ID: 35560170
Injury - Drug Overdose, Maternal and Child Health - Host Site Description
Baltimore City Health Department

Assignment Location: Baltimore, US-MD
Baltimore City Health Department
Youth Wellness & Community Health

Primary Mentor: Darcy Phelan-Emrick, DrPH, MHS
Chief Epidemiologist
Baltimore City Health Department

Secondary Mentor: Jana Goins, MHS
Epidemiologist Supervisor
Baltimore City Health Department

Work Environment
Hybrid

Assignment Description

The Fellow's assignment will be based in two areas of the agency: Overdose Prevention in the Division of Population Health & Disease Prevention and Maternal and Child Health in the Division of Youth Wellness & Community Health. The Division of Population Health & Disease Prevention focuses on acute communicable disease, including COVID-19, reproductive health services, HIV/STI prevention, overdose prevention, including harm reduction, and Ryan White services. The Division of Youth Wellness & Community Health focuses on maternal and child health, youth and trauma services, chronic diseases, asthma, lead poisoning, restaurant inspections, animal control, and school health.

The Fellow's work will focus on the epidemiologic intersection of injury-drug overdose and maternal and child health. The Fellow will create a surveillance report focused on overdose among children, youth, and pregnant persons using syndromic surveillance data and death certificate data. The Fellow will conduct descriptive and spatial analyses on the relationship between extreme cold weather and fatal and non-fatal overdose. They will also develop and implement an ArcGIS Online dashboard to monitor maternal and child health trends using birth and death certificate data. The Fellow will be assigned to a short-term detail with the Acute Communicable Disease team to learn about outbreak investigations. In addition, the Fellow will participate in BCHD's emergency preparedness and response activities. The Fellow will be supervised and mentored by BCHD's Chief Epidemiologist, Dr. Darcy Phelan-Emrick (primary mentor) and mentored by Ms. Jana Goins (secondary mentor). Dr. Phelan-Emrick provides epidemiology leadership and support to BCHD as a whole and focuses on department-wide reporting and surveillance. Ms. Goins serves as the agency's Maternal and Child Health Epidemiologist Supervisor.

Day-to-day activities will include:

- Analyze confidential and surveillance data (e.g., birth certificate data, fatal overdose data, non-fatal opioid overdose EMS data, autopsy data, emergency department and inpatient hospitalization discharge data, etc.)
- Summarize data analysis findings in reports and dashboards, including visualizations and maps
- Review and fulfill data requests received from BCHD staff, media, Mayor's Office, etc.
- Meet with BCHD staff and partners to discuss data, epidemiology, monitoring, and evaluation
- Write program monitoring and evaluation plans for funding applications
- Identify public datasets for analysis
- Read journal articles and the news to stay up-to-date with developments in behavioral health and injury-drug overdose epidemiology
- Work on the activities and projects described in this application

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

The primary and secondary mentors will provide statistical and data analysis technical assistance to the Fellow during their regular meetings. In addition, other BCHD epidemiologists will help facilitate the Fellow's analytic work. Several databases will be used by the Fellow, including birth certificate data, death certificate data, autopsy data from the Maryland Office of the Chief Medical Examiner, fatal overdose data from the Maryland Department of Health for surveillance and for overdose fatality review, non-fatal opioid overdose-related EMS data, hospital discharge data (emergency department visits and inpatient hospitalizations) provided by the Maryland Health Services Cost Review Commission, vital statistics mortality data, and syndromic surveillance data through ESSENCE. The Fellow will have software licenses for Stata, ArcGIS Pro, R, Power BI, Microsoft Office Suite, and Nitro Pro. The Fellow will have access to ArcGIS Online, the R Shiny platform, and the mySidewalk digital platform. Surveillance systems available to the Fellow will include BCHD's non-fatal opioid overdose surveillance system (funded by CSTE as Project SOON in 2017-2018), ESSENCE for syndromic surveillance, the Maryland Behavioral Risk Factor Surveillance System (BRFSS), the Youth Risk Behavior Surveillance System (YRBS), and exposure to the National Electronic Disease Surveillance System (NEDSS).

Projects

Surveillance Activity Title: Surveillance Report on Overdose Among Children, Youth, and Pregnant Persons in Baltimore City

Surveillance Activity Description:
Baltimore City experiences an overdose rate three times the national average; some of which occur among youth and children. Overdose is a risk factor for maternal mortality. This project aims to develop a regular surveillance report on fatal and nonfatal overdose among infants, toddlers, children, youth under 18 years old, and pregnant persons. To do so, the Fellow will analyze and report on data from various sources: emergency department (ED) data via Maryland's Electronic Surveillance System for the Early Notification of Community-based Epidemics (ESSENCE), ED and hospitalization claims data, autopsy death data, Youth Risk Behavior Surveillance System (YRBS) data, Child Fatality Review data, Maternal Mortality Review data, among others.

The Fellow will use STATA or R to develop a monthly automated Markdown surveillance report, including use of Application Programming Interfaces (APIs) when available. The Fellow will present the report to the overdose and Maternal and Child Health (MCH) teams across the agency. Elements of the report may be incorporated into the agency's overdose dashboard (https://dashboards.mysidewalk.com/baltimorecityoverdose/). This surveillance activity may be supplemented by participation in Overdose Fatality Review (OFR), Child Fatality Review (CFR), Maternal Mortality Review, and/or youth outreach programs conducted by agency partners.

Surveillance Activity Objectives:
The report will 1) enhance the surveillance of fatal and nonfatal overdose among children, youth, and pregnant persons in the city; and 2) better equip teams across the agency to prevent overdose in these groups. The deliverables will be a monthly surveillance report consisting of descriptive epidemiologic findings, data visualizations, and summaries of key takeaways and trends in the data, as well as the statistical code used to produce the report.

Surveillance Activity Impact:
This project will strengthen Baltimore City's capacity to monitor and prevent fatal and nonfatal overdoses among children, youth, and pregnant persons. By providing specialized surveillance data, the city will be able to 1) tailor prevention and intervention strategies to reduce overdoses among these groups; 2) enhance outreach efforts to providers and residents; and 3) improve surveillance sustainability through data automation.

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Surveillance System Evaluation Title: Evaluation of Baltimore City Health Department's Use of Maryland BRFSS Data

Surveillance System Evaluation Description:
The Maryland Behavioral Risk Factor Surveillance System (BRFSS) provides critical data on health behaviors, chronic disease prevalence, and risk factors at the state and local levels. BCHD leverages these data to inform program planning and support policy development. However, the use of Maryland BRFSS data at the agency has not been systematically evaluated to ensure its effectiveness in meeting public health objectives.

This project aims to evaluate how BCHD uses Maryland BRFSS data to support decision-making and improve population health. The Fellow will conduct the evaluation using established guidelines, such as the CDC's Updated Guidelines for Evaluating Public Health Surveillance Systems, focusing on key attributes of the data system. The evaluation will assess attributes such as timeliness, representativeness, and acceptability. Additionally, the Fellow will engage with internal stakeholders to understand current applications of BRFSS data and identify opportunities for more effective use. The Fellow will also explore potential enhancements, such as incorporating BRFSS data into dashboards and/or aligning BRFSS metrics with other surveillance data used by the agency.

Surveillance System Objectives:
The objective is to evaluate the use of Maryland BRFSS data for supporting BCHD's public health priorities and identify opportunities for more effective use. The Fellow will produce a detailed evaluation report summarizing findings, highlighting strengths and limitations, and offering actionable recommendations for improvement. Deliverables will include the evaluation report, a presentation to BCHD leadership and program staff, and a potential abstract for submission to a public health conference.

Surveillance System Impact:
The evaluation will enhance BCHD's capacity to use Maryland BRFSS data effectively, leading to more informed public health decisions and interventions. By identifying gaps and opportunities in the current use of BRFSS data, BCHD can improve its surveillance processes and ensure data are applied to address poor outcomes and advance public health goals. Recommendations from this project may also promote the integration of BRFSS data into other systems, such as dashboards, to increase accessibility and usability for internal stakeholders.

Major Project Title: Descriptive and Spatial Analyses of Extreme Cold and Overdose

Major Project Description:
Extremely cold weather provides unique vulnerabilities to people who use drugs. One study found that colder weather conditions are positively associated with the number of opioid related overdoses and overdose death, though this has not been more thoroughly explored.1 BCHD is interested in understanding how extreme cold is associated with fatal and nonfatal overdose rates in Baltimore and the survival of individuals who experience simultaneous overdose and hypothermia.

The Fellow will conduct descriptive and spatial analyses of how cold weather is associated with overdose and the intersection of overdose and hypothermia using R or STATA Markdown files and ArcGIS. The Fellow will access to syndromic surveillance emergency department data (ESSENCE), Health Services Cost Review Commission claims data, fatal overdose data, historic weather reports, and overdose fatality review (OFR) data. They will shadow community outreach programs to better understand how extreme weather is related to overdose risk and the steps being taken to mitigate that risk. The Fellow will contribute to planning OFR meetings and develop a presentation for community outreach partners, the Office of Public Health Preparedness and Response (OPHPR), and the overdose prevention team.
Sources:

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1. Goedel WC, Marshall BDL, Spangler KR, Alexander-Scott N, Green TC, Wellenius GA, Weinberger KR. Increased Risk of Opioid Overdose Death Following Cold Weather: A Case-Crossover Study. Epidemiology. 2019 Sep;30(5):637-641. doi: 10.1097/EDE.0000000000001041. PMID: 31205291; PMCID: PMC6679791.

Major Project Objectives:
The goal is to understand the association between extremely cold weather and overdose frequency and severity in Baltimore. BCHD would like to identify geographic areas at highest vulnerability to hypothermia-related overdoses to guide community outreach and preparedness. The Fellow will develop a report with detailed visualizations and descriptive/spatial trends and a presentation for internal partners. Additional deliverables will be complete documentation of methods and statistical code used to complete the work. This project could be submitted to a conference for presentation or for peer-reviewed publication.

Major Project Impact:
This project will describe the interaction between extreme cold weather and opioid overdoses. BCHD will be able to provide a more comprehensive understanding of overdoses among populations particularly vulnerable to extremely cold weather conditions and use that to guide community outreach. Further, this project could motivate community preparedness and response programs to include overdose specific resources and metrics in their outreach.

Additional Project #1 Title: Development and Implementation of an ArcGIS Online Dashboard for Monitoring Maternal and Child Health in Baltimore City
Project #1 Type: Major Project

Project #1 Description:
Monitoring maternal and child health (MCH) trends is critical to understanding and addressing poor health outcomes in Baltimore City. BCHD aims to enhance its capacity to monitor such trends through the development of an internal data visualization dashboard using ArcGIS Online. The dashboard will integrate preliminary data from monthly birth and death certificates provided by the Maryland Department of Health Vital Statistics Administration. The project will allow MCH program staff and leadership to view trends in key metrics such as preterm birth, low birth weight, infant mortality, prenatal care, and maternal characteristics, including cigarette smoking.

The Fellow will clean and manage the monthly datasets, develop statistical code to process and summarize the data, and create outputs that can be uploaded to ArcGIS Online. The Fellow will design and implement the dashboard, incorporating demographic and geographic data, including race, ethnicity, age, sex, and community statistical areas (CSAs). Further, the dashboard will include information on causes of death, including overdose, for infants, children, and pregnant persons (while pregnant or within 1 year of the end of pregnancy). The Fellow will engage MCH teams through iterative presentations and meetings to ensure the dashboard meets user needs and aligns with program goals. The Fellow will develop a written protocol to guide the process of updating the dashboard regularly and efficiently.

Project #1 Objectives and Expected Deliverables:
The objectives of this project are to develop a dynamic ArcGIS Online dashboard that integrates and visualizes maternal and child health data and to automate data workflows to ensure sustainability. The expected deliverables include the finalized dashboard, statistical code for data processing, a written protocol for dashboard updates, and presentations of the tool to MCH teams to gather feedback. The project could be submitted to a conference for presentation or for peer-reviewed publication.

Project #1 Impact:
This project will improve BCHD's ability to monitor maternal and child health trends, enabling data-driven decision-making and resource allocation. By integrating demographic and geographic data, the dashboard will support the

identification of poor outcomes and inform interventions. Mapping functionalities will allow for spatial analysis of key metrics, enhancing the department's ability to prioritize areas and populations. Automating data workflows will further strengthen the sustainability of MCH surveillance efforts, ensuring timely and accurate data for internal program planning and leadership decision-making.

Additional Project #2 Title: Development of a Data Profile of Overdose-Related Deaths during the Preconception and Perinatal Periods in Baltimore City
Project #2 Type: Major Project

Project #2 Description:
Overdose is the leading cause of maternal mortality in Baltimore City. To date the Baltimore City Health Department does not have a comprehensive data profile to inform maternal mortality prevention efforts related to substance use. This project aims to generate a detailed and actionable data profile of overdose-related deaths in Baltimore City during the preconception and perinatal periods (spanning from the time before conception through the postpartum year). To do this the fellow will be tasked with accessing, preparing and synthesizing data from three main datasets: (1) Maternal Mortality Review Database (2) Opioid-Fatality Review Database, and (3) Baltimore City Vital Statistics records. They will clean, update and align all three datasets to conduct a comprehensive analysis and develop a data profile. The data profile will inform the collaborative work of the Bureau of Maternal & Child Health and the Overdose Team to prevent poor health outcomes associated with substance use during the preconception and perinatal periods.

Project #2 Objectives and Expected Deliverables:
The key objectives for this project include: (1) Clean and update the Maternal Mortality Review Database (2018-Current), (2) Synthesize findings from multiple datasets offering a detailed understanding of overdose-related deaths during the preconception and perinatal periods, and (3) Create a Data Profile of Overdose-Related Deaths During Preconception and Perinatal Periods providing a foundation for focused public health interventions, informed policy-making, and potential healthcare system improvements.
There are three main deliverables include:

1) A complete/clean Maternal Mortality Review Database, including relevant code
2) Comprehensive data analysis looking at demographic trends, systems-level data, and geographic data, including relevant code
3) Data profile of overdose-related deaths during the preconception and perinatal periods in Baltimore City

Project #2 Impact:
This project will enhance understanding of the overdose crisis's impact on maternal health in Baltimore City and provide critical data that can drive more effective interventions aimed at preventing overdose-related deaths among women during preconception and perinatal periods. By bridging gaps between multiple data sources, this project will facilitate a more holistic, data-driven approach to improving maternal and reproductive health outcomes in the context of the overdose epidemic.

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

The Fellow will participate as an entry-level epidemiologist in BCHD's public health emergency preparedness and response activities. They will complete trainings, including FEMA National Incident Management System ICS-100, ICS-200, IS-700 and FEMA National Response Framework IS-800 courses, within 6 months of onboarding (20 hours). The Fellow will become familiar with the epidemiology components of BCHD' emergency response plans and will participate in tabletop exercises, drills, related activities (10 hours), and, if necessary, actual emergency responses. After receiving training, the Fellow will serve as the agency's on-call (nights and weekends) Infectious Disease Duty Officer for

approximately 2 weeks per year. This is a duty assigned to all agency epidemiologists. If the mpox response is still ongoing, the Fellow will run the monthly mpox testing and vaccination report (1 hour per 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 have a short-term detail with BCHD's Office of Acute Communicable Diseases (ACD) so the Fellow can gain experience in conducting outbreak investigations (estimated at 10 hours). The ACD team includes four epidemiologists, one of whom serves as the Director. The Fellow will join the ACD team as it progresses start-to-finish through the steps of at least one outbreak investigation. The Fellow will write a field investigation report and receive feedback on the report from the ACD team. The team will also expose the Fellow to NEDSS and other tools and resources used during their daily operations. Counts for selected notifiable conditions for Baltimore City are available at https://tinyurl.com/3xd8rpdd.