

Environmental Health, Infectious Diseases

Wisconsin Department of Health Services, Division of Public Health

Madison, Wisconsin

Assignment Description

The Fellow will have a unique opportunity to address waterborne disease and other environmental health concerns across multiple programs within the Wisconsin Division of Public Health (DPH). This cross-disciplinary opportunity will provide the Fellow with experience working in environmental surveillance focused on freshwater harmful algal blooms, as well as other communicable disease and environmental health surveillance and evaluation activities.

The Fellow will work with numerous staff having expertise in risk assessment, communicable disease surveillance, and outbreak investigation and response. Within the Bureau of Communicable Diseases (BCD) the Fellow will work directly with the waterborne, foodborne, and enteric disease epidemiology program but will also have opportunities to work with staff who manage other programs including influenza, vectorborne disease, hospital-acquired infections, invasive bacterial disease, rabies and tuberculosis.

The DPH's freshwater harmful algal bloom surveillance program is seated in the Bureau of Environmental and Occupational Health (BEOH), which is located in the same building as the BCD. The BEOH's range of programs includes asthma, environmental public health tracking, occupational health surveillance, Superfund site assessment and consultation, radon assessment and mitigation, and climate effects surveillance. The Fellow will be provided an introduction to all programs within the section, and may contribute to other programs in BEOH.

The personality of both Bureaus is professional and friendly, emphasizing a willingness to share ideas and resources for collaborative activities. Expertise includes epidemiologists, veterinarians, physicians, toxicologists, outreach and education specialists, evaluation specialists, and GIS analysts.

Day-to-Day Activities

During the course of the placement, it is anticipated that the Fellow will spend approximately 40% of his/her time working with the harmful algal blooms program and 40% on other specific environmental health and communicable disease surveillance and evaluation activities. The remaining 20% of the time may be allocated based on the Fellow's specific interests and will be agreed upon by the Fellow and mentors. The Fellow will be assigned physical space in the BEOH and a majority of time there will be spent in the home office. Field work opportunities most commonly occur during outbreak situations. When appropriate, every effort will be made to facilitate the Fellow's participation in on-site assessments or environmental sampling which are conducted as part of an investigation.

Daily activities of the Wisconsin Harmful Algal Blooms Surveillance program (which occur seasonally from May-October) will include reviewing new case data as it arrives, interviewing patients, consulting with Wisconsin Department of Natural Resources staff to determine whether follow-up sampling is appropriate, informing local public health officials about cases and concerns, and consulting with program staff to determine appropriate responses to case reports. The Fellow will also actively report bloom and illness data to CDC's One Health Harmful Algal Bloom System (OHHABS) and clean and standardize existing HAB surveillance data. While there may be circumstances when the Fellow will need to work in the field as part of an investigation or exercise, a majority of the time is spent in the home office. There will also be opportunities to perform outreach activities to increase program awareness.

Daily activities in the BCD, particularly early in the Fellowship, will be related to the Fellow's Legionellosis surveillance system evaluation. With the primary mentor's guidance, the Fellow will also develop an in depth understanding of communicable disease follow-up. While the Fellow's primary duty is not patient interviewing (most interviewing is conducted by the local health department) it will be important that he/she conduct some patient interviews using the existing interview tool to become familiar with the surveillance protocol. The Fellow will also have the opportunity to help conduct interviews during any waterborne outbreak investigations. When the Fellow has become familiar with the surveillance system, he/she will be encouraged to review case reports in real-time to identify clusters of illness and work with the mentor and local health department staff to investigate suspected outbreaks. With progressive gains in expertise, the Fellow will be encouraged to identify additional projects of interest. Finally the Fellow will be expected to attend and participate in bi-weekly communicable disease meetings with the other program areas represented and attend weekly Monday morning conference calls with the Wisconsin State Laboratory of Hygiene.

While there are multiple resources and experts readily available to guide the Fellow's activities, the Fellow is expected to develop a reasonable amount of independence and initiative to identify areas of interest, seek out additional resources as needed, and complete tasks.

Potential Projects

Surveillance Freshwater Harmful Algal Bloom Surveillance Activity

Wisconsin's freshwater Harmful Algal Bloom (HAB) surveillance program seeks to collect, evaluate, analyze, and disseminate data related to the health consequences of HABs in the state. During 2009-2013, Wisconsin received funding from the Centers for Disease Control and Prevention to support HAB surveillance. Program support from CDC has allowed Wisconsin to develop considerable infrastructure for HAB surveillance, including pathways for algae-related illness case reporting and partnerships with the Wisconsin Department of Natural Resources and the Wisconsin State Laboratory of Hygiene. HAB surveillance activities for a Fellow include collecting case reports of humans and animal HAB exposures, evaluating such reports to determine the likelihood that a health-relevant exposure has occurred, coordinating timely and appropriate water sampling with the partner agencies and analyzing, and maintaining and publishing program data to identify and evaluate public health interventions that may help address the problem. Work in this program may include specific surveillance-driven outreach projects related to the needs of local public health officers, veterinarians, recreational swimmers (including triathletes and race organizers), local lake management associations, and others.

Surveillance Legionellosis Surveillance System Evaluation Evaluation

Legionellosis is an infection caused by Legionella bacteria and can range in severity from a mild respiratory illness resembling influenza (Pontiac Fever) to a severe pneumonia with a 30% case fatality rate (Legionnaire's Disease). Legionella bacteria proliferate in warm stagnant water such as those found in most plumbing systems, hot water tanks, evaporative condensers of large air conditioning systems, hot tubs, etc. People can become infected after inhaling droplets of aerosolized water containing Legionella. Most cases of legionellosis occur as single sporadic events; however, outbreaks also occur. About 100 confirmed legionellosis cases are reported in Wisconsin annually.

The current CSTE Waterborne Fellow is conducting a surveillance evaluation of legionellosis through the Wisconsin Electronic Disease Surveillance System (WEDSS). Following the evaluation, BCD epidemiologists will revise and update the case reporting and case investigation forms in WEDSS to improve completeness of data, ensure thorough assessment exposures and risk factors are done, and to increase the ability to detect clusters and outbreaks of legionellosis. One of the new Fellow's activities will be to become familiar with all aspects of legionellosis surveillance in Wisconsin. The Fellow will work closely with BCD epidemiologists on enhanced surveillance and legionellosis cluster/outbreak investigation activities, which involves opportunities to work with staff from BEOH, DATCP, and local health departments. One of the Fellow's projects will be an evaluation of the revised legionellosis case reporting and investigation forms as well as the outbreak investigation module in WEDSS. Currently, the ability to detect clusters of legionellosis cases in WEDSS though

data analysis is very limited, and the outbreak investigation module in the system has never been customized for Legionella investigation, which involves an extensive environmental component.

Major Project Evaluation of Home Inspections and Abatement in Children with Elevated Blood Lead Levels

Children with blood lead levels >10 ug/dL receive a home inspection in Wisconsin to identify potential sources of lead exposure, including drinking water. Identified lead hazards require abatement which can take many months to complete. The objective of this analysis would be to analyze Wisconsin childhood lead poisoning data to describe the number of abatements performed, the time to completion of abatement, and pre-post abatement changes in children's blood lead levels.

Surveillance Expanding Surveillance on Reportable Conditions of Environmental Origin Activity

Under new administrative rules, carbon monoxide (CO) and several occupational lung diseases became reportable conditions in Wisconsin starting in 2017, including those caused by bio-aerosols. Laboratories and healthcare providers are submitting statewide data to DHS which provides a more accurate estimate of the burden of CO poisoning and occupational lung diseases. The fellow will develop and implement approaches to assess and improve data quality, timeliness, and utility. Project findings will help ensure that the new system functions as intended and provides actionable information to guide public health investigations and interventions.

Preparedness Role

The state's emergency preparedness program is located in the Office of Preparedness and Emergency Health Care. This office works closely with staff in the BCD and BEOH and funds staff in many areas of public health. BCD and BEOH staff members regularly collaborate with and participate in preparedness activities and the Fellow will have the opportunity to meet with these staff to learn more about the program, and will be invited to participate in simulations and table-top exercises. If actual events occur, the Fellow will be invited to be an active participant in the response.

Additional Activities

The Fellow will be encouraged, as they become familiar with both the infectious disease and environmental health programs, to seek out projects that they are both interested in pursuing and for which there is a need. In addition to any outbreaks caused by cryptosporidiosis or giardiasis, the Fellow may work on a variety of waterborne outbreak investigations during their fellowship which could be caused by infectious agents such as Legionella, Shiga toxin-producing E. coli, or norovirus. Concerns about wells becoming contaminated from surface spreading with manure has been an area of particular interest in recent years. The current Fellow has been able to work on several multi-agency projects associated with this topic including participating in a manure use working group and tailoring outreach materials for educating homeowners when a well is contaminated.

The presence of cyanotoxins in fish tissue is an emerging public health concern in the Great Lakes basin. The Fellow will have an opportunity to review the current body of literature regarding the accumulation of cyanotoxins in fish muscle tissue. This review may lead to the Fellow developing guidance documents to complement existing recreational exposure outreach materials. The Fellow will be encouraged to create fact sheets to educate Wisconsin anglers about consuming sport fish caught during algal blooms.

Additionally, opportunities may exist to work on projects related to the health impacts of flooding with Wisconsin's Climate and Health program in BEOH. The Climate and Health program seeks to enhance the quality and quantity of data available for evaluating the impact of climate-related effects on health in the state and works to build capacity to address or mitigate these adverse effects. One potential project is assisting with the development of a flood vulnerability index (FVI) to identify geographically vulnerable populations across the state. Additional projects may include analyses and outreach related to vectorborne disease data and other climate-related health indicators.

Mentors

Primary	Rachel Klos DVM, MPH Foodborne/Waterborne Epidemiologist
Secondary	Jonathan Meiman MD Chief Medical Officer for Environmental and Occupational Health