ID: 60455585
Wastewater Surveillance, Infectious Diseases - Host Site Description
Alabama Department of Public Health

Assignment Location: Montgomery, US-AL
 Alabama Department of Public Health
 Infectious Diseases & Outbreaks Division

Primary Mentor: Amanda Ingram, MPH
 Epidemiologist Supervisor
 Alabama Department of Public Health

Secondary Mentor: Melanie Roderick, MPH
 Epidemiologist Supervisor
 Alabama Department of Public Health

Work Environment
Hybrid

Assignment Description

The Bureau of Communicable Disease is comprised of four Divisions: Immunizations, Infectious Diseases & Outbreaks (ID&O), Sexually Transmitted Diseases (STD), and Tuberculosis (TB). The fellow would be assigned to ID&O, which is responsible for conducting passive surveillance for 91 reportable conditions, as well as outbreak investigations for a wide range of infectious, non-infectious, and environmental conditions of public health concern. The fellow will be provided a well-rounded experience and given the opportunity to conduct and lead these types of investigations at the local, state, and federal levels.

ID&O would like the fellow's assignment to have a Infectious Diseases & Wastewater Surveillance focus. Since Alabama's Wastewater Surveillance Program is young, this will provide the fellow with the opportunity to contribute to the development of a surveillance program from the ground up. They will work with colleagues to identify ways to harmonize ID&O's current condition-specific activities with the aim to improve overall efficiency. We also have plans for the fellow to work on a health equity project related to wastewater surveillance.

Anticipated Day-to-Day Activities:
No day is ever the same in ID&O. However, it can be guaranteed that the fellow would be working at their PC conducting surveillance activities; conducting or leading outbreak investigations; analyzing data; preparing reports, presentations, fact sheets, or meeting agendas; developing just-in-time trainings; and collaborating with stakeholders. There will be opportunities to write and submit abstracts to national conferences, as well as deploy in the field for investigations.

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

Access to ALNBS, ArcGIS, DCIPHER, ESSENCE, REDCap®, SAS, SEDRIC, and Tableau will be granted via internet or remote access. If R and RStudio is wanted, those can also be installed. Training will be provided as needed. Monthly, epidemiologists and other data analysts from across the Department meet to discuss a variety of analytical projects which would provide the fellow with exposure to subject matter experts across various disciplines.

Projects

Surveillance Activity Title: Wastewater Surveillance

Surveillance Activity Description:
CDC launched the National Wastewater Surveillance System (NWSS) in September 2020 at select sites across the United States to build the nation's capacity to track the presence of SARS-CoV-2, the virus that causes COVID-19. Alabama was added to the program in 2022. Wastewater-based surveillance aims to serve as an early detection system, allowing health departments to stand up resources (e.g., testing clinics, vaccination clinics, health education campaigns, etc.) in the areas that need it the most at the time they need it most.

Wastewater samples are submitted twice weekly for testing. The primary target is SARS-CoV-2, but over the next few years ADPH plans to include additional targets including influenza, respiratory syncytial virus (RSV), and norovirus. Testing for these targets will complement existing surveillance programs at ADPH (e.g., ILINet, NRVESS, NoroSTAT, etc.).

The Fellow will contribute to the implementation, data management, data analysis, data visualization, and enhancement of this relatively new surveillance program in Alabama. The Fellow will be responsible for performing weekly data quality assurance checks and examine trends in SARS-CoV-2, influenza, norovirus, and RSV wastewater levels over time and determine correlations between increased wastewater levels and reported outbreaks submitted to ADPH's Potential Outbreak Submission project in REDCap®.

Surveillance Activity Objectives:
- Maintain and enhance ADPH's wastewater surveillance system.
- Perform weekly quality assurance checks on reported data.
- Examine trends in SARS-CoV-2, Influenza, Norovirus, and RSV wastewater levels.
- Determine correlations between increased wastewater levels and reported outbreaks submitted to ADPH's REDCap potential outbreak submission form.
- Present findings to ADPH staff and leadership during the ID&O's annual meeting.
- Create a report summarizing findings and recommendations for improvements.
- Develop targeted education materials to distribute to entities upon request.

Major Competencies: Interpret surveillance data; collect health data from appropriate sources; recommend control measures, prevention programs, or other public health interventions based on epidemiologic findings; write a surveillance report; present data graphically and know how to use graphic software

Surveillance Activity Impact:
Increase awareness about the utility of wastewater-based surveillance and improve access to much needed ADPH resources (e.g., testing clinics, vaccination clinics, health education campaigns, etc.)

Surveillance System Evaluation Title: Evaluation of the Alabama Wastewater Surveillance System

Surveillance System Evaluation Description:
To date, there are 11 wastewater utilities participating in wastewater surveillance across Alabama, either through a public health partnership or academic/philatropic partnership. Over the next few years, ADPH aims to onboard an additional 15 utilities and/or schools. All data are being submitted to CDC and published publically on their wastwater dashboard. The goal of this project is to evaluate the Alabama Wastewaster Surveillance System (ALWWS) by performing a descriptive analysis that consists of the following three steps: (i) description of the ALWWS system, (ii)

identification of end-users and stakeholders, and (iii) analysis of the system's attributes and performance (sensitivity, specificity, timeliness, usefulness, representativeness, simplicity, flexibility, stability, and communication).

Surveillance System Objectives:
- Collaborate with other jurisdictions to determine their effectiveness and efficiency when receiving and reporting wastewater data.
- Evaluate Alabama Wastewaster Surveillance System utilizing CDC guidelines for evaluating public health surveillance systems.
- Submit abstract to the CSTE Annual Conference.
- Create a report summarizing findings and recommendations for improvements.
- Implement identified methods for surveillance improvements.

Major Competencies: Design or implement a new, or revise an existing surveillance system; evaluate a surveillance system and know the limitations of surveillance data; collect health data from appropriate sources; recommend control measures, prevention programs, or other public health interventions based on epidemiologic findings; write a surveillance report; present data graphically and know how to use graphic software; present at a national or regional meeting

Surveillance System Impact:
Improve the Alabama Wastewater Surveillance System based on findings during the evaluation

Major Project Title: Implementing wastewater surveillance at a school in an area experiencing a sewage crisis

Major Project Description:
In 2017, a well-publicized, yet controversial, study was conducted by Baylor College of Medicine in collaboration with the Alabama Center for Rural Enterprise to assess the prevalence of helminthic and protozoan infections and determine correlation with sewage exposure in Lowndes County, Alabama. Using a laboratory-modified PCR test (MP FastPrep® spin kit for soil), investigators found of the 55 stool samples tested, 19 (34.5%) were positive for Necator americanus, 4 (7.3%) for Strongyloides stercoralis, and 1 (1.8%) for Entamoeba histolytica.

In response to the findings of that study, the University of Alabama at Birmingham, in collaboration with the Alabama Department of Public Health (ADPH), Centers for Disease Control and Prevention, Georgia Institute of Technology, and local community healthcare providers, launched a study in 2019 to assess if hookworm and other related intestinal parasites were present in individuals who reside in three counties (Lowndes, Perry, and Wilcox) of Alabama's Black Belt, as well as compare the utility of newer testing methods. Three stool samples are being collected and tested from each of the more than 700 children enrolled during the study period. To date, no positives have been reported to ADPH.

Nevertheless, on May 5, 2023, ADPH entered into an interim resolution agreement (https://shorturl.at/cnT59) with the Departments of Justice (DOJ) and Health and Human Services (HHS) to ensure the development of equitable and safe wastewater disposal and management systems in Lowndes County, Alabama. The agreement aims to help low-income homeowners who are unable to connect to municipal sanitation systems install or replace failing septic tank systems on their properties with conventional or engineered systems appropriate for the site conditions (https://shorturl.at/douT2).

In response to the Baylor study and the DOJ/HHS interim agreement, ADPH would like to reach out to the elementary school where the children in the affected area attend to discuss the potential of conducting wastewater surveillance on their property which is hooked up to the municipal sanitation system. This venture would be the first of its kind in Alabama. After installing an autosampler at the school, ADPH would focus on sampling twice per week. If any hookworm

and other soil transmitted helminths are detected, ADPH will provide targeted awareness and prevention messaging to the school, community, and healthcare providers in the area.

Major Project Objectives:
- Work with the ADPH public health laboratory as it works to develop protocol and workflow for the detection of hookworm and other soil transmitted helminths in wastewater.
- Develop and provide targeted awareness and prevention messaging to the school, community, and healthcare providers in the area regarding soil transmitted helminths.
- Assist with the expanding activities into additional blackbelt county experiences the same wastewater issues.
- Create a report summarizing findings from the wastewater testing results, University of Alabama at Birmingham study, and survey findings.
- Present findings to ADPH staff and leadership during the ID&O's annual meeting.

Major Competencies: Design an epidemiologic study to address a health problem; demonstrate an understanding of study design and the advantages and limitations of each type; collect health data from appropriate sources; create a database for a health data set; use statistical software to analyze and characterize epidemiologic data; interpret findings from epidemiologic studies, including recognition of the limitations of the data and potential sources of bias and/or confounding; recommend control measures, prevention programs, or other public health interventions based on epidemiologic findings; make an oral presentation using appropriate media, present data graphically and know how to use graphic software

Major Project Impact:
Contribute to the efforts to provide equitable and safe wastewater disposal and management systems to the residents of Lowndes County, Alabama

Additional Project #1 Title: Lowndes County School Wastewater Norovirus Surveillance Project
Project #1 Type: Surveillance Activity

Project #1 Description:
Studies have shown that human norovirus is detectable in wastewater treatment plant (WWTP) influent and studies have reported positive correlations between wastewater levels and conventional surveillance data, including confirmed human norovirus cases, gastrointestinal illness cases, and confirmed hospital cases. In 2024, ADPH aims to partner with a school in Lowndes County to retrieve wastewater samples. The goal of this project is to analyze norovirus laboratory results, review trends in seasonal changes, outbreak investigations, and absentee data. The fellow will provide targeted awareness and prevention messaging to the school, community, and healthcare providers in the area. If the project is successful, the fellow will assist in enrolling additional K-12 schools.

Project #1 Objectives and Expected Deliverables:
- Meet with school administrators and other stakeholders to discuss wastewater surveillance and how sampling will inform public health responses for the school.
- Examine trends in norovirus data in wastewater levels received from school samples.
- Review school absentee data to identify trends or predictions
- Assist with enrolling additional school into the wastewater surveillance project.
- Share with school administrators and other stakeholders wastewater surveillance results
- Develop and provide targeted awareness and prevention messaging to the school, community, and healthcare providers in the area regarding norovirus

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Major Competencies: Collect health data from appropriate sources, recommend control measures, prevention programs, or other public health interventions based on epidemiologic findings, make an oral presentation using appropriate media

Project #1 Impact:
Norovirus is the leading cause of sporadic cases and outbreaks of acute gastroenteritis in all age groups, causing more than 699 million infections and approximately 212,000 deaths worldwide each year. Wastewater surveillance/wastewater-based epidemiology is one ideal approach for monitoring viruses' prevalence and to-date has been applied to screen for a wide range of waterborne and non-waterborne viruses. Wastewater monitoring for norovirus has the potential to provide more local, early-warning information to inform public health and school decision-making - potentially prior to clinically detected outbreaks.

Additional Project #2 Title: Evaluation of manual vs automated surveillance systems
Project #2 Type: Surveillance System Evaluation

Project #2 Description:
Review reports from the Alabama Trauma Registry (ATR), the Alabama Head and Spinal Cord Injury Registry (AHSCIR), and the Alabama Trauma System (ATS) to compare the last full annual report data with information submitted by emergency department visits to the Alabama Syndromic Surveillance program.

Project #2 Objectives and Expected Deliverables:
The analysis will evaluate the completeness and timeliness of each system to make recommendation for potential policy revisions to improve data-driven decision making.

Project #2 Impact:
This evaluation of younger surveillance mechanisms such as emergency department visits could potentially reduce administrative burdens on providers and improve data quality and timeliness for public health action.

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 engaged in emergency readiness and response activities as opportunities arise; possible activities include providing epidemiology support to responses, participating in CASPERs or other community needs assessments following disasters, and contributing to tabletop exercises. CDC Career Epidemiology Field Officer, Melissa Morrison, will provide direction and mentorship in disaster epidemiology and the Fellow will be invited to participate in training opportunities.

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

ADPH Epidemiologists and CSTE AEF Fellows are responsible for reviewing potential outbreak submissions in REDCap®. Once an investigation is assigned to the Fellow, the Fellow will be responsible for leading the outbreak investigation from start to finish.

- Review REDCap® potential outbreaks one day per week
- Lead initial outbreak investigation call for those outbreaks assigned
- Manage the outbreak in the Outbreak Management System and ensure the questions are being completed accurately and timely

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- Complete NORS report for enteric, foodborne, and waterborne disease outbreaks
- Update SEDRIC for multistate outbreaks, as required

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

The Fellow will be responsible for monitoring trends in SARS-CoV-2 levels in wastewater across the state. They will also be expected to review potential outbreak submissions for COVID-19. At least half of their time will be focused on these two activities.

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

The major project we are proposing for the fellow to work on has a major health equity focus. We are also looking to revamp many of our legacy pages in our surveillance system to ensure health equity focused questions are included on the new investigation pages. We are a relatively small state health department, but staff within our Division come from all walks of life and are very diverse. Fellows are given the oppotunity to work on a variety of projects that may be of interest. There are several workgroups within ADPH focusing on these areas and the Fellow will be allowed to participate.