ID: 59950445
Environmental Health, Maternal and Child Health - Host Site Description
Minnesota Department of Health

Assignment Location: Saint Paul, US-MN
Minnesota Department of Health
Environmental Health

Primary Mentor: Jessica Nelson, PhD, MPH
Director of Biomonitoring, Principal Epidemiologist
Minnesota Department of Health

Secondary Mentor: Stephanie Yendell, MPH
Supervisor of lead prevention program, Epidemiologist Supervisor Sr
Minnesota Department of Health

Work Environment
Hybrid

Assignment Description

The Minnesota Department of Health is in the Twin Cities Metro area, which has a population of about 4 million and was voted one of the most diverse cities, with the largest Hmong population in the US, a large Somali population, and home to Little Earth, a residential housing area for American Indians. Minnesota has a lot of outdoor activities to offer with lakes built into the city, voted the most bike-friendly city in the US, and beautiful hiking in the local parks. Minnesota has a wonderful arts scene with dozens of theaters in Minneapolis; Northeast Minneapolis is one of the country's greatest art districts with more than 400 artists.

The fellow will work on applied epidemiology projects to understand and address environmental health disparities. This billet includes epidemiology exposure projects across the age spectrum, including biomonitoring on preschool age children and developing a process for investigating adults with high blood lead levels. These high exposure levels are often found in vulnerable and overburdened populations. The challenge is translating the findings to action to make the information accessible to communities with these disparities. The fellow will gain the skills for developing surveillance data, analytical analyses, and survey skills, with the expertise of senior environmental health epidemiologists.

The fellow will join our environmental epidemiology unit at the Minnesota Department of Health. This unit includes two programs: the MN Biomonitoring program and the MN Environmental Public Health Tracking (EPHT) program. The MN Biomonitoring program measures levels of chemicals in Minnesotans and whether chemical exposures differ between groups and over time. The Healthy Kids Minnesota program is working to better understand and take action to prevent children’s exposures to chemicals that may harm development. In partnership with school districts, local public health, and tribal nations, the program uses biomonitoring to measure chemicals in preschool-age kids across the state.

The other mentor is from the lead unit. The lead unit’s data collection activities protect the health of the public and promote awareness of lead issues by monitoring lead testing activities and tracking the occurrence of elevated blood lead cases in the state, maintaining a high-quality database of information that can be used to effectively manage the risks associated with lead exposure, and providing the basis for strategies designed to reduce the occurrence of lead-related disease, conducted collaboratively with local, state and federal partners.

The Environmental Health Division inspects and monitors the environment to ensure it is safe for the public. They collect environmental data on water quality, air quality, and lead poisoning that we utilize for our surveillance work. Our environmental epidemiology unit is within the Environmental Health Division, and we coordinate and collaborate with numerous programs such as indoor air, lead poisoning, and climate and health.

ID: 59950445
Environmental Health, Maternal and Child Health - Host Site Description
Minnesota Department of Health

We work collaboratively across many programs not only in this division, but across the health department to provide epidemiology support for analyzing, interpreting, and conducting on-going surveillance. There are many data scientists to support the fellow as they apply their training, to share resources, and to teach them how to analyze, interpret, and display data for public health use.

Day-to-day activities:

Day-to-day activities will include independent work and analysis time, team meetings, communities of practice, and professional development resources, relationship building and communications with partners, and socializing with co-workers. Day-to-day work responsibilities include reviewing, summarizing, and collating data; project planning; collaborative meetings; and data formatting and coding analysis.

The fellow will meet with their mentors weekly to discuss priorities, progress, and to get any feedback and direction. Each project will have a mentor to support and collaborate with them. We have monthly epidemiology team meetings to share our work and get feedback on analyses. They will also join our weekly biomonitoring team meetings and our unit meetings that are now in-person every month.

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

A broad range of tools are made available to the fellow through the standard MDH operating environment. The Office suite of products offers access to analytic tools like Microsoft Excel and Access. Additional software can be purchased or licensed and installed for the Fellow workstation (Endnote, Tableau, SAS, ESRI ArcGIS, etc.). Analysis can be done in SAS and/or R with Tableau as a visualization tool.

Many opportunities for training on the tools are available including classes, community of practice groups, university trainings, and hands on training from mentors and staff. Our program works with many datasets and works closely with data stewards and users across the agency.

Projects

Surveillance Activity Title: Conducting Surveillance Analysis for Maternal Child Health Indicators

Surveillance Activity Description:
The fellow would be responsible for analyzing, interpreting, and displaying data on the MN EPHT data portal for national and state biomonitoring data, as well as specific maternal child health indicators. The fellow will analyze national results from National Health and Nutrition Examination Survey (NHANES) for comparison to the state biomonitoring results. They will determine the best way to display the data and develop appropriate risk messaging. For the maternal child health indicators, such as birth defects, they will conduct annual trends, assess at-risk populations using significance difference testing for age groups and gender and map rates to see geographical patterns.

The fellow will learn ArcGIS mapping, analysis using SAS, conducting significance testing, interpreting data appropriately, developing the data for display, and using data visualization software.

The fellow would be assisting with transitioning some topic areas to our new data portal and taking over the updates for some content areas. This would include the annual analysis, documenting how-to-guide and process steps, validating, and possibly some testing and evaluation with a partner. In their second year, the fellow will learn how to conduct CDC data submission for grant requirements to assist the program with meeting our grant deliverables.

ID: 59950445
Environmental Health, Maternal and Child Health - Host Site Description
Minnesota Department of Health

Surveillance Activity Objectives:
The fellow will analyze national and state biomonitoring data and determine the best way to display the data. The maternal child health indicators will be analyzed, and the charts, tables, maps, and interpretive messaging will be updated. The required data will be formatted and submitted to meet CDC's requirements.

Surveillance Activity Impact:
The findings from MN biomonitoring studies compared to national studies will be available to the community along side prevention information to reduce childhood exposures. The maternal child health surveillance data will be maintained and updated for on-going surveillance and to inform the birth defects program.

Surveillance System Evaluation Title: Evaluate the Adult Blood Lead Epidemiology and Surveillance (ABLES) System

Surveillance System Evaluation Description:
In adults, lead exposure can lead to increased risk for chronic diseases such as hypertension and kidney disease. The Adult Blood Lead Epidemiology and Surveillance (ABLES) program is an active surveillance program that follows up on EBLLs reported to BLIS among adults in Minnesota and ascertains the source of lead exposure. This includes calling healthcare providers to determine the source of an adult's lead exposure, their employer information, job title, known non-occupational lead exposures, and pregnancy status.

The National Institute for Occupational Safety and Health (NIOSH), CDC, and the State of Minnesota use a reference value of 5 µg/dL in adults, as well as children. MDH reports work-related blood lead levels of 25 µg/dL or greater to Minnesota Occupational Safety and Health Administration (MNOSHA) so MNOSHA can investigate the conditions that led to the EBLL. Adult lead testing is most common among people working in high-risk industries and pregnant women with either occupational or non-occupational risk factors for lead exposure.

Surveillance System Objectives:
- Assess the Minnesota surveillance system for occupational lead exposure in adults.
- After assessing the current system, develop a questionnaire to interview adults with elevated blood lead levels.
- Administer the questionnaire as a pilot project and analyze the results.
- Develop recommendations on whether to continue patient interviews for adults exposed to lead.

Surveillance System Impact:
The AEF fellow will determine if there are key exposure and risk information missing from the ABLES system and if so, fill that gap by adapting the case investigation process.

Major Project Title: Analyzing Biomonitoring Data from the Healthy Kids Minnesota Program

Major Project Description:
Biomonitoring is an increasingly important tool in environmental public health surveillance. Healthy Kids Minnesota (HKMN), a statewide biomonitoring program focused on children's environmental exposures, is a groundbreaking new MDH effort, funded with support from the CDC's 2024-2027 State-Based Public Health Laboratory Biomonitoring Programs funding. Using a population-based sampling approach, the program works with partners at school districts, local public health agencies, and tribal nations to recruit children through Early Childhood Screening appointments. These developmental screenings are a pre-kindergarten requirement for all Minnesota children. With family consent, a urine sample is collected and analyzed by the MDH Public Health Laboratory for over 70 chemicals of concern within six categories of chemicals: metals, pesticides, polycyclic aromatic hydrocarbons (PAHs), environmental phenols, phthalates, and flame retardants.

ID: 59950445
Environmental Health, Maternal and Child Health - Host Site Description
Minnesota Department of Health

HKMN moves to different regions of the state in a five-year cycle, working in one Metro and one non-Metro region each year. Launched in 2021, three of the five program years are completed and recruitment will begin again in spring 2025 to complete the final two program years. The program has been hugely successful so far, recruiting over 1,250 children and achieving participation rates of 55-75%. Results are used to assess population exposures, identify disparities that may exist, and inform actions needed to reduce these disparities and ensure a healthy start for all Minnesota children.

A huge amount of data is collected as part of the program. In addition to individual-level biomonitoring results for all 70+ chemicals, families answer survey questions about background factors and possible sources of exposure their child may have had to the chemicals including drinking water source, diet, personal care product use, home and yard pesticide use, etc. Some families choose to receive free private well testing, results of which can be compared to biomonitoring measures. We have geographic location for each child along with environmental exposure data layers such as crops grown in certain areas and vehicle traffic measures.

Major Project Objectives:

- The AEF will analyze survey responses and biomonitoring results.
- Assess population exposure and compare to the National Health and Nutrition Survey (NHANES).
- Identify differences in exposure by household income, rural/urban status, race/ethnicity, and other factors.
- Investigate exposure sources using survey and environmental data. Utilize epidemiologic methods that account for confounding and effect modification, correlated data, and non-normally distributed outcome variables.
- Produce data reports for partner organizations and to inform community reports, presentations to Advisory Panel and national meetings, at least 1 peer-reviewed scientific publication.

Major Project Impact:
Through this project, the results from Healthy Kids Minnesota (a first-time state effort to proactively examine childhood exposures to chemicals across the state) will be analyzed, interpreted, and shared widely with partners and the scientific community. The results will provide key information for public health action and exposure reduction messaging, with the broader public health goal of reducing childhood exposures to chemicals that may harm child development.

Additional Project #1 Title: Develop a Guide for Investigating Exposures to Lead-Containing Products
Project #1 Type: Surveillance Activity

Project #1 Description:
The potential for consumer products to contain lead (and other harmful metals) has been known for some time. Over many years, lead poisoning cases associated with the use of lead-contaminated consumer products have been investigated nationally and abroad. These product categories can vary, but they can include certain foods, spices, health remedies, traditional cookware/dishware, cultural powders, toys and jewelry/amulets/charms from around the world. Lead may be unintentionally or intentionally added to these consumer products during manufacturing or processing, or it may be a component of the product itself. It can be difficult to tell whether a product contains lead without laboratory testing, as lead is generally not listed as an ingredient on the product.

The AEF would develop a Minnesota Technical Guide for Investigating and Addressing Exposures to Lead-Containing Consumer Products similar to New York City's technical guide (https://www.nyc.gov/assets/doh/downloads/pdf/lead/lead-technical-guide.pdf).

Project #1 Objectives and Expected Deliverables:

- They will facilitate meetings with lead risk assessors from MDH, Ramsey County, and the City of Minneapolis to gain consensus on actions to be taken when lead is identified in consumer products.

- Develop a Minnesota Technical Guide for Investigating and Addressing Exposures to Lead-Containing Consumer Product
- Summarize the findings and key messages on ways to reduce exposure in children in a written community report.
- Display the data findings on the MN Tracking Data Portal.

Project #1 Impact:
This technical guide will be used to help standardize procedures within the State of Minnesota and will help Minnesota contribute to national efforts to address lead in consumer products.

Additional Project #2 Title: Healthy Kids Minnesota Exposure Follow-up and Intervention
Project #2 Type: Surveillance Activity

Project #2 Description:
Results from Healthy Kids Minnesota (HKMN) have indicated that some Minnesota children may be having elevated exposures to certain chemicals from unexpected and preventable exposures sources. In particular, we have found elevated exposure to inorganic arsenic with high frequency of eating certain types of rice, and elevated exposure to polycyclic aromatic hydrocarbons (PAHs) with use of certain types of incense.

This project will take these results and develop and implement a plan to further investigate the results and work towards an intervention to reduce childhood exposures. This will be done in coordination with the HKMN team and a range of partners, including the Minnesota Department of Agriculture (who has already partnered with MDH to collect samples of rice from Minnesota businesses and analyze them for arsenic content), the MDH Division of Health Equity Strategy and Innovation and others.

Project #2 Objectives and Expected Deliverables:
- Literature review of exposures and environmental sampling methodologies.
- Analyze environmental sampling data for rice. Develop environmental sampling plan for incense/related scented products.
- Work with MDH subject matter experts, agency partners, and MDH Cultural Communicators on data analysis/interpretation and appropriate public messaging about these exposures.
- Share results widely with partners, community organizations, ETHB Advisory Panel, and colleagues in other states. Publish at least one peer-reviewed scientific publication.

Project #2 Impact:
This project will provide important and novel information to MDH and our partners about two concerning and preventable sources of childhood exposure to chemicals. It will actively work to take action to prevent these exposures in children.

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

Emergency Preparedness and Response Division will provide opportunities to learn more about emergency preparedness and response at the state level. The fellow will be expected to take basic MDH public health preparedness courses on Incident Command Structure. Additionally, the fellow can learn about disaster epidemiology by participating in the CSTE Disaster Epidemiology Subcommittee calls and workshops alongside her secondary mentor.

ID: 59950445
Environmental Health, Maternal and Child Health - Host Site Description
Minnesota Department of Health

Potential activities:

- Orientation to the Emergency Preparedness and Response Division to include an overview of the public health preparedness program and healthcare preparedness program.
- Participation in MDH response and incident management workshops and exercises. Share information of related emergency preparedness workshops and conferences in Minnesota.
- Attendance at a meeting with partners to enhance knowledge of preparedness and response training in Minnesota.

Meetings include:

- Science Advisory Team, established by MDH to develop operational processes for the provision of crisis clinical care in the event of a public health emergency and provide clinical and operational expertise to MDH prior to and during events requiring such input.
- Regional Hospital Preparedness Quarterly Meeting which includes the regional healthcare preparedness coordinators, public health preparedness consultants, members from health care coalitions and MDH staff. These meetings provide for collaboration inter-regionally across the state for planning and response purposes.
- Local Public Health meetings with directors and emergency preparedness staff for information sharing.
- Tribal Emergency Preparedness meeting with tribal staff, EPR staff and staff from the MDH Office of American Indian Health.

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

We have connections with the infectious disease division and can have the fellow involved in those outbreaks. Our current fellow is working on the pertussis outbreak.

MN Biomonitoring has identified arsenic in rice through biomonitoring analyses and strives to communicate to the community about risk prevention. The blood lead program conducts investigations in products found to have lead in them, including the recent apple sauce contamination.

The environmental health section that our program is under conducts regular environmental investigations. The fellow will be asked to participate in environmental investigations, as available. Their level of involvement depends on the need, fellow skillset, and where the response is currently at. They could be called upon to develop epidemiology study design with comparison populations including considering exposures and risk factors. They will complete informational briefs or summary reports after these investigations. The fellow's anticipated role in environmental should comprise 5% or less of their total allocated time.