

ID: 59071473

Birth Defects and NAS, Occupation Health - Host Site Description

Texas Department of State Health Services

Assignment Location: Austin, US-TX
Texas Department of State Health Services
Community Health Improvement Division

Primary Mentor: Ketki Patel, MD, PhD, MPH
Director, Environmental Surveillance and Toxicology Branch
Texas Department of State Health Services

Secondary Mentor: Charles Shumate, PhD
Director, Birth Defects Epidemiology and Surveillance Branch
Texas Department of State Health Services (DSHS)

Work Environment

Hybrid

Assignment Description

The fellow will be placed with the Environmental Epidemiology and Disease Registries Section (EEDRS) of 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; and Environmental Surveillance & Toxicology. 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 Section 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 mentee with opportunities to contribute to environmental, occupational and birth defects epidemiology projects, as well as projects from other disciplines.

The fellow will be stationed at the DSHS main office in Austin, Texas. Day-to-day activities will include working on their surveillance and major projects, including conducting data linkage for integrating childhood and adult blood lead surveillance, performing statistical analyses, and interpreting and writing up results for publications and presentations. They will also work on data cleaning, analysis, and interpretation of results for other projects as needed. 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 QA/QC. Another main task will involve analyzing and interpreting surveillance data to describe trends and creating data visualizations to present results.

The fellow will attend regular weekly meetings with primary and/or secondary mentors to provide status updates and will attend meetings for each of the surveillance and research projects. In addition, the fellow will be given opportunities to attend meetings in other areas of DSHS to learn about epidemiologists' work in other subject areas, such as opioid overdose prevention, maternal and child health, and injury. The fellow will 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 have the potential to impact Texans. The fellow will perform all of these activities with daily communication and support from both mentors.

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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 DSHS surveillance databases and data sets, including child and adult blood lead surveillance data, vital statistics data, Texas Birth Defects Registry (TBDR) data, Texas Behavioral Risk Factor Surveillance System (BRFSS) data, occupational health surveillance data, hospital discharge data, Texas Poison Center Network data, and Texas Syndromic Surveillance System (TxS2) 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 be participating in. The fellow will be provided with needed software, including SAS and R, for statistical analysis, Tableau for data visualization, and MatchPro for data linkages. 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: Integrating adult and childhood blood lead surveillance to improve case identification and intervention efforts

Surveillance Activity Description:

Child and adult blood levels are reportable to Texas Department of State Health Services (DSHS) Blood Lead Surveillance Branch (BLSB). The BLSB's Childhood Lead Poisoning Prevention Program conducts surveillance and prevention activities for blood lead levels in children (persons less than 16 years old). The DSHS Occupational Health Surveillance (OHS) program receives data for reported adult blood lead levels from BLSB to conduct in-depth case follow-up activities and outreach for adults.

To improve case identification and intervention efforts, this project involves linking data from the childhood blood lead surveillance database to the adult blood lead surveillance database. Data will be linked using patient identifiers (name, date of birth and address) and an algorithm that joins these datasets (years 2021 to 2022) by patient address. The fellow will use software tools such as SAS, R, and MatchPro to link data and create algorithms. Once the data are successfully linked, the fellow will perform data QA/QC and produce datasets for detailed analyses and data sharing. The fellow will work with OHS program and BLSB epidemiologists to further examine characteristics and patterns of lead exposures in the community and identify emerging lead issues.

Surveillance Activity Objectives:

The project objective is to integrate adult and childhood blood lead surveillance through data linkage. The combined information will improve case identification and intervention efforts. The expected deliverables include but are not limited to: 1) creating an integrated dataset for adult and childhood lead poisoning in Texas, and 2) creating abstracts and presentations summarizing project findings for presentation to DSHS staff, external stakeholders and at scientific meetings/conferences.

Surveillance Activity Impact:

An integrated system will facilitate the linkage of high-risk children to parents with potential occupational lead exposure. Additionally, an integrated system facilitates longitudinal follow-up of cases and their potentially affected household members. Data analyzed from this endeavor can then be used to educate public health officials on where lead exposure is occurring, health care providers in how to educate patients, and employers in how to prevent lead exposure being transported from the workplace into employee homes.

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Surveillance System Evaluation Title: Evaluation of Reportable Conditions Knowledge Management System (RCKMS) for Birth Defects

Surveillance System Evaluation Description:

The DSHS Birth Defects Epidemiology and Surveillance Branch (BDESB) is at the forefront of public health initiatives and houses the Texas Birth Defects Registry (TBDR). Its mission is to identify and describe the patterns and outcomes of children with birth defects in Texas, and to collaborate with others in research, prevention, and referral to services. TBDR was established in 1993 and has been in operation since 1994. Statewide data became available in 1999. Highly trained regional staff review hospital logs, hospital discharge lists, and other records to find babies with birth defects (structural malformations or chromosomal disorders). If the record indicates that the infant or fetus has a birth defect covered by the TBDR, demographic and diagnostic information are abstracted from the medical record. Over 25,000 cases are entered into the registry each year.

Evaluation of Reportable Conditions Knowledge Management System (RCKMS) for Birth Defects

The Reportable Conditions Knowledge Management System (RCKMS) is an authoritative, real-time portal to improve disease surveillance. RCKMS stores comprehensive information on public health reporting requirements and acts as a decision support service to determine if a potential case is reportable and to which jurisdiction. An evaluation of RCKMS will provide valuable insights into the system's effectiveness, identify areas for improvement, and contribute to the enhancement of the BDESB's capabilities in monitoring select birth defect conditions in RCKMS.

The evaluation will have process and outcomes evaluation components. Data completeness will be assessed by comparing the system's electronic case reports (eCR) with other reliable sources, e.g., medical record, ensuring that no crucial information for active birth defects surveillance is missing. Accuracy will be evaluated through a thorough validation process, cross-referencing RCKMS data with clinical records and assessing how a defect may change over time from the initial eCR to any subsequent eCRs in the first year of life. Timeliness will be measured by analyzing the system's ability to promptly capture and update information as new cases emerge and estimate how eCR can increase birth defect surveillance timeliness.

Furthermore, the evaluation will involve collaboration with epidemiologists, data managers, and other stakeholders to gather user perspectives, understand workflow challenges, and identify potential barriers to data entry and system utilization. This holistic approach will provide a comprehensive understanding of the RCKMS system's performance in the context of birth defects surveillance.

Surveillance System Objectives:

The primary objective of this project is to assess the completeness, accuracy, and timeliness of the RCKMS system in capturing and managing data related to birth defects. The expected deliverables include but are not limited to: 1) a detailed report, highlighting the strengths and weaknesses of the system in terms of completeness, accuracy, and timeliness, and 2) recommendations for system enhancements, workflow improvements, and potential training programs will be provided, aiming to address identified shortcomings and optimize the system's performance for birth defect surveillance activities.

Surveillance System Impact:

By the conclusion of this project and CSTE fellowship, it is anticipated that the insights gained from this evaluation will contribute to the ongoing efforts of the CSTE in advancing the surveillance of birth defects. The knowledge generated through this project will not only benefit CSTE but will also have broader implications for public health, guiding the development of more effective strategies to monitor, prevent, and address birth defects surveillance on a national scale.

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Major Project Title: Exploring Fentanyl-Associated Syndrome in Texas Birth Defects Registry Data

Major Project Description:

DSHS BDESB manages the TBDR and aims to carry out an investigation into a recently identified syndrome associated with prenatal fentanyl exposure. The CSTE AEF will identify cases exhibiting the phenotype associated with prenatal fentanyl exposure in the TBDR.

The TBDR ascertains birth defects statewide among all pregnancy outcomes (live births, fetal deaths, and terminations). Briefly, TBDR staff conduct active surveillance at delivery and tertiary facilities throughout the state to identify cases delivered by Texas residents. To be included in the TBDR, potential cases must have a monitored birth defect (including chromosomal abnormalities and syndromes) diagnosed within the first year of life. Demographic and diagnostic information is collected from the medical record and each identified birth defect is recorded using Centers for Disease Control and Prevention-modified codes based on the British Pediatric Association Classification of Diseases (CDC/BPA codes). TBDR records are routinely linked to vital records (birth certificates, death certificates, and fetal death certificates) to obtain additional information (e.g., demographic characteristics, vital status).

The fellow will conduct in-depth statistical analysis to determine the prevalence of the syndrome in the TBDR and identify potential clusters or patterns within TBDR that reflect the identified phenotype. Records in the TBDR will be searched using birth defect codes and descriptions matching the novel syndrome between years 1999-2023. After finalizing the criteria based on co-occurrence patterns observed in the TBDR, the fellow will, with the guidance of BDESB epidemiologist, classify each identified case in the registry. For example, the fellow will first tabulate the number of defects present (1) overall (i.e., counted the number per case), and (2) in each system group (i.e., the number of cardiac defects, the number of central nervous system defects per case, etc). Additional factors will be considered, not limited to, demographic details, medical history, gestational period, specific fentanyl exposure details, and associated birth defects.

The fellow will learn to calculate the prevalence rates of the syndrome within the TBDR dataset. Birth prevalence will be calculated by dividing the total count of cases by the sum of live births (denominator) expressed per 10,000 live births. The fellow will also utilize GIS tools (Tableau, SATSCAN) to map the spatial distribution of reported cases, identifying potential clusters or patterns within the data. The fellow may employ spatial statistical techniques (e.g., Moran's I) to identify statistically significant spatial clusters of reported cases. Depending on frequencies, the fellow will conduct subgroup analysis to explore variations in syndrome prevalence across demographic categories.

Major Project Objectives:

This CSTE fellowship project focuses on evaluating the TBDR's data for cases with an indication of prenatal fentanyl syndrome exposure in Texas. The objective is to assess the validity and reliability of TBDR data for infants affected by prenatal exposure to fentanyl, with a particular emphasis on geographic distribution, disparities by maternal race and ethnicity, patterns of birth defects, and the impact on healthcare outcomes. The expected deliverables include but are not limited to a data report and/or a manuscript for publication in peer-reviewed journal, submission of an abstract for scientific meetings/conferences such as, Texas Public Health Association (TPHA) annual meeting, CSTE annual meeting, American Public Health Association (APHA) annual conference.

Major Project Impact:

This project aligns with the BDESB's commitment to be responsive to emerging health concerns. The findings will contribute not only to the immediate unanswered questions but also to broader discussions on the impact of prenatal substance exposure on birth outcomes.

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Additional Project #1 Title: Prevalence of health-related risk behaviors among working adults in Texas

Project #1 Type: Major Project

Project #1 Description:

The DSHS OHS program conducts activities to track occupational injuries and illnesses that affect Texans and recommends intervention strategies. However, little is known about health-related risk behaviors, chronic conditions, and health-related quality of life among the working population in Texas.

Beginning in 2018, the Texas Behavioral Risk Factor Surveillance System (BRFSS) survey has added questions on industry and occupation. The fellow will evaluate the results of these newly added questions to examine the prevalence of health-related risk behaviors among Texas workers and identify high-risk subpopulations for interventions. The fellow will evaluate the Texas BRFSS data using robust statistical and survey methods. The fellow will examine distribution of health behaviors, chronic conditions, access to care, and health outcomes by industry and occupation, and conduct subgroup analysis to identify high-risk worker populations.

Project #1 Objectives and Expected Deliverables:

The project objective is to evaluate 2018-2023 Texas BRFSS data to characterize health behaviors, chronic conditions, and health outcomes by industry and occupation, including subgroups, to identify high-risk worker populations for risky healthy behaviors and chronic conditions. The fellow is expected to disseminate project findings through peer-reviewed publications, data briefs, conference presentations, and/or stakeholder meetings.

Project #1 Impact:

Work/occupation is one of the key determinants of health and is linked to other health determinants including income, education, access to health care, environmental hazards, and chronic diseases. Information on health behaviors and health outcomes in employed persons by industry and occupation will be useful in designing better and targeted workplace health promotion and wellness programs. It will also provide a more complete understanding of the burden of risky health behaviors and outcomes, identify emerging health issues in the working population of Texas, and help evaluate the effectiveness of prevention efforts for behavioral risk factors and occupational health over time.

Additional Project #2 Title: Spatial Analysis of Access to Care for Individuals Affected by Trisomy 21 in Texas

Project #2 Type: Major Project

Project #2 Description:

This project aims to conduct a spatial analysis of Trisomy 21 clinics in Texas utilizing data from the TBDR. The information will identify potential disparities in access to care for families affected by a child with Trisomy 21. The TBDR is a large, population-based active surveillance registry. The cohort of interest includes live-born infants with a delivery date between 1999 through 2019 (representing 20 years of statewide coverage). Individuals affected with T21 (or cases) will be identified through six-digit modification of the British Paediatric Association and International Classification of Diseases, 9th Revision, Clinical Modification codes as modified and adapted by the Centers for Disease Control and Prevention and Texas Department of State Health Services. These include codes 758.000 to 758.090. The fellow will employ geographic information system (GIS) tools to visualize and analyze the geographic distribution of T21 clinics, considering demographic, socio-economic, and geographic factors influencing accessibility.

The fellow will utilize GIS software (e.g., ArcGIS, Tableau, SAS) to create spatial maps of T21 clinics. The fellow will apply spatial analysis tools to identify clusters, gaps, and potential disparities in clinic distribution compared to cases in Texas. Specifically, the fellow will conduct statistical analyses to assess the association between clinic distribution and demographic/socio-economic factors.

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This analysis will allow the fellow to evaluate geographic barriers such as distance and transportation infrastructure that may impact access to T21 clinics. They will then overlay demographic and socio-economic data to identify vulnerable populations facing potential disparities in access.

Project #2 Objectives and Expected Deliverables:

The objective is to conduct a spatial analysis of T21 clinics in Texas, utilizing data from the TBDR, to identify potential disparities in access to care for families affected by a child with T21. The expected deliverables include but are not limited to: 1) detailed spatial maps highlighting the distribution of Trisomy 21 clinics in Texas, along with a comprehensive analysis of factors influencing access, and 2) presentation of findings to DSHS staff and stakeholders, and/or at a scientific meeting and conference.

Project #2 Impact:

The methods used for this project will enable the identification of potential disparities, contributing valuable insights for targeted interventions and resource allocation for managing and delivering services for families with children with T21 in Texas.

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

The fellow will take Incident Command System (ICS) trainings (ICS-100 and ICS-200) to become familiar with the ICS structure used by DSHS. ESTB staff are periodically involved in DSHS public health preparedness and response activities and the fellow will have opportunities to be involved in preparedness and response activities. For example, if a natural disaster such as a hurricane occurs, the fellow may be deployed to the State Medical Operations Center (SMOC) to provide epidemiology support, or to participate in response/recovery activities in the field as needed. They may also be able to participate in Community Assessment for Public Health Emergency Response (CASPER) to assess community needs following disasters. We anticipate that these activities should take no more than 5% of the fellow's total allocated time.

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 ESTB investigations of acute environmental exposures or disease clusters, and/or to assist in writing 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

The fellow may be asked to participate in one or more other time-sensitive agency investigations related to COVID-19, and/or to assist in data collection or analyses and writing agency briefs. The time spent on these additional activities should take no more than 5% of the fellow's total allocated time.

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

Fellows will have the opportunity to delve into analysis of potential health disparities among certain Texas populations/subpopulations through several of their projects, including the surveillance activity and major project.