ID: 73563401
Environmental Health - Host Site Description
Public Health -- Seattle & King County

Assignment Location: Seattle, US-WA
Public Health -- Seattle & King County
Environmental Health Services

Primary Mentor: Bradley Kramer, PhD, MPA
Senior Program Manager
Public Health - Seattle & King County

Secondary Mentor: Jessica Lundin, PhD, MPA
Environmental Epidemiologist
Public Health -- Seattle & King County

Work Environment
Hybrid

Assignment Description

This fellowship will be focused on environmental health surveillance efforts at Public Health Seattle & King County in the Environmental Health Division. The fellowship will be split so that approximately 50% of the fellow's time is spent with the toxicology team and the other 50% of the time will be supporting the Climate & Health Equity Initiative. The Environmental Health Services Division works on reducing environmental exposures to toxics, toxins, pests and other hazards that impact public health through prevention and permitting, research, and guidance and education. The Climate and Health Equity initiative uses data to improve the ability to anticipate, respond, and adapt to the effects of extreme weather events, and aims to promote community resilience and health equity. There will also be opportunities to collaborate with other divisions of Public Health on emerging public health threats and investigations.

The fellow's day-to-day activities will include:
- Analyzing environmental health (chemical contamination) data
- Conducting surveillance studies to better understand trends in environmental exposures, health outcomes, and risk profiles by retrieving, harmonizing, and managing large and disparate datasets
- Conducting literature reviews to support improved understanding of new or emerging topics
- Responding to extreme weather events (e.g. analyzing surveillance data, coordinating with Preparedness partners, creating after-action summaries)
- Analyzing syndromic surveillance data around extreme weather and exploring its use for environmental health topics
- Analyzing and summarizing data collected by environmental health programs such as private well testing results data, potential sources of lead poisoning identified through case management of kids with elevated blood lead levels, environmental exposure data for pollutants, and others
- Conducting program evaluation on efforts undertaken by the health department to adapt to increasing impacts for extreme heat, wildfire, floods, drought, and extreme cold, for example: developing surveys, collecting data, analyzing data, and disseminating findings
- Support online dashboard updates and provide reports to summarize the health impacts of extreme weather events
- Participating in weekly unit-wide epidemiology meetings, toxicology team meetings, Climate and Health Equity Initiative team meetings, Environmental Health division meetings, and other meetings as appropriate
- We anticipate there may be an opportunity to help with the sampling at community events, and drafting surveys to capture information of exposure and health outcomes
- Writing up findings for presentation at conferences, manuscripts, or white papers
- Assist in preparation of outreach material to share with the community (and policy staff) about why these exposures are important to understand, possible health impacts, and how to protect yourself, your family, and your community.

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- Supporting environmental health investigations

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

The fellow will have access to R, Tableau, SQL, GIS, and any other software that is needed to complete their work. They will also have access to various surveillance datasets that will be used throughout the fellowship including vital statistics data, syndromic surveillance data, medical examiner's office data, environmental health program data, and other survey data, such as our local Healthy Youth Survey, Behavioral Risk Factor Surveillance system, among others.

Mentors will help support the fellow with statistical and data analysis support, and the Community Health and Assessment Division also has many resources to support the learning of R, Tableau, GitHub, and SQL. There are Microsoft Teams channels to ask questions and engage in discussion, as well as office hours to help troubleshoot problems. Epidemiologists throughout the division will be available to assist with software, and there are also many resources already developed to analyze data from the surveillance systems mentioned above.

Projects

Surveillance Activity Title: Lead exposure in kids, refining predictors of high blood-lead levels

Surveillance Activity Description:
Childhood lead exposure is a serious but preventable environmental public health issue. Lead is a toxin that can have long-term impacts on physical health and brain development, even at low levels. These effects include behavioral challenges and lower academic achievement. Lead-based paint and lead-contaminated dust are responsible for much, but not all, of the lead exposure in children in the United States. Knowing how children are exposed to lead can help public health departments to design more effective interventions or strategies to reduce the occurrence and impact of exposure. Similarly, knowing what health outcomes are associated with exposure can help identify circumstances of kids unknowingly having high levels of exposure.

Surveillance Activity Objectives:
This project would involve reviewing ten-years of blood lead testing measurements in kids (>60,000 tests) to look for predictors of elevated levels such as geographic location (census tract or zip code), sex, race, etc. Information collected during in home investigations can be evaluated to look for associations with elevated blood lead levels, for example from different exposure sources such as spices, toys, chipping paint, etc. In addition, PHSKC has information on co-morbidities in children with and without high lead levels. These co-morbidities with lead exposure, especially learning disabilities and developmental disabilities (collected using ICD-10 codes), will be considered for being predictive of high blood lead levels.

This collective information from this project would be put into a report or peer-reviewed publication. The project will also need outreach material to share with the community and public health agencies about why these exposures are important to understand, possible health impacts, and how to protect yourself, your family, and your community.

Surveillance Activity Impact:
This collective information from this project would be put into a report for the community, public health agencies, legislature, and funding agencies and will assist with outreach and engagement materials, interventions, policy development, strategies, and can alert staff to new exposure sources or trends that develop in specific communities or through time. The overarching goal is to reduce the occurrence of lead exposure and high blood lead levels in kids.

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Surveillance System Evaluation Title: Assess and compare surveillance on heat related illness used by local health jurisdiction, regionally across Washington, Oregon and British Columbia.

Surveillance System Evaluation Description:
This project will start with a more comprehensive look at our own local syndromic surveillance for heat related illness. We will revisit the 2021 heat dome using three data sources: 1) emergency room visits through Rapid Health Information Network (RHINO) Washington State's syndromic surveillance data; 2) Medical examiners office data; and 3) hospital admission data. These data will help inform the case-definition and a more comprehensive look our syndromic surveillance approach. The project will then comparatively assess how other regional, local health jurisdictions assessed the impact of the 2021 heat dome, including our metropolitan counterparts in Multnomah, Oregon and Vancouver, British Columbia.

Surveillance System Objectives:
The goals of this study are: 1) Define health related illness through different data sets (emergency department, emergency medical services, death) and what differences exist in how excess deaths were accounted for in the region (Oregon, Washington, and British Columbia). 2) Characteristics of heat related illness and excess deaths: We will use multiple data sources (including electronic health record data) to qualitatively assess each excess death and more comprehensively understand factors of heat related illness and death, and then compare these results to the case definition of heat related illness. 3) Assess local surveillance operations for King County, and how to improve based on regional accounting. 4) Identify strategies to use data to inform health care systems and public health operations during heat events.

Surveillance System Impact:
This project will improve surveillance efforts for monitoring the health impacts of heat related illness in King County with the potential to support improvements and coordination regionally. From a practice-based perspective, this study provides the opportunity to learn how public health operations are connected across divisions (e.g., emergency preparedness, syndromic surveillance, health prevention and promotion programs, communications, medical examiner), as well as partners in our emergency management and hospital systems. in order to inform preparedness and response efforts. These efforts can also be disseminated to improve surveillance efforts in other parts of Washington and nationally. This study has the potential for broader impact through partnerships built for this cross-jurisdictional learnings, the Collaborative on Extreme Heat (OR, WA, BC), and the Northwest Health Care Response Network.

Major Project Title: Increasing rates of cancer in children and young adults: improving the understanding of environmental contributors

Major Project Description:
There is increasing incidence in cancer diagnoses in younger age groups nationwide. There is uncertainty surrounding the factors and patterns that are contributing, but environmental factors, dietary practices, lifestyle, and comorbidities have been proposed. For example, there has been an observed increase in thyroid cancer incidence, the most common endocrine cancer, for people <35 years in King County over the last three decades. Although this is consistent with national trends, PHSKC is relatively data-rich and has data available to help address this increase in cancer that other jurisdictions may not. This data will allow for a closer look at trends and clusters based on geographic location and demographics, as well as case incidence associated with environmental variables to help better understand the predictors of this increase. A next step is to determine if rates are disproportionate across the community including by geography and demographic information. These methods will be applied to other cancers including colorectal, breast, and testis.

Next steps also include bringing in environmental exposure data such as surveys to cases or clinicians, and geocoding residential address with the Washington state Environmental Health Disparities map or with US EPA estimates of exposure to endocrine disrupting or carcinogenic air toxics. We will also explore local health roles in communicating and reducing risks to these cancers.

Major Project Objectives:
The objective of this project are to: (1) investigate the annual trends of thyroid and other cancer rates in younger age groups in King County, Washington; (2) evaluate the cancer rates across demographic and geographic groups, and social determinants of health, to determine if rates are disproportionate across the community; (3) bring in environmental exposure data to model environmental conditions/exposures with cases to improve understanding of environmental contributors; (4) Draft a survey to send families of children diagnosed with cancer in the recent two-years to gather additional information on early childhood exposures or experiences; and (5) engage in community outreach.

Major Project Impact:
This project will contribute to building and expanding our childhood cancer surveillance system, and evaluate associations with environmental health data, to inform protective programs, policy makers, and the public. This will help us gain a more in depth understanding of how to protect our communities from early-childhood cancer and inform programs across the county of how conditions could be improved.

Additional Project #1 Title: Quantifying the economic impacts of extreme weather events on human health to understand the benefits of proactive public health mitigation measures.
Project #1 Type: Major Project

Project #1 Description:
Extreme weather events (e.g., increased frequency and severity of extreme heat, wildfire, drought, flooding, and severe winter weather) have a variety of direct and indirect impacts on human health, including increased mortality, morbidity, and health care utilization. While many of the health impacts have been quantified by epidemiologists, the health economic implications of these events have not been comprehensively studied. For example, epidemiology studies have quantified increase emergency medical service calls and emergency room visits during extreme heat events. The quantification of the impacts on our health and social systems, can inform the required cost-benefit analysis for federal grants to develop infrastructure projects and community interventions that address these concerns. We propose to explore the translation of health impacts (i.e. increased health care service utilization, morbidity, and mortality) into health economic values that assess the burden of extreme weather on our public health systems, health care expenditures, and broader burden of disease on our communities.

Project #1 Objectives and Expected Deliverables:
The objective and deliverables of this project would be: 1) Quantify direct costs (emergency response and health care utilization) associated with extreme weather events; 2) Asses indirect impacts (e.g., missed school or work days, long-term costs from chronic conditions); 3) Analyze impacts across different exposure, sensitivity, and access to preventative resources for our most impacted communities; 4) quantify the potential economic benefits (through assessment of losses avoided) of potential public health mitigation measures that serve to reduce population exposure and vulnerability to anticipated impacts; 5) Disseminate results to partners to inform project and grant proposal that resource public health mitigation measures that demonstrate a potential return-on-investment.

Project #1 Impact:
This project will provide important and new data that will help expand our understanding of the potential economic costs of human health impacts anticipated to result from extreme weather events. The results will be important in prioritizing investments and approaches to address the needs of our most impacted communities to these events.

These actions can lead to improved public health resourcing to address the needs in extreme weather events, inform health care resources, and more effective policies as we adapt to these changing weather patterns. , and identify investment opportunities that have the greatest potential return-on-investment for the prioritization and implementation of proactive adaptation and public health mitigation measures to reduce human health impacts from these extreme weather events.

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

There will be many opportunities to play a role in preparedness and response efforts. The Preparedness unit of Public Health activates their Health and Medical Area Command (HMAC) when there are emergency response efforts needed, such as during periods of extreme heat, extreme cold, or other public health emergencies (e.g. COVID-19). The fellow will have the opportunity to closely collaborate with the Preparedness team by providing relevant data, participating in coordination calls, joining staff in site visits, developing needed education and outreach materials, and helping to conduct after-action evaluations of the response.

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

There will be opportunities for the fellow to work with other sections of the health department, such as our Communicable Disease Epidemiology team to conduct cluster or outbreak investigations. The fellow would work with their team on a short-term basis on a cluster or outbreak investigation. One example of possible work could be on communicable disease investigation at certain facilities (e.g. long term care facilities, schools). Other environmental health examples could be around food borne illness (e.g. vibriosis).