ID: 88164904
Occupational Health, Environmental Health - Host Site Description
Wisconsin Department of Health Services

Assignment Location: Madison, US-WI
Wisconsin Department of Health Services
Division of Public Health

Primary Mentor: Paul Creswell, PhD
Occupational Health and Safety Surveillance Senior Epidemiologist
Wisconsin Department of Health Services

Secondary Mentor: Carrie Tomasallo, PhD, MPH
Section Manager, Environmental Epidemiology and Surveillance
Wisconsin Department Of Health Services

Work Environment
Hybrid

Assignment Description

The Fellow will be stationed with the Occupational Health and Safety Surveillance (OHSS) Program within the Environmental Epidemiology and Surveillance (EES) Section of the Bureau of Environmental and Occupational Health (BEOH). BEOH offers extensive opportunities in applied epidemiology, including public health surveillance, research, health informatics, data analysis, and investigation of exposure/disease relationships. Over the two year fellowship, the Fellow will gain experience across a wide range of programs and activities.

Depending on the Fellow's interests, 50-100% of their time may be dedicated to OHSS, with work encompassing surveillance data analysis, case follow-back, epidemiologic investigations, and some opportunities to support communications and outreach. Remaining time can be spent on other BEOH activities. The Bureau's expertise spans environmental health surveillance, lead poisoning prevention, asthma and healthy homes, occupational health, Superfund site assessment, indoor air quality, climate and health, radiation safety, and groundwater quality. With guidance from mentors, the Fellow will develop a customized work plan aligned with their interests and the fellowship's core competencies. They will have opportunities to collaborate with experts in public health education, stakeholder engagement, policy development, and regulatory programs. BEOH also maintains strong academic partnerships; the primary mentor is a UW research Scientist (Researcher III), the secondary and tertiary mentors are an Assistant Adjunct Professor and Honorary Fellow, respectively, in the UW School of Medicine and Public Health.

As opportunities arise, the Fellow will participate in field experiences such as outbreak investigations, environmental inspections, preparedness exercises, and emergency response activities. They are strongly encouraged to present and publish findings from surveillance or research projects. Mentors will help identify these opportunities, and travel support for local conferences and workshops will be provided as needed.

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

As a host-site, BEOH can offer significant statistical and data analysis support for an incoming Fellow. Both mentors have extensive experience with data analysis and statistical methods, as do several other staff members with whom the Fellow would interact - including two additional Occupational Health epidemiologists. The Bureau has active cohorts of SAS and R users and hosts regular affinity meetings for each. Moreover, DPH provides a large network of individuals who can provide data analysis support. BEOH has a strong record of peer reviewed publications and can support the Fellow with manuscript development and submission. Tableau licenses are available for data visualization projects, and several

staff maintain Tableau dashboards and expertise in visualization best practices. GIS tools are also accessible for Fellows interested in mapping or spatial analysis. Additional software needs can be considered if not already in use.

BEOH makes use of several data sources, including:

- Hospital discharge data
- Vital records data
- Ambulance run data
- Workers Compensation claims data
- ESSENCE syndromic surveillance data
- Wisconsin Electronic Disease Surveillance System (WEDSS) system for reportable conditions. This system increasingly uses electronic case reporting (eCR) as well as electronic lab reporting (ELR) and manually reported case information.
- Wisconsin Poison Center data
- Cancer registry data
- Birth defects registry data
- Adult and childhood blood lead data
- Behavioral Risk Factor Surveillance System (BRFSS) data
- Wisconsin trauma registry data

Projects

Surveillance Activity Title: Expanding eCR-based Follow-Back Surveillance of Occupational Lung Diseases: Farmer's Lung and Asbestosis

Surveillance Activity Description:
The Fellow will have the opportunity to assist with the expansion of follow-back surveillance methods for occupational lung diseases - specifically, farmer's lung and asbestosis. A systematic approach involving mailed surveys, electronic surveys, and follow-up phone interviews has been established at BEOH for silicosis. Expanding and adapting this system to additional occupational lung diseases is a vital next step.

Surveillance Activity Objectives:

1) To expand capture of relevant case details for the determination of case status using a multi-modal follow-back methodology.
2) Creation of a mailed paper survey and matching digital (REDCap) survey for distribution to eCR-identified possible cases of farmer's lung and asbestosis.
3) Creation of a streamlined standard operating procedure (SOP) document for dealing with farmer's lung disease and asbestosis that can be used by BEOH staff for follow-up, based on the existing SOP for silicosis
4) An assessment of the process developed which can determine if the adoption of these new methods is successful in improving case capture of occupational lung disease in Wisconsin.
5) A share out (e.g., presentation or manuscript) that details the process and the findings from the project.

Surveillance Activity Impact:
This project will help Wisconsin's public health community assess the utility of expanding new follow-back methods for epidemiological surveillance. It will also help to assess the burden of these occupational lung diseases in the state. This project will continue to build on Wisconsin's reputation as a leader in electronic case reporting (eCR) for public health surveillance.

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Surveillance System Evaluation Title: Evaluation and Comparison of ELR (Lab-Based) and eCR (Medical Record-Based) Sources for Lead Poisoning Surveillance in Wisconsin

Surveillance System Evaluation Description:
Electronic laboratory reporting (ELR) systems have significantly improved the capture of lab based indicators for reportable conditions, including lead poisoning, for public health surveillance. A newer system - electronic case reporting (eCR) - can also identify reportable conditions by using information from electronic health records in clinical settings. Wisconsin is a national leader in adopting eCR and already uses it to track occupational health conditions, many of which cannot be detected through lab results alone and instead rely on clinical diagnoses.

However, no formal evaluation comparing ELR and eCR has yet been conducted. As a result, there is no clear evidence about the relative strengths or limitations of these systems that could guide improvements in occupational health surveillance. Lead poisoning, which is captured by both systems, offers a useful case for comparing ELR and eCR to assess their respective advantages and disadvantages.

The Fellow will have the opportunity to design this comparison and support BEOH in carrying out the evaluation. The findings will help quantify the value and limitations of each data source and reduce long-term duplication in tracking lead poisoning in Wisconsin. The results of this evaluation may also be useful for the surveillance of other reportable conditions that use either - or both - of these sources.

Surveillance System Objectives:
The project will help answer the following questions:

1) What level of overlap is there between case capture via ELR and eCR sources?
2) For whom and under what conditions are these sources of surveillance data most effective?
3) How could the system be further improved?

Surveillance System Impact:
The evaluation project will enable BEOH to make the most of limited resources by addressing important gaps in our understandings of the occupational surveillance data and systems. Results of the evaluation project can inform the work of other Wisconsin surveillance programs and may also reduce potentially duplicative efforts leading to longer term efficiencies. Projects like this are especially valuable as new tools emerge and must be assessed against existing or gold standard methods.

Major Project Title: An Analysis of Work-Related Questions Pilot-Tested in BRFSS

Major Project Description:
Measuring the prevalence and impact of major occupational illnesses and injuries in the U.S. is notoriously challenging. Both administrative records and medical datasets are known to substantially under report and misclassify these conditions. To address these limitations, Wisconsin has added several relevant questions to recent BRFSS surveys. These include items on long COVID - which can affect a person's ability to work and may result from workplace SARS CoV 2 exposure - as well as questions on work related injuries or illnesses and standard industry and occupation measures.

Wisconsin is currently piloting the work related injury questions, which were adapted and shortened from an earlier multi state BRFSS module. These questions provide new, unexplored data sources, and the CSTE Fellow would be the first to analyze and report the findings. Because BRFSS includes a wide range of variables, the Fellow will also have the opportunity to disaggregate or adjust results using many other factors of interest. In addition to generating prevalence estimates for long COVID and work related injuries, this analysis will directly inform Wisconsin's decisions about whether to continue or refine these questions in future BRFSS cycles.

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Major Project Objectives:

1) Use BRFSS data to estimate the prevalence of long COVID and/or work-related injuries within the workforce.
2) Determine which groups have higher risk (e.g., specific industries, occupations, demographic groups, or those defined by other health characteristics).
3) Communicate the findings through a manuscript, surveillance brief, or formal presentation.
4) Perform validity and reliability assessments of the work-related injuries module (if used).
5) Collaborate with BEOH staff to discuss data strengths and limitations identified through the analysis.

Major Project Impact:

Work is a key social determinant of health, and work related illnesses and injuries contribute substantially to major causes of morbidity and mortality in the United States. Yet the role of work in shaping health outcomes remains under recognized in public health, largely because our primary data systems have significant and longstanding gaps in identifying whether conditions are work related. If the piloted BRFSS questions on work injuries or illnesses prove to be valid and reliable, they could offer an important new source of information for estimating the prevalence and burden of these conditions. This is especially critical because existing data sources rely heavily on employers, healthcare providers, and insurers - systems that are known to substantially undercount the workers at highest risk. Collecting self reported data directly from workers could better illuminate the health challenges faced by vulnerable populations and guide policy and prevention strategies. This potential value exists whether the Fellow analyzes the workplace injury questions, the long COVID questions, or both.

Additional Project #1 Title: Assessment of Work-Related Carbon Monoxide (CO) Poisoning Using ESSENCE for Syndromic Surveillance
Project #1 Type: Other

Project #1 Description:

Carbon monoxide (CO) is an ongoing occupational hazard and accounts for numerous workplace poisonings every year in Wisconsin. Mortality is not the only risk with CO poisoning as exposure can lead to other longer-term sequelae including cardiovascular and psychological issues. Wisconsin has access to syndromic surveillance of emergency department visits via ESSENCE with excellent coverage throughout the state. ESSENCE is being increasingly used by BEOH to track CO poisonings that result in emergency department visits. OHSS staff have also been involved in a national project to establish a gold-standard syntax in ESSENCE which can detect, with reasonable accuracy, if an ESSENCE case is work-related. An interested Fellow could pair ESSENCE CO poisoning data with this work-related case detection syntax and assess work-related CO cases in the ESSENCE data. Such an assessment has the potential to improve Wisconsin's surveillance with regards to occupational CO poisonings.

Project #1 Objectives and Expected Deliverables:

This project will answer the following questions:

1) How well does the new syntax work to identify a sub-set of work-related CO poisonings from among all CO visits?
2) If the syntax works well to identify these cases, does it work better than established surveillance methods?
3) How could the system be further improved?

Project #1 Impact:

This project is worthwhile because it offers a real world opportunity to apply the newly developed work related case detection syntax in ESSENCE, while also evaluating ESSENCE's potential as a tool for identifying work related CO poisonings in Wisconsin. At present, these incidents are typically detected through calls to the Wisconsin Poison Center or identified retrospectively in hospital and emergency department data. Developing a more effective method for

detecting work related CO poisonings could improve our understanding of the circumstances in which they occur, ultimately supporting better prevention strategies and more useful information for both employers and workers.

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

Several BEOH programs pursue work related to climate adaptation. The Fellow will be able to participate in activities related to climate adaptation, especially preparation for extreme heat and precipitation events - which closely align with the initiatives of DPH's Office for Preparedness and Emergency Healthcare. The Fellow will also have opportunities to participate in statewide emergency preparedness exercises that cover a range of potential incidents, including radiological contamination, power outages, and bioterrorism. Finally, as the opportunities arise, the Fellow will be invited to participate in field experiences such as outbreak investigations, environmental inspections, preparedness exercises, and emergency response activities.

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

Previous BEOH fellows have supported preparedness and response activities as needs arose, including participation in the Incident Command System (ICS) during real-world statewide emergencies. Their involvement has spanned events such as EVALI (an investigation of contaminated vapes), a large carbon monoxide (CO) poisoning at a hockey rink, an industrial lead poisoning incident at a shipyard, the COVID 19 pandemic response, a blastomycosis outbreak at a papermill, and a lead poisoning investigation in Milwaukee schools. Several of these incidents made national headlines, and almost all resulted in peer-reviewed publications.

BEOH programs routinely conduct cluster and outbreak investigations related to a wide range of environmental and occupational exposures - including lead or other heavy metals, CO, silica, asbestos, harmful algal blooms, cancer clusters, and emerging hazards. The Occupational Health and Safety Surveillance (OHSS) Program also collaborates with the Bureau of Communicable Disease (BCD) on selected work related infectious disease investigations. Avian flu, measles, and Legionellosis are a few infectious diseases where OHSS has collaborated with BCD recently. BEOH's Hazard Assessment section likewise responds to local health departments seeking toxicological support for diverse environmental health situations, including chemical spills and indoor air quality issues. Fellows may participate in these site visits, assist with interviews, and help compile and communicate findings.

This work typically represents 5-10% of the fellowship, with periods of intensive investigation followed by quieter intervals. Alternatively, fellows interested in strengthening cluster or outbreak detection may focus on improving early warning capabilities using syndromic surveillance, poison control center data, the Wisconsin Electronic Disease Surveillance System (WEDSS), or similar data sources. Such a project could account for up to 20% of the Fellow's time, depending on the Fellow's interests.