety Network (NHSN) data to better understand the dialysis landscape in Arizona, creating an aggregate report summarizing events by access type, and producing and distributing facility-level Dialysis HAI Prevention Progress Reports to facilities. The fellow will also support the NHSN Coordinator by providing guidance and subject matter expertise, as needed, to county health departments and healthcare facilities on NHSN reporting and dialysis event surveillance.

#### *Surveillance Activity Objectives:*

Improve surveillance for dialysis events in Arizona; Create a summary report for dialysis events in AZ, Produce and distribute facility-level dialysis HAI Prevention Progress Report to each facility.

#### *Surveillance Activity Impact:*

Identify facilities that need additional help to prevent dialysis events; Help educate facilities on prevention strategies to reduce these dialysis events.

### **Surveillance System Evaluation Title: Evaluation and enhancement of statewide MDRO surveillance visualization methods**

#### *Surveillance System Evaluation Description:*

Carbapenem-resistant Enterobacterales (CRE), carbapenem-resistant *Acinetobacter baumannii* (CRAB), carbapenem-resistant *Pseudomonas aeruginosa* (CRPA) and *Candida auris* (*C. auris*) are reportable in Arizona and considered targeted MDROs for prevention and containment. The ADHS Office of HAI monitors all reports of MDROs for suspect cases/clusters and alerts the local health department (LHD) of each case or cluster of a morbidity that requires a timely public health response. The Office of HAI provides recommendations for response actions based on case investigation data entered into the state's centralized electronic disease surveillance system, MEDSIS, by the local investigator. The data entered into MEDSIS is compiled into an internal PowerBI dashboard for surveillance of several data points and trends for each MDRO. The dashboards also help inform gaps in data quality and investigations. The fellow will perform an evaluation of the dashboards to identify gaps and enhance data visualizations to help improve understanding and visualization of the MDRO trends in Arizona.

#### *Surveillance System Objectives:*

Perform an evaluation of the MDRO dashboards and data analysis methods, improve quality of data outputs and visualizations, identify gaps in data analysis methods and/or data collection, improve and enhance information sharing with internal and external partners, develop new data visualizations upon identification of gaps.

#### *Surveillance System Impact:*

Improve MDRO surveillance for the state of Arizona to improve internal and external understanding of the statewide MDRO data landscape and inform efforts for MDRO prevention and containment.

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**Major Project Title: Development of non-MDRO HAI/AR Organisms Case and Outbreak Surveillance Methods and Visualizations**

*Major Project Description:*

Aside from targeted MDRO's, the ADHS Office of HAI tracks and monitors other HAI and AR threats including but not limited to Methicillin-resistant Staphylococcus aureus (MRSA), Streptococcal Group A Infection, Legionellosis, Fungal Meningitis, Viral Hemorrhagic Fevers, and Strep pneumoniae. Novel and emerging non-MDRO HAI and AR threats are reportable in Arizona under their morbidity or captured under the public health reporting classification of "emerging and exotic diseases". Laboratory and case investigation data is entered into the state's centralized electronic disease surveillance system, MEDSIS, by the local investigator. The Office of HAI is working towards implementing surveillance methods to help improve tracking of cases and outbreaks for these morbidities. The fellow will work on the development of an internal dashboard to display relevant data points and trends related to these morbidities, as well as the development of a method for tracking potential outbreaks or clusters of cases among healthcare facilities.

*Major Project Objectives:*

Improve case and outbreak surveillance of non-MDRO threats in Arizona, create internal dashboard with data visualizations, develop a non-MDRO report highlighting Arizona data for internal and/or external partners.

*Major Project Impact:*

Improve non-MDRO surveillance for the state of Arizona to help inform non-MDRO prevention and containment strategies based on trending patterns.

**Additional Project #1 Title: Understanding epidemiology, trends and risk factors of Invasive Streptococcus Group A**

**Project #1 Type: Other**

*Project #1 Description:*

The number of invasive Streptococcus Group A (iGAS) cases has been consistently increasing, with a 65% rise from 2019 to 2023. Preliminary genomic analyses conducted in Arizona suggest the introduction and circulation of new, virulent emm types, which may be contributing to this increase. The ADHS HAI team collaborated with the Translational Genomics Research Institute (TGen) to initiate the AZ statewide iGAS genomic surveillance system in 2019. Since then, TGen has sequenced the genomes of ~3,000 isolates, of ~30 different emm types. Of these emm types, ≥5 are of known endemic strains (emm types 1, 3, 12, 28, 89), and have been seen in low, but steady numbers across multiple years. Other emm types appear to be ephemeral, peaking for months to ≥1 year, causing spikes in iGAS cases then apparently disappearing. The fellow will work closely with other HAI team members and TGen epidemiologists in analyzing 5 year iGAS data to identify trends, epidemiology, risk factors, disease severity, and emm types. Demographic, epidemiologic, and genomic data from 2019 to 2023 will be used to compare the risk of death and severity of illness among patients with different emm types.

*Project #1 Objectives and Expected Deliverables:*

Identify trends, risk factors and disease severity among different iGAS emm types cases.

*Project #1 Impact:*

Develop a better understanding of trends, risk factors and disease severity among different iGAS emm types; Target education campaigns among high risk individuals.

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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 have multiple opportunities to participate in preparedness activities. The fellow will be included into the state’s incident command structure during public health emergencies, including widespread infectious disease outbreaks or during disaster drills. The fellow will have an opportunity to participate in emergency preparedness tabletop exercises, developing emergency response and outbreak response plans, creating educational resources and materials for biological, chemical and/or radiological emergencies, and responding to public health emergencies as needed. The fellow will also have the opportunity to conduct after hours drills with the local health departments that include a high impact infectious disease scenario. The fellow will likely spend about 10% of their time on preparedness activities.

**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 incorporated into the HAI Prevention and Response Program where they will have the opportunity to work on HAI surveillance and outbreak response. There are currently 3 epidemiologists that are part of this program and assist with outbreak activities. The fellow will be trained on outbreak response actions. The fellow will assist with entering outbreak information into the statewide outbreak management system through REDCap, provide updates/communication to the local jurisdictions, review whole genome sequencing data, review case investigation data for identification of epi linkages, provide outbreak stats and create epi-curves, and participate on county/state/national outbreak calls. The fellow will likely spend about 40% of their time assisting with outbreak response.