ID: 57893735
Maternal and Child Health, Wastewater Surveillance - Host Site Description
Texas Department of State Health Services

Assignment Location: Austin, US-TX
Texas Department of State Health Services
Environmental Epidemiology and Disease Registries Section

Primary Mentor: Victoria Salinas, MPH
Medical Research Specialist, Environmental Epidemiology and Disease Registries Section
Texas Department of State Health Services

Secondary Mentor: Natalie Archer, PhD, MS
Director, Cancer Epidemiology and Surveillance Branch
Texas Department of State Health Services

Work Environment
Hybrid

Assignment Description

The Fellow will be placed within the Environmental Epidemiology and Disease Registries Section (EEDRS) of the Texas Department of State Health Services (DSHS). EEDRS conducts disease surveillance and operates several large-scale disease registries. The Section also investigates unusual occurrence of disease, assesses environmental exposures, and conducts population research studies. The following branches/groups are part of EEDRS: Cancer Epidemiology & Surveillance; Birth Defects Epidemiology & Surveillance; Blood Lead Surveillance; Environmental Surveillance & Toxicology; Wastewater Epidemiology & Surveillance, and Sickle Cell Data Collection. EEDRS management and staff are highly trained and have expertise in a variety of disciplines, including epidemiology, biostatistics, medicine, pediatric health, environmental health and toxicology, and occupational safety and health.

The Fellow will be placed within the EEDRS Office and will work on cross-cutting projects with staff from one or more EEDRS branches, DSHS staff in other Sections, and external collaborators. This placement will provide the fellow with opportunities to contribute to wastewater surveillance and maternal and child health epidemiology projects, as well as projects from other disciplines (e.g., cancer epidemiology).

Day-to-day activities will involve major project tasks, including conducting data linkages for epidemiology studies, performing statistical analyses, and interpreting and writing results for publication. The Fellow will also work on data cleaning, analysis, and interpretation of results for other projects as needed.

The Fellow's day-to-day activities will also involve work on surveillance system activities, including surveillance data management, analysis, and reporting to produce reliable, actionable, and high-quality data for public health action. They will modify, enhance, and evaluate existing surveillance systems, and will develop related data workflows, standard operating procedures, and surveillance indicator definitions. They will perform activities required for surveillance system maintenance, such as data quality assurance and control. Other main tasks involve analyzing and interpreting surveillance data to describe trends and creating data visualizations to present results.

The Fellow will attend regular weekly meetings with the primary and secondary mentors. The Fellow will also attend meetings for each surveillance and research project. Additionally, the Fellow will have opportunities to attend meetings in other areas of DSHS to learn about epidemiologists' work in other subject areas, such as cancer, environmental health, and disaster response.

ID: 57893735
Maternal and Child Health, Wastewater Surveillance - Host Site Description
Texas Department of State Health Services

The Fellow may assist EEDRS's Environmental Surveillance & Toxicology Branch (ESTB) with environmental and occupational investigations as needed. For over thirty years, ESTB has been the primary entity charged with addressing environmental and occupational public health issues that impact Texans. The Fellow may also be asked to participate in time-sensitive agency investigations related to COVID-19 or other emerging issues, and to prepare informational briefs and summary reports.

The Fellow will perform all activities with daily communication and support from both mentors.

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

The Fellow will have the opportunity to work with multiple Texas Department of State Health Services (DSHS) surveillance databases and data sets, including wastewater surveillance data, vital statistics data, newborn screening data, Texas BRFSS data, occupational health surveillance data, hospital discharge data, Texas Poison Center Network data, and Texas Syndromic Surveillance System data. DSHS IT will provide the Fellow with access to needed folders and databases, including read/write permissions, as appropriate. Existing IRBs and other agreements will be amended to grant access to datasets needed for public health studies the Fellow will participate in. The Fellow will be provided with necessary software, including SAS and/or R for statistical analysis, Tableau for data visualization, Match*Pro for data linkage, and ArcGIS for spatial data management and analyses. Primary and secondary mentors and other EEDRS staff will provide the Fellow with support for data collection, management, and analytic techniques. Other DSHS epidemiologists and biostatisticians will also be available to share their expertise with the Fellow.

Projects

Surveillance Activity Title: Wastewater Surveillance Program

Surveillance Activity Description:
Wastewater-based surveillance is an emerging approach to detect the presence of pathogens at a facility or community level. Pathogen genetic material is shed in feces (or other bodily fluids) and is detectable in wastewater, enabling wastewater surveillance to capture presence of pathogens shed by individuals with and without symptoms. This allows wastewater surveillance to serve as an early warning system when a pathogen is spreading within a facility or community.

The Fellow will contribute to the implementation, maintenance, and enhancement of a wastewater surveillance system that involves weekly wastewater sample results from participating facilities and municipalities throughout Texas. In addition to wastewater results, other pathogen measures (such as case counts, hospitalizations, etc.) are also obtained for participating sites, as available. Data on these measures are incorporated into the surveillance system and are updated on a daily or weekly basis.

This wastewater surveillance program began as a pilot surveillance project from March 2021 to July 2023. The project is expanding as a program to include additional municipalities. Wastewater surveillance data are contained in Excel spreadsheets, and weekly data updates from several different sources are mostly completed manually. The Fellow will be responsible for streamlining surveillance data workflows, conducting high-level quality assurance on surveillance data, and submitting surveillance data with geospatial elements (e.g., sewershed boundary shapefiles) to the National Wastewater Surveillance System (NWSS). The Fellow will also use wastewater surveillance data to prepare weekly reports of trends and correlations between pathogen wastewater levels and corresponding pathogen measures (e.g., case counts, hospitalizations, positivity rates, syndromic surveillance information, etc.) for participating sites. The Fellow

will work closely with one or more graduate interns/practicum students to create data visualizations and to prepare summary reports for leadership.

Surveillance Activity Objectives:
Project objectives include maintaining and enhancing the Texas Department of State Health Services' (DSHS) wastewater surveillance system, as well as analyzing and interpreting surveillance data. Expected deliverables include documenting standard operating procedures for the surveillance system, conducting high-level quality assurance for surveillance data, submitting surveillance data with geospatial elements (e.g., sewershed boundary shapefiles) to the National Wastewater Surveillance System (NWSS), and creating weekly reports of trends and correlations between pathogen wastewater levels and corresponding pathogen measures for participating sites. The Fellow will present findings to DSHS staff and leadership as needed and will submit at least one abstract on surveillance findings to a state or national public health conference for presentation.

Surveillance Activity Impact:
Tracking pathogen levels in facility and community wastewater will complement existing pathogen surveillance and will provide DSHS and participating sites an improved understanding of the circulation of pathogens within their populations (both symptomatic and asymptomatic). Wastewater surveillance also serves as an early warning system when a pathogen is spreading within a community.

Surveillance System Evaluation Title: Childhood Blood Lead Surveillance System Evaluation

Surveillance System Evaluation Description:
The Texas Department of State Health Services (DSHS) Texas Childhood Lead Poisoning Prevention Program (TXCLPPP) receives approximately 500,000 blood lead reports a year for approximately 365,000 children, and provides follow-up for those with elevated blood lead levels. The fellow will conduct an evaluation of the surveillance system. They will describe the system, including its purpose, methods, necessary resources for operation, and public health significance. They will then gather additional information about the system, including input from stakeholders, to assess its attributes (e.g. data quality, flexibility, sensitivity), as well as the efficacy and usefulness of the system.

Surveillance System Objectives:
The Fellow will summarize their findings, conclusions, and recommendations in a report. They will share the results with TXCLPPP staff members during an oral presentation.

Surveillance System Impact:
Evaluation of the state childhood blood lead surveillance system is the first step towards implementing changes to ensure more complete and useful public health data for government policymakers, medical providers, researchers, and the general public.

Major Project Title: Determining representativeness of stored newborn dried blood spots in Texas

Major Project Description:
Starting in 2012, leftover blood spots not used for mandatory newborn screening in Texas have been destroyed, unless parents give approval (or opt-in) for long-term storage and use in research. It is estimated that only about 30%-40% of Texas parents opt-in for storage of their newborn's dried blood spots (DBS); thus, these stored specimens may not be representative of all births in Texas. It is important to know how similar, or representative, stored newborn DBS specimens are to all births in Texas, as this information is needed for correct interpretation of results from research studies using these specimens. This project will assess how representative stored newborn dried blood spots are to all births in Texas, with regards to a variety of different maternal and infant demographic and health characteristics. The

ID: 57893735
Maternal and Child Health, Wastewater Surveillance - Host Site Description
Texas Department of State Health Services

Fellow will probabilistically link newborn screening records for the years 2012-2018 with birth records (vital statistics) data, and then will compare distributions of a variety of maternal and infant demographic and health characteristics between those whose parents opted in for long-term storage and those who did not.

With consultation from the secondary mentor, the Fellow will lead this probabilistic linkage analysis effort using National Cancer Institute (NCI) Match*Pro software, and will work with other Texas Department of State Health Services (DSHS) staff to manually review uncertain record matches. The Fellow will also perform data manipulation/re-classification and conduct statistical analyses (including descriptive statistics, simple hypothesis testing, and crude and multivariable logistic regression) to compare distributions of maternal and infant characteristics for infants whose parents approved dried blood spots storage with corresponding distributions for infants whose parents did not approve storage for the 2012-2018 time period. The Fellow will also help draft a manuscript with the findings, to be submitted for publication in a peer-reviewed journal. Linkage analysis for this project was started by the current Environmental Epidemiology and Disease Registries Section (EEDRS) CSTE Applied Epidemiology Fellow, but not all years of data will be able to be linked and analyzed by the time of the current Fellow's departure.

Major Project Objectives:
The objective of this project is to determine whether specimens for infants whose parents approved long-term dried blood spot storage are representative of all births in Texas. The Fellow will complete a linkage between newborn screening records and vital statistics birth records for all infants born between 2012 and 2018, and will conduct statistical analyses to determine similarities and differences between infants born in Texas with stored newborn dried blood spots (those whose parents approved storage) and those whose newborn dried blood spots were not stored. By the end of the fellowship, the Fellow should have completed all analyses and have drafted a manuscript with results, for submission to a peer-reviewed journal.

Major Project Impact:
The representativeness of stored newborn dried blood spots in Texas is currently unknown, and this data linkage project will allow us to evaluate this. Information on the representativeness of stored dried blood spots is important to include in all future public health research conducted using dried blood spots, to aid in interpretation of results and determining whether results are generalizable to all Texas births. In addition, linkage and statistical analysis results will aid the Texas Department of State Health Services (DSHS) newborn screening group in identifying approaches to improve educational efforts regarding opting in for long-term storage of dried blood spots.

Additional Project #1 Title: Prevalence, characteristics, and health disparities of sickle cell disease in Texas
Project #1 Type: Major Project

Project #1 Description:
The Texas Department of State Health Services (DSHS) Environmental Epidemiology and Disease Registries (EEDRS) is implementing a new state sickle cell disease (SCD) data collection system. Though all infants with SCD are identified at birth, there is no ongoing state or national registry of SCD to identify other SCD cases. While not a registry, this one-time data collection system will enhance our current understanding of SCD in Texas, including the prevalence, characteristics, healthcare needs, and health outcomes of individuals with SCD. The Fellow will analyze and interpret sickle cell data using scientifically valid methods and advanced statistical software (e.g., SAS, ArcGIS, etc.) to estimate the prevalence of SCD in Texas, describe the population of affected individuals, and examine disparities in healthcare utilization and health outcomes.

Project #1 Objectives and Expected Deliverables:
The Fellow will share project findings through peer-reviewed publications, data briefs, conference presentations, and/or stakeholder meetings.

ID: 57893735
Maternal and Child Health, Wastewater Surveillance - Host Site Description
Texas Department of State Health Services

Project #1 Impact:
Information on the prevalence, manifestations, and healthcare needs and outcomes of SCD in Texas is currently unknown; this information will greatly aid the implementation of practices and policies to improve the quality and length of life for individuals with SCD in Texas, including the allocation of resources and implementation of services related to healthcare, housing, transportation, education, and employment for individuals with SCD in Texas.

Additional Project #2 Title: Evaluation of a National Cancer Institute (NCI) Surveillance, Epidemiology, and End Results (SEER) ExtractEHR pilot project
Project #2 Type: Surveillance System Evaluation

Project #2 Description:
The SEER program collects data on cancer cases from various locations and sources throughout the United States, including the Texas Cancer Registry (TCR). The information is used to provide cancer statistics and for research to reduce the cancer burden among the U.S. population. SEER and Texas Children's Hospital (Houston, Texas) have requested TCR's assistance to pilot an electronic health records project focusing on childhood cancer data. Texas Children's Hospital will use a finder's file provided by TCR to locate electronic health records (EHRs) for patients listed, as well as for other childhood cancer case management activities. Texas Children's Hospital will extract EHR data for childhood cancer cases, as well as for childhood cancer cases found prospectively using disease index information from their own files, using an extraction tool called ExtractEHR. The Fellow will examine new data fields for completeness, relevance, and usefulness for cancer surveillance and research. The Fellow will additionally participate in a series of discussion with other pilot sites (Georgia Cancer Registry and Seattle-Puget Sound Cancer Registry) to determine which of these new data fields should be requested from all participating National Children's Cancer Registry (NCCR) sites throughout the country.

Project #2 Objectives and Expected Deliverables:
The Fellow will share project findings through evaluation reports, stakeholder meetings, and/or conference presentations.

Project #2 Impact:
Benefits of this pilot project are that TCR would learn how to acquire cancer data directly from hospital electronic health records, which is not currently done. The project will result in many more specific pieces of information being reported for childhood cancer cases (such as lab results, medication info, oncology notes, etc.), which will be helpful for childhood cancer research. Results of TCR's analysis of the data received will be used to make recommendations on useful childhood cancer variables to report nationwide.

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

We will ask the Fellow to take ICS-100 and ICS-200 trainings to become familiar with the Incident Command System (ICS) structure used by the Texas Department of State Health Services (DSHS). The Environmental Epidemiology and Disease Registries Section (EEDRS) Environmental Surveillance & Toxicology Branch (ESTB) staff are periodically involved in DSHS public health preparedness and response activities. The Fellow will have opportunities to be involved in these preparedness and response activities. For example, if a natural disaster such as a hurricane occurs, the Fellow may have opportunities to be deployed to the State Medical Operations Center (SMOC) to provide epidemiology support, or to participate in response/recovery activities in the field. The Fellow may also be able to participate in CASPERs to assess community needs following disasters. We anticipate that these activities should take no more than 5% of the Fellow's allocated time.

ID: 57893735
Maternal and Child Health, Wastewater Surveillance - Host Site Description
Texas Department of State Health Services

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

The Fellow may be asked to participate in Environmental Surveillance & Toxicology Branch (ESTB) investigations of acute environmental exposures or disease clusters, and/or to assist in preparing informational briefs and summary reports for such investigations. The Fellow's anticipated role in cluster and outbreak investigations should comprise less than 5% of their total allocated time.

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

Beyond wastewater surveillance activities described above in this application, the Fellow may be asked to participate in other time-sensitive agency investigations related to COVID-19 or other emerging issues, and/or to assist in data collection and writing agency briefs. The time spent on these additional COVID investigations should take no more than 5% of the Fellow's allocated time.

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

Wastewater surveillance activities across rural and peri-urban sites address health equity by providing additional pathogen monitoring for underserved populations. The Fellow will additionally have the opportunity to delve into analysis of potential health disparities among certain Texas populations/subpopulations through several of their projects, including the sickle cell data collection project.