ID: 60403740
Wastewater Surveillance, Infectious Diseases - Host Site Description
Jackson County Public Health

Assignment Location: Lee's Summit, US-MO
Jackson County Public Health
Epidemiology and Data Analytics/ Surveillance and Research

Primary Mentor: Tolulope Awolusi, DrPH, MPH, B.Sc
Epidemiology Surveillance and Research Coordinator
Jackson County Public Health

Secondary Mentor: Adeyemi Adedokun, DrPH, MPH, MS
Communicable Disease Epidemiology Coordinator
Jackson County Public Health

Work Environment
Hybrid

Assignment Description

The Surveillance and Research Program in Jackson County Public Health Local Health is critical in acquiring high-quality epidemiologic data and quality procedures. In addition, the program will be responsible for implementing active, passive, syndromic, and population-based surveillance for threats within the Eastern Jackson County Jurisdiction.

Implement diverse surveillance systems: The fellow will work to strengthen the newly established wastewater surveillance and develop an eclectic array of surveillance tools to ensure JCPH has a comprehensive picture of public health risks. The goal is to create and implement innovative, diverse surveillance approaches that address emerging and reemerging infectious diseases and complement existing programs.

Tracks and access Diseases: The fellow tracks and assesses diseases by collecting, analyzing, and evaluating data, as well as maintaining a database that aids in the surveillance and research regarding infectious diseases within the jurisdiction

Data Collection and Analysis: By establishing robust data collection and analysis strategies, JCPH can ensure proactive responses to public health threats and promote a healthier population. The data collected on communicable and non-communicable diseases will help to identify trends and patterns in disease prevalence and burden. In addition, JCPH develops comprehensive data dashboards for real-time monitoring of trends and produces data reports and presentations for external partners and internal use.

Ensures program quality and collaborates with partner organizations, constituents, and interested parties: The fellow collaborates with internal and external programs to maintain surveillance data and provide complete, quality data that are available and accessible to JCPH. The surveillance and research program will utilize data from targeted program areas, like emergency room admissions or crisis hotlines, to identify high-risk populations.

Data Integration: Develop data-sharing partnerships between LHDs and research institutions to create a comprehensive picture of disease surveillance dynamics within the community.

Research: We conduct researchÂ in collaboration with our Research Advisory Committee (RAC), which consists of faculty members from partnership universities, researchers from hospitals, and key leaders in the communities employing a community-based participatory (CBPR) approach and through a health equity lens.

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

Data are currently stored on the shared drive and with access to a protected folder, in which the data are located with limited access to specific individuals to which the CSTE fellow will be given access following strict protocols. The data analytics team is working on getting the Oracle database, an ongoing process. The software currently used at JCPH includes Excel, SPSS, R studio, Python, ArcGIS Pro, and Power BI.

The surveillance systems that will be made available to the fellow include Clinisys WorldCare, EpiTrax, Websurv, and ESSENCE, which are currently used in Missouri, and we are looking to add more soon.

Projects

Surveillance Activity Title: Strengthening Surveillance Systems at Jackson County Public Health: Wastewater, Tickborne and Mosquito, and Global Surveillance

Surveillance Activity Description:
Wastewater surveillance monitors the presence of pathogens or biomarkers in a community's wastewater, providing early warning of disease outbreaks or changes in disease trends.
Sample Collection:

- Wastewater samples are collected from sewage treatment plants or manhole covers already mapped out in Eastern Jackson County (EJC) communities.
- The frequency of sample collection is twice weekly using autosamplers as 24-hour composite samples at the identified locations to monitor trends
- Testing and Analysis:
- Samples will be tested in-house-Jackson County Public Health Laboratory
- Concentration levels of the target pathogen or biomarker are quantified to assess trends and potential public health risks.

Data Interpretation and Dissemination:

- Our results will be sent to another contracting company for data analysis until our surveillance and research team has the capacity for genomic data analysis
- Data will be published on our dashboards, and results will be shared with public health officials, researchers, and communities to inform decision-making and prevention strategies.

Tickborne Surveillance
Passive tick surveillance consists of people submitting ticks to researchers or government agencies found on themselves, their pets, or their property when the tick encounter was incidental. Passive tickborne surveillance relies on the power of citizen scientists and keen observers to gather vital information about these miniature menaces. It's a collaborative effort where everyone plays a role in mapping the distribution and prevalence of ticks and the diseases they carry.
Activities include:

- Get familiar with www.etick.ca
- Meet with communications to discuss adding tick surveillance to the JCPH website
- Create a tick identification guide for JCPH staff (include multiple pictures for each kind of tick, with different angles, lighting, etc.
- Develop education materials for the tick page (how to remove ticks, check for ticks, info on tickborne diseases, etc.)
- Develop a guide on how to take photos of ticks for submission

- Develop a Microsoft Form to be submitted by the public
- Follow up with communications to submit completed resources for the webpage and to check in on the process
- Set up the ArcGIS mapping system for tick submissions
- Implement a tick surveillance system
- Write SOP for the surveillance system

Mosquito Surveillance

- Mosquito collection: Diverse traps (light and gravid) target different mosquito stages (adult and immature) would be placed at strategic locations in East Jackson County.
- Species identification: Captured mosquitoes would be examined in the laboratory to determine their species and identify potential disease vectors.
- Pathogen testing: Mosquitoes may be tested for specific diseases (e.g., West Nile virus) depending on local health concerns.
- Data utilization: Data gathered from the mosquito surveillance would be used to:
    - Monitoring mosquito population trends: The tracking of fluctuations across locations and time helps understand population dynamics.
    - Targeted interventions: High-activity areas would be prioritized for control efforts, optimizing resource allocation.
    - Early disease detection: Identifying infected mosquitoes aids in preventing outbreaks.
    - Control measure evaluation: Monitoring mosquito populations helps assess the effectiveness of control methods

Global Surveillance:

- Regularly monitor the diverse passive surveillance systems in EJC, including international and national news, travel alerts, and surveillance systems, for the earliest detection of potential risks or outbreaks in its population.
- Follow the population behavior in response to potential disease outbreaks
- Provide briefings to the Surveillance team and upper management.

Surveillance Activity Objectives:
Wastewater Surveillance Objectives and deliverables:
Objectives: To monitor multiple high-priority pathogens such as SARS-CoV-2, RSV, and influenza A & B. In addition, we aim to utilize wastewater surveillance as a complementary surveillance tool that would be a leading indicator of disease trends from 4-7 days before clinical data report new cases. Implementing a robust disease surveillance system will facilitate a more expeditious response to potential outbreaks while simultaneously enabling the generation of comprehensive data to inform the development of targeted interventions to mitigate pathogen dissemination within communities. It will also provide an in-depth understanding of how high-priority pathogens spread through our community. Eventually, we hope to serve as a resource for wastewater surveillance in our jurisdiction and other communities.

Deliverables:
To generate data for tracking infectious diseases in circulation within EJC. Results will inform intervention strategies and give a head start to prevent and control outbreaks. In addition, disseminating results to the public and stakeholders in the community through dashboards will contribute to a more extensive wastewater surveillance network.

Tick-borne objectives and deliverables
Objectives: To develop and implement a new tick passive surveillance system that monitors the distribution of ticks and identifies commonly found ticks in Eastern Jackson county and Missouri.

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Deliverables:

- Community Participation in Surveillance: To create awareness among the general public about the new surveillance system. In addition, the public can use the new passive surveillance system to submit tick pictures to Jackson County Public Health for monitoring and identification.
- Education: Complete the development of educational materials on preventing tick bites, removing a tick after a bite and where to check for one that will be accessible electronically and in hard copies.
- A Photographic Guide for Effective Passive Surveillance: Develop a video / photographic guide on how to take pictures of ticks for our passive surveillance system.

Mosquito Surveillance and deliverables
Objectives: The goals of mosquito surveillance in Jackson County are to determine the array of mosquito species domiciled in Jackson County, their geographic distribution, seasonal occurrences, the quantification and the identification of potential vectors of mosquito-borne pathogens in the county. Entomological expertise from the University of Missouri Extension will be leveraged to conduct species identification, and subsequent testing for medically significant viruses circulating within the mosquito populations of Jackson County.

Deliverables: Utilizing surveillance data for informed decision-making - the acquired data and intelligence gleaned from mosquito surveillance efforts will empower both Jackson County Public Health and stakeholders to:

- Targeted Interventions: Prioritize areas exhibiting high mosquito densities and elevated risk of arboviral transmission, enabling the implementation of focused mosquito control measures.
- Strategic Vector Control: Guide decisions regarding the necessity, timing, and selection of appropriate vector control interventions, including environmentally friendly larvicides, biological control agents like Gambusia fish, and community-driven mosquito prevention initiatives.
- Monitoring and Evaluation: Assess the efficacy of deployed vector control methods, ensuring their continued effectiveness in mitigating mosquito populations.
- Laboratory Analysis: Prompt targeted laboratory testing (molecular assays) to detect arboviral pathogens within identified mosquito species, enabling early identification of potential outbreaks.

Global Monitoring objectives and deliverables:
Objectives: To elucidate the etiology and impact of health and disease patterns across diverse populations. In addition, this epidemiological tool will help to investigate disease outbreaks, assess population-level health risks, and inform the development of public health interventions with global reach. Furthermore, monitoring for novel and emerging threats, and investigate outbreaks to pinpoint their source and implement strategies to curb further spread is one of the central focus of our global surveillance. In conclusion, we will identify factors that elevate or mitigate the risk of specific diseases through meticulous analysis of disease patterns across different populations.

Deliverables:

- Epidemiological Reports: These reports detail the findings of investigations into disease outbreaks, risk factors, and health disparities: data analysis, visualizations, and interpretations.
- Peer-Reviewed Publications: Research findings will be disseminated through scientific journals, contributing to the broader body of knowledge in global health.
- Formulate Research Questions: Leveraging global disease events and conditions as springboards for research questions grounded in real-world disease events and conditions, with the potential to directly address pressing public health concerns and contribute meaningfully to improving global health outcomes.

Surveillance Activity Impact:
Have well-rounded passive and active surveillance systems in JCPH and improve timely data acquisition for strategic decision-making.

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Surveillance System Evaluation Title: Efficient and Effective Innovative Surveillance Systems at JCPH

Surveillance System Evaluation Description:
The CSTE fellow would ascertain whether the implemented surveillance systems possess the requisite attributes of effective and efficient surveillance mechanisms. Methods to be employed in evaluation include data analysis and surveys. Listed below are the critical aspects the fellow will consider when evaluating surveillance systems at JCPH:

- Simplicity: This is to assess the ease of use of the surveillance system's features, such as data collection, reporting, and analysis.
- Flexibility: The purpose is to determine the systems' ability to adapt to changing public health threats or emerging diseases. The critical question is whether they can incorporate new data sources or adapt to new testing methods.
- Acceptability: This evaluates how well stakeholders (healthcare providers, public health officials, and other partners) accept the system. Answering the questions– whether it is user-friendly or addresses their needs- would be crucial in determining its acceptability.
- Sensitivity: This would measure the systems' ability to detect actual public health concern cases accurately. A susceptible system should minimize missed cases.
- Predictive value positive (PPV): This assesses how often a positive test result indicates a valid case. A high PPV reduces false positives.
- Representativeness: This is to gauge whether the data collected accurately reflects the target population.
- Timeliness: This measures the speed with which data is collected, analyzed, and disseminated. Timely data is essential for prompt public health interventions.
- Stability: The goal is to assess the systems' current functionality and reliability. Questions such as – whether data collection is consistent and whether there are mechanisms to ensure data quality over time should be answered.
- Cost-effectiveness: The financial cost and resources needed to operate the surveillance systems would be evaluated against the public health benefits they generate.
- Ethical considerations: The assessment of data privacy and the protection of PHI, potential biases inherent in the system's design, or data collection methods would also be done.

Surveillance System Objectives:
Surveillance Systems Evaluation Objectives:

To assess the effectiveness of various surveillance systems in monitoring health events.
To examine the surveillance systems' attributes, such as usefulness, timeliness, and representativeness, to determine their ability to generate data that inform public health interventions.
To identify strengths and weaknesses, recommending improvements to optimize the system's capacity to protect public health.

Surveillance Systems Evaluation Deliverables:

- Evaluation Summary: A comprehensive report describing the evaluation process with an introduction, methods, results, and discussion sections. These evaluation findings would be the precursor for actionable strategies, and the report would present clear and specific recommendations for improvement and would be presented to upper management (Director, Assistant Director, and JCPH legislators).
- Implementation Plan: The fellow would develop a stepwise outline of implementing the recommendations. This outline would include timelines, responsibilities, and resource allocation.

- Presentations: The summary of the evaluation findings will be presented to the entire JCPH staff and other stakeholders (healthcare providers, Research Advisory Committee).

Overall, the deliverables of our public health surveillance systems evaluation are expected to provide a clear picture of our surveillance systems' effectiveness and efficiency, outlining areas for improvement and presenting actionable strategies to maximize their ability to protect public health.

Surveillance System Impact:

- Targeted Public Health Interventions: Data from our surveillance systems should pinpoint areas with high disease burden or risk factors. This empowers us to direct public health interventions to the most at-risk groups, such as vaccination campaigns or educational programs.
- Evaluation of Public Health Programs: Surveillance data would be used to assess the effectiveness of public health programs.
- Improved Resource Allocation: Evaluation can pinpoint areas where the surveillance systems are wasteful. Hence, a more strategic allocation of resources would ensure that resources are directed towards the areas of greatest need.
- Increased Public Confidence: If the public trusts JCPH more in its ability to protect their health, this would subsequently lead to greater cooperation with public health initiatives during outbreaks or emergencies.

Major Project Title: JCPH Data Modernization Efforts

Major Project Description:
JCPH strengthens data reporting, management, and analytics processes within the JCPH division. This process will include conducting proper surveillance of COVID-19, Communicable Diseases, School Syndromic Surveillance, and other innovative systems using public-facing visualizations and data analysis tools like Power BI to provide valuable support and information to local health authorities, individuals, local health authorities, community leaders, and organizations working to improve health for all people. Additionally, JCPH supports data staff in pursuing innovation and building state-of-the-art data science skills by providing opportunities to attend contemporary public health conferences and trainings. Lastly, JCPH plans to develop the Data Use Agreement with potential partners and timely receive public health-related information while ensuring data security and confidentiality.

Major Project Objectives:
To develop the plan for accelerating data into action.
To develop the plan for improving workforce skills and capacities.
To collaborate with partners to receive and timely receive public health information through data sharing agreements while ensuring data security and confidentiality.

Major Project Impact:
Through these JCPH Data Modernization Efforts, JCPH will timely inform public health-related information to individuals, community leaders, local health authorities, and organizations working to improve health for all people within Eastern Jackson County Jurisdiction.

Additional Project #1 Title: Improving Latent Tuberculosis Treatment Completion Rates in Eastern Jackson County
Project #1 Type: Surveillance Activity

Project #1 Description:
The CSTE fellow's project will be to develop an LTBI treatment grant and take a lead role in executing it. Latent Tuberculosis Treatment (LTBI) grants typically focus on funding programs and initiatives that aim to increase

identification, diagnosis, and treatment completion for LTBI. The target population for this project is foreign-born individuals from regions with high TB prevalence, people living with HIV, or recent TB contacts.

Project #1 Objectives and Expected Deliverables:
Reduced TB Incidence: Untreated LTBI acts like a hidden reservoir of active TB; treatment effectively breaks this cycle, dramatically reducing the risk of active TB and lowering community transmission rates.

Improved Public Health Outcomes by Mitigating Morbidity and Mortality: Active tuberculosis (TB) presents a significant public health challenge due to its debilitating nature and potential for mortality. Early intervention through LTBI treatment plays a critical role in preventing the progression to active TB, thereby safeguarding individuals from the substantial physical and economic burden of the disease. This proactive approach demonstrably reduces morbidity and mortality associated with TB.

To seek funding and grants for LTBI treatment.
To develop and implement a program to increase Latent Tuberculosis Treatment (LTBI) completion rates in Eastern Jackson County.

CSTE Fellow Activities
Pre-Award Phase/Grant Proposal Development
Research funding opportunities and eligibility requirements.
Conduct a need assessment to identify the specific needs and challenges related to LTBI treatment in the target community.
Use readily available data on LTBI in EJC, community surveys, or focus groups to conduct a need assessment.
Develop a compelling proposal that outlines the program's goals, target population, activities, budget, and evaluation plan.
Assemble supporting documents such as letters of support and relevant data.

Award/Program Implementation
Develop and implement LTBI education, outreach, and screening strategies within the target population. This may involve partnerships with community organizations, healthcare providers, and faith-based organizations.

Patient Management
Facilitate access to LTBI testing and treatment for identified individuals. This may involve working with the Health Services Division to establish clinics, referral networks, or patient support services.
Data Collection and Reporting
Another responsibility of the CSTE fellow is to track and document program activities, including the number of individuals screened, diagnosed, and completed treatment.
In addition, the fellow will prepare regular reports for the Communicable Disease Coordinator and the grant funders outlining progress and achievements.

Monitoring and Evaluation
Monitor the LTBI treatment program fidelity – ensuring activities are delivered as planned. Maintain compliance with grant regulations and reporting requirements.
Build partnerships and collaborations with stakeholders involved in TB control efforts.
Conduct training and capacity building for healthcare providers and community health workers on LTBI identification and treatment.
Collaborate with the Policy and Strategic Initiative Division to advocate for policies and funding that support increased access to LTBI testing and treatment.

Furthermore, the evaluation of the program's effectiveness in achieving its stated goals and objectives will be conducted by the fellow. This may involve analyzing data on treatment completion rates, cost- effectiveness, or impact on TB incidence.

Post-Award/Sustainability Planning
The CSTE fellow will develop strategies to ensure the program's continued operation beyond the grant funding period. This may involve securing alternative funding sources or transitioning program activities to existing health systems.

Final Report
In conjunction with the Communicable Disease Coordinator, the fellow will write a final report summarizing the program's activities, outcomes, and lessons learned for the grant funders.

Project Objectives:
Increase latent tuberculosis infection (LTBI) treatment completion rates within a target high-risk community.
Establish or expand access to LTBI testing and treatment services
Develop culturally appropriate educational materials on LTBI for the target population.
Generate regular progress reports summarizing program achievements and challenges for grant funders. Conduct a comprehensive program evaluation to assess the effectiveness of implemented strategies in increasing LTBI treatment completion rates.

Project Deliverables:
Develop program activities: This includes creating materials, resources, and interventions to achieve the grant's goals. Examples are culturally appropriate educational materials on LTBI, training manuals for healthcare providers on LTBI identification and treatment, and outreach materials promoting LTBI screening and treatment completion.
The establishment of LTBI clinics or extended clinic hours to improve access to services.
Development of patient support services like medication reminders, directly observed therapy (DOT), or video observed therapy (VOT) programs.

Implement program strategies: This involves implementing the planned activities, which may include conducting educational workshops in the target community, partnering with community organizations to facilitate outreach efforts, providing LTBI testing and treatment services to identified individuals, and enrolling patients in patient support programs to enhance adherence.
Data collection plan: This outlines the methods for capturing data on program activities and outcomes, such as the number of individuals reached through outreach efforts, the number of individuals screened for LTBI, the number of individuals diagnosed with LTBI, and the number of individuals completing LTBI treatment.

Regular progress reports summarize program activities, achievements, and any challenges encountered.

The program evaluation report states the result of assessing the program's effectiveness in achieving its stated goals and objectives. It analyzes data on treatment completion rates, cost-effectiveness, and impact on TB incidence.
Final Report: This report provides a detailed account of all program activities, achievements, challenges, and lessons learned. It summarizes the program's impact and justifies the use of grant funds.

Project #1 Impact:
Untreated LTBI acts like a hidden reservoir of active TB; treatment effectively breaks this cycle, dramatically reducing the risk of active TB and lowering community transmission rates. Improved Public Health Outcomes by Mitigating Morbidity and Mortality: Active tuberculosis (TB) presents a significant public health challenge due to its debilitating nature and potential for mortality.

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Early intervention through LTBI treatment plays a critical role in preventing the progression to active TB, thereby safeguarding individuals from the substantial physical and economic burden of the disease. This proactive approach demonstrably reduces morbidity and mortality associated with TB.

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

Jackson County adopts the Incident Command System, and the incident commander will assign roles in an Emergency the incident commander assigns. While there are different roles to be assigned, the CSTE fellow in the surveillance program will be assigned to the monitoring and surveillance team. This team will be responsible for implementing and maintaining robust surveillance systems in diverse settings, such as congregate and healthcare settings, to mitigate/ reduce the size of outbreaks in real-time as possible.

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

The fellow will work under the mentor's direct supervision and in collaboration with the monitoring and evaluation team to continuously monitor the cluster or outbreaks and the effectiveness of control measures. In addition, the fellow will also work with the data analytics team to effectively collect, manage, analyze, and interpret data to conclude decision-making.
Duties will be assigned as needed.

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

Since the CDC declared the emergency phase of the COVID-19 pandemic over, COVID-19 cases are only reported as an aggregate count. In light of this, the fellow would only have a limited role in the COVID-19 response if identified in a high-risk congregate setting. The role will be assessed pending the situation.

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

The mentors will encourage using a health equity lens when conducting surveillance and during outbreak investigations. Trainings are chosen based on the findings from organizational health equity assessments and the population we serve. The fellow will also work with the mentors and the diverse partners identified for the programs.