

ID: 76302125

Injury, Environmental Health - Host Site Description

Harris County Public Health

Assignment Location: Houston, US-TX
Harris County Public Health
Office of Epidemiology Surveillance and Emerging Diseases

Primary Mentor: Rachel Roy, PhD, MPH
Senior Manager, Non-Communicable Diseases
Harris County Public Health

Secondary Mentor: Rebecca Duong, MPH
Non-Communicable Disease Supervisor
Harris County Public Health

Work Environment

Hybrid

Assignment Description

The Non-Communicable Disease (NCD) team, part of the Office of Epidemiology, Surveillance, and Emerging Diseases (OESED) at Harris County Public Health, is responsible for the surveillance of chronic diseases, environmental health concerns, substance use trends, and Long COVID epidemiology. The team also plays a critical role in responding to public health emergencies related to environmental hazards, including chemical releases, natural disasters, and extreme weather events.

The CSTE Fellow will actively contribute to the NCD team's core activities, engaging in surveillance efforts and special projects across these focus areas. They will have the opportunity to collaborate with epidemiologists specializing in chronic disease, environmental health, and substance use to support data analysis, emergency response, and community outreach.

Day-to-day, the Fellow will work with various public health data platforms, including R, ArcGIS, SQL, and syndromic surveillance systems, to analyze and interpret non-communicable disease data. During environmental public health emergencies, they will assist in monitoring injuries and health outcomes related to hurricanes, winter storms, floods, extreme temperatures, and chemical incidents, focusing on identifying and tracking affected community members who seek medical care. Through this work, the Fellow will gain hands-on experience in applied epidemiology, contributing to data-driven public health decision-making and community resilience efforts.

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

The Fellow will work closely with the mentors, junior and senior data analysts, and epidemiologists, that have extensive experience in data analysis and injury surveillance. They will also have access to various public health surveillance data systems and software including: Electronic Surveillance System for the Early Notification of Community-based Epidemics (ESSENCE), National Electronic Disease Surveillance System (NEDSS), statistical analysis software (R, Python), and data management and visualization software (ArcGIS, SQL, and PowerBI). They will receive training on all data analysis processes and systems.

Projects

Surveillance Activity Title: Comprehensive Injury Surveillance and Data Integration

Surveillance Activity Description:

The CSTE fellow will establish a centralized repository of injury-related data sources to enhance surveillance and analysis of unintentional injuries in Harris County. This repository will integrate multiple data streams, including syndromic surveillance (ESSENCE), vital statistics, medical examiners' data, hospital and emergency department records, law enforcement reports, and insurance claims data available at Harris County Public Health (HCPH).

The fellow will conduct ongoing surveillance using real-time data from ESSENCE syndromic surveillance to identify trends in unintentional injuries. By analyzing these integrated data sources, the fellow will develop a more comprehensive understanding of injury patterns, high-risk populations, and geographic hotspots.

Key responsibilities include:

- Mapping and cataloging all available injury-related data sources.
- Collaborating with internal and external partners to streamline data-sharing processes.
- Conducting real-time injury surveillance to identify emerging trends and seasonal variations.
- Applying statistical and spatial analysis to detect clusters and disparities in injury occurrences.
- Developing reports and data visualizations to inform targeted intervention strategies and public health policies.

This integrated approach will support data-driven decision-making and facilitate the implementation of targeted prevention efforts to reduce the burden of unintentional injuries in Harris County.

Surveillance Activity Objectives:

Objectives:

1. Identify all relevant ICD-10 codes and develop syndromic surveillance queries related to unintentional injuries to ensure comprehensive case identification.
2. Analyze injury data to identify populations disproportionately impacted by unintentional injuries, with a focus on special populations such as children, older adults, and other impacted groups.

Deliverables:

1. Develop a centralized repository and a comprehensive manual detailing unintentional injury surveillance methods, including ICD-10 codes, syndromic surveillance queries, and relevant data sources.
2. Produce a quarterly report on injury trends in Harris County, highlighting emerging patterns, high-risk populations, and potential areas for targeted interventions.

Surveillance Activity Impact:

This project will enhance Harris County's capacity to monitor and respond to unintentional injuries by integrating diverse data sources and conducting real-time surveillance. This will help HCPH target resources and identify interventions to reduce unintentional injury in Harris County.

Surveillance System Evaluation Title: Enhancing Unintentional Injury Surveillance: Evaluating ESSENCE Query Accuracy and Data Quality

Surveillance System Evaluation Description:

The evaluation will focus on assessing the accuracy and effectiveness of ESSENCE syndromic surveillance queries for unintentional injuries. A key component will be calculating the positive predictive value (PPV) by manually reviewing all cases pulled by the query to determine if they are truly unintentional injuries or if irrelevant cases were included.

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To improve accuracy, the evaluation will incorporate data from the Institute of Forensic Sciences (IFS) or the Medical Examiner's Office, reviewing case descriptions to identify additional injury cases or misclassified incidents. The fellow will also develop a standardized manual review method, outlining clear criteria for identifying false positives and refining query parameters.

Additional evaluation metrics will include timeliness, representativeness, and data completeness, ensuring the system effectively captures injury trends and informs public health action. Findings will be used to optimize query performance and enhance injury surveillance efforts.

Surveillance System Objectives:

Objectives:

1. Assess the accuracy of ESSENCE syndromic surveillance queries for unintentional injuries by calculating the positive predictive value (PPV) through manual case review.
2. Develop a standardized manual review method to systematically identify false positives and refine query parameters.
3. Evaluate key surveillance system metrics, including timeliness, representativeness, and data completeness, to ensure the system effectively captures unintentional injury trends.
4. Use evaluation findings to improve query performance and data quality, enhancing the system's ability to inform public health interventions.

Deliverables:

1. A manual review protocol outlining standardized criteria for case validation and query refinement.
2. A summary report detailing the PPV analysis, key findings, and recommendations for improving ESSENCE query accuracy.
3. Updated ESSENCE query definitions incorporating refinements based on manual review findings.
4. A presentation or training session for public health staff on best practices for syndromic surveillance query evaluation and improvement.

Surveillance System Impact:

This project will enhance the accuracy and reliability of unintentional injury surveillance in Harris County, leading to more precise and actionable public health data.

Major Project Title: Enhancing Injury Surveillance to Strengthen Public Health Prevention Efforts

Major Project Description:

This project will improve injury surveillance in Harris County by integrating firearm-related injuries in ESSENCE, medical examiner data, and other injury datasets to refine the county's injury prediction model. While focusing on violence-related injuries, the project will also examine broader injury trends, identifying high-risk populations, geographic hotspots, and contributing risk factors such as substance use and social determinants of health. By enhancing surveillance capacity, this project will support data-driven public health interventions, resource allocation, and injury prevention strategies.

Major Project Objectives:

Objectives:

1. Analyze firearm-related injuries and other injury trends in ESSENCE to assess demographic and geographic patterns.
2. Integrate data from the Institute of Forensic Sciences, medical examiner reports, and other surveillance sources to improve injury classification and trend analysis.
3. Identify public health risk factors associated with injuries, including violence, substance use, and environmental or social determinants.

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4. Update and refine the data for the existing injury prediction model to strengthen surveillance and inform targeted public health interventions.

Deliverables:

1. A comprehensive injury surveillance report detailing trends in both violence-related and other injury types, with a focus on prevention.
2. Updated datasets to include in the existing model
3. A stakeholder presentation outlining key findings and public health recommendations to enhance injury prevention efforts.

Major Project Impact:

This project will improve Harris County's injury surveillance system, providing a more accurate and comprehensive understanding of injury trends, particularly those related to violence and substance use. By integrating multiple data sources and refining predictive models, the project will help identify high-risk populations, guide resource allocation, and inform evidence-based prevention strategies. These improvements will strengthen public health interventions, policy development, and cross-sector collaboration, ultimately reducing injury-related morbidity and mortality in the county.

Additional Project #1 Title: Enhancing Environmental Incident Surveillance and Injury Monitoring

Project #1 Type: Surveillance Activity

Project #1 Description:

This project will support the Environmental Epidemiology team in conducting surveillance during environmental incidents by utilizing ESSENCE syndromic surveillance to track potential health impacts. The fellow will assist in data extraction, quality assurance (QA), and report generation, ensuring timely and accurate public health responses. Additionally, they will be trained in syndromic surveillance methods and provide ongoing support to the Non-Communicable Disease (NCD) team for injury surveillance efforts.

Project #1 Objectives and Expected Deliverables:

Objectives:

1. Assist the Environmental Epidemiology team in monitoring environmental incidents by pulling and analyzing relevant data from ESSENCE.
2. Conduct quality assurance (QA) reviews of data pulled by other epidemiologists to ensure accuracy and consistency.
3. Generate real-time surveillance reports to support rapid public health responses during environmental events.
4. Receive training in syndromic surveillance methods and apply these skills to injury surveillance efforts for the NCD team.

Deliverables:

1. Environmental incident surveillance reports summarizing trends and health impacts identified through ESSENCE.
2. Provide feedback on existing QA protocols for reviewing syndromic surveillance data to ensure accuracy in environmental incident reporting.
3. Training in syndromic surveillance, with hands-on application to both environmental and injury surveillance.
4. Ongoing support for the NCD team in injury-related data analysis and reporting.

Project #1 Impact:

This project will enhance Harris County's ability to rapidly detect and respond to environmental incidents, minimizing potential health risks to the community. By improving surveillance accuracy, data quality, and reporting, the project will ensure that public health officials have timely and reliable information to guide interventions.

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Additionally, strengthening injury surveillance and syndromic surveillance capacity will improve the county's ability to track and prevent injury-related health outcomes. Overall, this project will support data-driven decision-making, enhance emergency response efforts, and contribute to long-term public health preparedness and injury prevention.

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

Harris County is home to one of the largest industrial complexes in the world and experiences chemical leaks frequently. Harris County is also no stranger to natural disasters with flooding, hurricanes, and extreme heat as frequent concerns. The Fellow will assist in preparedness and response efforts by supporting surveillance during emergencies as outlined in "Surveillance Activities" and in "Additional Project #1". The Fellow will also be trained in Incident Command Systems (ICS) as part of their onboarding process and will be trained in response activities.

The Fellow will play a key role in enhancing Harris County's preparedness and response capacity by supporting environmental incident surveillance, injury monitoring, and syndromic surveillance quality assurance. Their responsibilities will be divided among real-time surveillance, data validation, reporting, and capacity-building activities to strengthen public health response efforts.

Anticipated Activities & Time Allocation

Environmental Incident Surveillance & Response (40%)

1. Monitor ESSENCE syndromic surveillance for health impacts related to environmental incidents (e.g., chemical spills, extreme weather events).
2. Pull and analyze relevant data to identify trends in symptoms, emergency department visits, and other indicators.
3. Collaborate with the Environmental Epidemiology team to provide real-time surveillance reports for incident response.

Quality Assurance & Data Validation (25%)

1. Review and validate ESSENCE data pulled by other epidemiologists, ensuring accuracy in environmental incident reports.
2. Provide feedback and recommendations to improve data integrity and existing surveillance methodologies.

Injury Surveillance & NCD Team Support (20%)

1. Assist the Non-Communicable Disease (NCD) team with injury-related syndromic surveillance efforts.
2. Conduct analyses on injury trends and contribute to routine injury surveillance reports.
3. Support special projects related to violence, substance use, or other injury prevention initiatives.

Training & Capacity Building (15%)

1. Receive formal training in syndromic surveillance methods and best practices.
2. Receive ICS Training
3. Participate in tabletop exercises or emergency preparedness drills to strengthen response capabilities.
4. Receive training or guidance from other epidemiologists on pulling and interpreting syndromic surveillance data.

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

The Fellow will have the opportunity to play a role in investigating clusters and outbreaks, both related to infectious diseases and injury incidents resulting from environmental factors such as chemical incidents or outbreaks at shelters.

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The Fellow will have the opportunity to work closely with public health teams to assess the scope and impact of outbreaks, perform case investigations, and ensure that surveillance data is accurately collected, analyzed, and communicated to inform timely response efforts.

Cluster Detection and Case Investigation (40%)

1. Assist with identifying and investigating clusters of injuries or illness, particularly those linked to chemical exposures (e.g., chemical spills, air quality issues) or infectious disease outbreaks (e.g., respiratory infections in shelters).
2. Work with epidemiologists to define the case definition, conduct interviews, and track symptoms to confirm the presence of an outbreak or cluster.
3. Collect and analyze data from ESSENCE and other surveillance sources to track patterns and identify emerging trends.

Data Collection and Surveillance (30%)

1. Gather and analyze syndromic surveillance data to monitor ongoing outbreaks or injury incidents, ensuring timely identification of new cases or clusters.
2. Coordinate with field teams to collect environmental or exposure data (e.g., air quality, shelter conditions) to understand potential links to the outbreak or cluster.
3. Collaborate with other public health teams to update and refine surveillance systems to capture relevant data.

Reporting and Communication (20%)

1. Contribute to internal briefings and stakeholder presentations, summarizing investigation outcomes and the public health response.

Preparedness and Training (10%)

1. Participate in outbreak response drills and cluster investigation training to strengthen investigative skills and preparedness.