ID: 34589863
Infectious Diseases - Host Site Description
Tennessee Department of Health

Assignment Location: Nashville, US-TN
Tennessee Department of Health
HIV/STI/Viral Hepatitis Section

Primary Mentor: Christine Thomas, DO, MPH
Medical Director, HIV/STI/Viral Hepatitis Section and TB Elimination Program
Tennessee Department of Health

Secondary Mentor: Steffany Cavallo, MPH
Sexually Transmitted Infections Program Director/Epidemiologist 3
Tennessee Department of Health

Work Environment
Hybrid

Assignment Description

The fellow will gain a detailed understanding of HIV, STI, and Viral Hepatitis surveillance and programmatic activities, with a particular focus on syphilis. The fellow will become familiar with application of STI CDC/CSTE case definitions to assign appropriate case status, HIV and viral hepatitis cluster detection, conducting STI and other field investigations, and database and data quality management.

The fellow will have the opportunity to develop solutions and implement tools to enhance monitoring, reporting, and dissemination of STI, HIV and Viral Hepatitis surveillance data. The fellow will participate in outbreak detection and response activities, with a particular focus on assisting the STI program to enhance outbreak detection. The fellow will also be expected to participate in all aspects of an outbreak investigation including: questionnaire design, interview training and case/control interviews, data collection and management, data analysis, after-action reviews and field investigation report writing.

Collaboration with local, regional and state health department staff, as well as agencies outside of TDH such as the CDC, will be necessary. Through these activities, this fellow will be closely engaged with our internal and external partners and will have the opportunity to build critical and systems thinking to solve problems and innovate. Placement at TDH will afford the fellow an opportunity to get a true grassroots experience. The fellow will be mentored and supported to complete all of the fellowship requirements and will be encouraged to present their work at local and national meetings and publish findings in peer-reviewed journals.

Fellow's anticipated day to day activities:

- Attend weekly CEDEP surveillance meetings.
- Attend monthly STI surveillance team meeting and STI epidemiology check in.
- Participate in HIV, STI, and/or Viral Hepatitis cluster detection and outbreak investigations.
- Participate in the quarterly STI Outbreak Response Plan Workgroup.
- Serve as a consultant for local and regional health department staff on questions regarding HIV/STI/Viral Hepatitis outbreak and cluster investigations.
- Provide data analysis and report writing support to local and regional health departments.
- Attend all statewide epidemiology trainings including CEDEP conference calls and face-to-face meetings.
- Conduct special studies to include aspects of study design, implementation, and analysis.

- Support STI epidemiology staff in development and maintenance of enhanced surveillance monitoring and reporting tools, including data dashboards, data quality reports and epidemiologic profiles/reports.
- Analyze data from Tennessee's surveillance systems including the Enhanced HIV/AIDS Reporting System (eHARS), National Electronic Disease Surveillance System (NEDSS) Base System (NBS), Patient Reporting Investigation Surveillance Manager (PRISM) and vital records (e.g., birth and death certificates).
- Prepare and deliver presentations at state and national meetings.
- Lead and/or support the writing and development of manuscripts and reports.
- Use results of congenital syphilis case control study (to be completed mid-2025 by TDH CSTE Fellow) to identify additional intervention opportunities or areas for collaboration in Tennessee to control congenital syphilis rates. Determine if regular monitoring of additional data sources (live birth datasets, hospital discharge datasets) may be useful for tracking progress.
- Assist with monitoring syphilis rapid testing pilots throughout the state, by monitoring test ordering, sites at which tests were used, positivity rates, and summarizing for leadership.

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

The fellow will receive hands-on training on the use and application of multiple databases and surveillance systems, including NBS, PRISM, eHARS, Epi Info, and Research Electronic Data Capture (REDCap). Available statistical analysis software include GIS for Health, Statistical Analysis System (SAS), SQL, R, and Tableau; support and training will be provided via primary and secondary mentors, in addition to formal classroom and online training.

Projects

Surveillance Activity Title: Using laboratory volume data to enhance STI cluster detection in Tennessee

Surveillance Activity Description:
STI case investigation is a labor and time-intensive process. In Tennessee, the sheer volume of STIs such as Chlamydia (>35,000 cases per year) and Gonorrhea (>18,000 cases per year) mean that some jurisdictions are not able to do full investigations, or there are significant time lags to investigation. Historically the STI program has generated threshold reports to identify increases in chlamydia, gonorrhea, or syphilis that are based on completed case investigations. However, these threshold reports are not timely and therefore may limit our ability to adequately detect clusters. This project involves evaluating the usefulness of a laboratory-report based cluster detection system. At TDH most lab reports come in via ELR directly from laboratories throughout Tennessee and are therefore fairly timely. By comparing lab volume from week to week, we may be able to detect clusters early and instruct local DIS in health departments on how to prioritize their work.

Surveillance Activity Objectives:
- Conduct a literature review on STI cluster/or other laboratory report-based aberration detection strategies.
- Meet with TDH HIV and Viral Hepatitis epidemiologists to understand cluster detection activities for these pathogens and where collaboration may be optimal.
- Review incoming lab data for the last 5 years, compare volume of lab reports to proportion that become cases based on the CDC case definition.
- Identify pros and cons of using lab data for cluster detection and whether it is suitable for STI cluster detection.
- Consider inclusion of social vulnerability index or other socioeconomic measures to ensure rapid response in communities at high risk of poor outcomes or systemic barriers.

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Surveillance Activity Impact:
Better cluster detection systems will assist Tennessee public health staff with targeting intervention and education activities to reduce burden. In the context of overflowing workloads, the more rapidly we can detect aberrations the more quickly we can adjust our response to be more strategic. If useful, this project could inform development of CEDEP-wide laboratory report-based cluster detection activities.

Surveillance System Evaluation Title: Evaluation of gonorrhea surveillance in Tennessee

Surveillance System Evaluation Description:
The gonorrhea incidence rate in Tennessee has historically ranked 12th highest in the US. As STIs continue to increase in TN, it is important to continuously evaluate the way we do surveillance and the usefulness of the data we collect. This project is intended to evaluate the way we've done gonorrhea surveillance for the last decade, and identify ways to improve our ability to measure the gonorrhea epidemic in TN. The fellow will evaluate the gonorrhea surveillance system on the following attributes:

- Sensitivity - is the system able to detect critical outcomes like DGI or treatment failure?
- Positive Predictive Value - Are the current automations correctly identifying confirmed and probable cases?
- Representativeness - How representative are the data in the system?
- Completeness - Does the resource-focused approach to investigation of gonorrhea impact completeness of data overall and for key populations?

Surveillance System Objectives:

- Conduct a gonorrhea surveillance literature review.
- Extract gonorrhea data from PRISM and NBS.
- Understand the gonorrhea and DGI case definitions.
- Review trends in completeness over 10 years and compare trends to changes in STI service levels.
- Complete a surveillance evaluation report with recommendations for improving the surveillance of gonorrhea, especially to inform sampling strategies.

Surveillance System Impact:
The large volume of infections makes it difficult to prioritize prevention activities. This evaluation will help us 1. Understand the impact of service disruptions on gonorrhea incidence and outcomes and 2. Strategize improvements to maximize existing resources.

Major Project Title: Using Hospital Discharge Data to supplement STI/HIV/Viral Hepatitis Surveillance data

Major Project Description:
The Hospital Discharge Data is data collected during inpatient and outpatient hospital encounters in TN. There are many elements in this dataset that can complement STI, HIV and Viral Hepatitis surveillance and enhance understanding of the syndemic. Traditionally stigmatized behaviors such as drug use are often under-reported during public health interviews. Unfortunately, not having this information also makes it difficult for TDH to mount appropriate responses to these co-occurring epidemics. This activity will focus on improving our assessment of drug use and other risk factors in these populations. STI/HIV/Viral Hepatitis data will be linked to the most recent hospital discharge dataset (HDD). The fellow will evaluate if indicators for drug use in the HDD can supplement existing risk factor data for syphilis, HIV, and HCV patients. The fellow will also assess Emergency Department screening for Syphilis, HIV, and HCV among Tennessee hospitals.

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Major Project Objectives:

- Conduct a literature review on hospital discharge data and how it has previously been used in combination with surveillance activities.
- Meet with TDH HDDS and STI, HIV, and Viral Hepatitis surveillance directors to clarify project and data needs.
- Identify elements that will allow for linking these datasets.
- Draft project outline and analysis plan.
- Submit data request and IRB approval, if required.
- Analyze the impact of the more complete data; including comparison of cluster detection with supplemental information and without.
- Summarize findings in a written report, including a specific focus on whether this data could be used during field or outbreak investigations.

Major Project Impact:

As getting patients to agree to interviews becomes more challenging in the post-COVID era, exploration of all the data available to us is not only necessary but efficient. Linking different surveillance systems allows programs to have a more complete understanding of an individual and supports a syndemic approach to disease investigation and prevention. Furthermore, increased completeness of data allows the surveillance system to be the gold standard, and outbreak and cluster response to be more targeted.

Additional Project #1 Title: Intersection of Neonatal Abstinence Syndrome and Congenital Syphilis Surveillance
Project #1 Type: Surveillance Activity

Project #1 Description:

Previous analyses have found persons with a congenital syphilis pregnancy outcome are more likely to report illicit use of opioids than those without a congenital syphilis pregnancy outcome. In the US from 2013-2017, drug use more than doubled among heterosexuals with syphilis. An analysis of TN data from 2016-2020 did not find the same association, possibly due to under reporting of opioid or other drug use. This activity is intended to understand what, if any, overlap exists between congenital syphilis and neonatal abstinence syndrome (NAS) diagnoses and between parental syphilis diagnosis and babies born with NAS.

Project #1 Objectives and Expected Deliverables:

- Conduct a literature review on NAS, congenital syphilis, and the association between syphilis infection and drug use.
- Meet with the NAS Surveillance team to understand their surveillance system and the NAS case definition.
- Perform exact and fuzzy matching to create a linked NAS-syphilis dataset.
- Conduct risk factor analysis and analysis of the relationship between NAS and CS diagnoses.
- Present findings at internal STI, CEDEP and Family Health and Wellness (FHW) meetings.

Project #1 Impact:

Understanding the number of individuals diagnosed with syphilis who deliver a baby with CS and NAS will allow more targeted prevention of CS and NAS. Also, further understanding the number of babies with both CS and NAS is essential to understanding the current CS epidemic as well as the syndemic of STIs and substance use disorder.

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Additional Project #2 Title: Analysis of STI reinfection rates and treatment failure in Tennessee
Project #2 Type: Surveillance Activity

Project #2 Description:
Timely treatment of persons diagnosed with STIs and their partners is essential to slowing the STI epidemic. Reinfection rates among Tennesseans have not been evaluated in recent years. Reinfection indicates a partner or partners may not have been treated and may warrant changes in our efforts to reach patients and their partners. Additionally, in 2023, shortages of penicillin G benzathine, the frontline treatment for syphilis, led to rationing of this medication and use of doxycycline for all non-pregnant patients for approximately 8 months. Non-compliance with a doxycycline regimen (14 or 28 days of oral medication) is likely, but difficult to measure once a patient leaves with their prescription. The fellow will compare patients who received the doxycycline regimen to those who received the traditional penicillin regimen.

Project #2 Objectives and Expected Deliverables:
- Determine the proportion of gonorrhea and syphilis cases that could be reinfections. Elements to consider include:
    - Whether a partner was identified and successfully treated,
    - Results from subsequent lab reports, and
    - Additional treatments administered.
- Breakdown STI reinfection rates by age, sex, and geography.
    - Syphilis only: doxycycline vs. penicillin and pre- and post- Bicillin shortage.
- Present reinfection rates on statewide STI manager call.
- Determine if there is a way to proactively identify patients with possible treatment failure and flag them in TDH REDCap data quality reports.

Project #2 Impact:
Understanding reinfection rates will help regional health departments target outreach. Additional efforts to contact and educate, or alternative treatments may be needed for individuals with apparent reinfections or treatment failure. An understanding of the impacts of the bicillin shortage may assist the STI Program in refining our Bicillin management strategy during future shortages.

Additional Project #3 Title: Improving the surveillance of congenital syphilis in Tennessee
Project #3 Type: Surveillance Activity

Project #3 Description:
Congenital syphilis (CS) has grown at an alarming rate in Tennessee in the last five years; cases have gone from an average of 4 per year from 2011-2015 to >100 in 2024. Babies with CS often have serious health consequences ranging from prematurity to death. Some may not have symptoms at birth, and if the mother is not screened, could go undiagnosed and treated for months or years; further, if the mother is untreated, they could have additional future babies born with CS. Therefore, it is important that every single case of CS be identified so that mom and baby can be appropriately treated. Building off the work completed by the previous CSTE fellow the fellow will expand the scope of our data linkage to vital statistics data to identify additional cases or patients in need of follow-up. We currently match all persons assigned female at birth to live birth (birth certificate) and fetal death datasets to ensure we know about all syphilitic pregnancies in TN. The CSTE fellow will expand this work to include men as well as named sexual partners. They will also assess concordance between our syphilis surveillance data and the syphilis diagnosis field in the vital statistics data. Using guidance of subject matter experts in the program the fellow will develop criteria for evaluating if any of these patients need further investigation or outreach.

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Project #3 Objectives and Expected Deliverables:

- Extract syphilis diagnosis and partner data from PRISM and NBS
- Link syphilis surveillance and partner data to vital statistics data
    - Identify syphilis patients and partners who are also named in the vital statistics files as parents within their syphilis infectious period.
    - Determine if partner or pregnant person was previously diagnosed, treated, or provided partner services.
- Compare the syphilis diagnosis field in vital statistics datasets (live birth and fetal death) to the STI surveillance system.

Project #3 Impact:
Congenital syphilis is 100% preventable if women who are pregnant are screened and treated prior to delivery. Improving our ability to detect these cases will help identify gaps in services and needs in the community.

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

HIV/STI/Viral Hepatitis outbreak preparedness and response will be a core component of the fellow's role within our section. The fellow will participate in STI Outbreak Response Plan Work Groups and updates to the STI Outbreak Response Plan. They will also work closely with all regional surveillance staff to provide technical assistance for investigation of and response to potential clusters, as needed. In addition, the fellow will become familiar with the State Health Operations Center and receive training in Incident Command System (ICS) for public health outbreak investigations. The fellow will also serve as surge capacity during any CEDEP-related outbreaks and emergency response activities (not just HIV/STI/Viral Hepatitis). Time allocation: 5-10 hours/month.

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 expected to participate in any HIV/STI/Viral Hepatitis cluster or outbreak response that occurs during their tenure. If no outbreaks are reported by year 2 of their fellowship, the fellow will be expected to assist with an outbreak within other CEDEP program areas including zoonotic, vaccine-preventable, waterborne, or foodborne diseases, or healthcare associated infections. Expected time allocation: 10 hours/week for 4-12 weeks for a HIV/VH/STI outbreak or ~20 hours/week for 3 weeks for an acute CEDEP outbreak response.