Environmental Health – Waterborne Diseases, Infectious Diseases

Site Name, Bureau/Division
City, State

Assignment Description

The Fellow will have a unique opportunity to address waterborne disease 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 and communicable disease surveillance focusing particularly on waterborne disease and cryptosporidiosis and giardiasis surveillance.

The Fellow will be assigned physical space in the Bureau of Communicable Diseases (BCD) and work with numerous staff having expertise in communicable disease surveillance and outbreak response. Within BCD the Fellow will work directly with the waterborne, foodborne and enteric disease 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 located in the Bureau of Environmental and Occupational Health (BEOH), and is 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 change surveillance. The Fellow will be provided an introduction to all programs within the section, and may contribute to other programs in BEOH, particularly those regarding the licensing of campgrounds, swimming pools and waterparks.

The personality of both Bureaus is professional and friendly, emphasizing a willingness to share ideas and resources for collaborative activities. Expertise includes epidemiologists, veterinarians, toxicologists, outreach and education specialists, evaluation specialists, GIS analysts and staff who focus on regulatory issues related to radiation and food safety.

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 communicable disease waterborne program and 40% with the harmful algal blooms program. 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 sit in the BCD near the primary mentor 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 in the BCD, particularly early in the Fellowship, will be related to the Fellow’s giardiasis surveillance evaluation project. With the 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 cryptosporidiosis 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.

Daily activities of the Wisconsin Harmful Algal Blooms Surveillance program, will include reviewing new
case data as it arrives, 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. There
may be circumstances when the Fellow will need to work in the field as part of an investigation or
exercise; however, a majority of the time is spent in the home office. 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**

**Giardiasis Surveillance Evaluation**

Giardiasis is a parasitic infection associated with non-bloody diarrhea and other symptoms of
gastrointestinal illness. The parasite can be spread in different ways, but water is the most common
method of transmission. The burden of illness associated with giardia infections among Wisconsin
residents is significant. In Wisconsin during 2009–2013 the median annual number of reported cases of
giardiasis was 529.

One of the Fellow’s activities will be to evaluate Wisconsin’s giardiasis surveillance system and
summarize the available surveillance data. The Fellow will use SAS or other statistical software to extract
and analyze existing giardiasis surveillance data maintained in the Wisconsin Electronic Disease
Surveillance System (WEDSS) system. WEDSS data includes patient demographic, clinical and exposure
information and is a robust data set. The evaluation process will help detect limitations to the current
system. By working with the primary mentor and other epidemiologists the Fellow will make
recommendations for updating the surveillance protocols and data collection tool. The Fellow will
prepare a written surveillance evaluation and summary report and will be encouraged to also present
findings in an oral presentation.
Surveillance Activity

Freshwater Harmful Algal Bloom Surveillance

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. From 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, 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.

Cryptosporidiosis Surveillance and Outbreak Investigation

The burden of illness associated with cryptosporidium infections among Wisconsin residents is significant. In Wisconsin during 2009–2013 the median annual number of reported cases of cryptosporidiosis was 688. In Wisconsin, case data are submitted from laboratories and clinicians throughout the state. Patients diagnosed with cryptosporidiosis are interviewed by local public health staff regarding their exposures. The Fellow will become familiar with all aspects of cryptosporidiosis surveillance in Wisconsin during their fellowship and once familiar with the system will review routine surveillance data collected by local health departments in the state. This data is entered into the Wisconsin Electronic Disease Surveillance System (WEDSS) and will be used by the Fellow in conjunction with other software to identify clusters of cryptosporidiosis which may represent outbreaks. The Fellow will work closely with the enteric disease epidemiologists in the Bureau of Communicable Diseases (BCD) on any outbreak investigations involving cryptosporidiosis with the ultimate objective of being able to lead an investigation. In addition to working with epidemiologists in the BCD during outbreak investigations, the Fellow will also have the opportunity to work with staff in the Bureau of Environmental and Occupational Health (BEOH) to gain a solid understanding of the environmental component of the outbreak investigation.

Major Project

Waterborne Disease Toolkit and Resources

Many agencies, in addition to the Division of Public Health, are involved in working to ensure that water in Wisconsin is safe for both drinking and recreating. Furthermore, when problems occur that may impact the safety of our water or outbreaks associated with waterborne exposures occur, the response and investigation also crosses multiple agencies. Under the guidance of the mentors, the Fellow will work to collate existing resources from across these agencies into a single toolkit that can be made available to state and local officials working in multiple agencies. The type of resources include, but are not limited to, fact sheets for the public, guidance for the public during adverse water events, training and educational materials, protocols for environmental inspections and sample collection, investigation manuals for public health officials including templates for letters, line list templates, and outbreak questionnaires. This process will also help identify gaps in existing resource or those that may require revision.
The Fellow will be able to help develop new materials for the public and public health officials. One resource in particular that the Fellow will play an integral role in revising is the Wisconsin Division of Public Health’s “Foodborne and Waterborne Disease Outbreak Investigation Manual”. This project will afford the Fellow opportunities to become well versed in the multitude of water related issues that public health officials encounter including both infectious and non-infectious illnesses that can be associated with ambient water in our lakes and rivers, treated recreational water venues, private wells, public drinking water systems, and built environment water features.

**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 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.

**Mentors**

**Primary**

Rachel Klos, DVM, MPH  
Foodborne/Waterborne Epidemiologist

**Secondary**

Henry Anderson, MD  
Chief Medical Officer for Environmental Health