

## Environmental Health- Waterborne Diseases

### Assignment Description:

The Wisconsin Division of Public Health is delighted to propose a cross-disciplinary fellowship opportunity focused on waterborne disease and hazard surveillance and outbreak detection. The Fellow will have the unique opportunity to focus on waterborne disease epidemiology with two programs representing the communicable disease and environmental health realms. The Fellow will be seated and have primary mentoring in the Bureau of Communicable Diseases and Emergency Response (BCDER).

#### A. Freshwater Harmful Algal Bloom Surveillance (Environmental Health):

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. Wisconsin is one of only two inland states with Centers for Disease Control and Prevention funding to support HAB surveillance. Within this program, anticipated activities of 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 Wisconsin Department of Natural Resources, 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.

#### B. Cryptosporidiosis and Enteric Diseases (Communicable Diseases):

Cryptosporidiosis is a parasitic infection often associated with frequent, non-bloody diarrhea and other symptoms of gastrointestinal illness that is caused by the protozoan *Cryptosporidium*. The burden of illness associated with *Cryptosporidium* infections among Wisconsin residents is significant. In Wisconsin during 2003–2010 the median annual number of reported cases of cryptosporidiosis was 572 and the incidence rate per 100,000 population ranged from 7.8 to 17.4 which greatly exceeds the national reported rate of 1.2–3.9 cases per 100,000. In Wisconsin, case data are submitted from laboratories and clinicians throughout the state. Patients diagnosed with cryptosporidiosis are interviewed by a local or state public health staff regarding their exposures.

Because of the large burden of cryptosporidiosis associated with water-related transmission, one of the Fellow's important activities will be to evaluate Wisconsin's cryptosporidiosis surveillance system. The Fellow will use SAS or other statistical software to extract and analyze existing cryptosporidiosis surveillance data maintained in the Wisconsin Electronic Disease Surveillance System (WEDSS) system. WEDSS data includes patient demographic, clinical and exposure information. The evaluation process will help detect limitations to the current system. By working with the primary mentor and other epidemiologists the Fellow will develop updated surveillance protocols to enhance detection and response to suspected waterborne outbreaks. The Fellow will prepare written surveillance reports and will be encouraged to present findings in an oral presentation, as a written report for publication or, ideally, both.

#### C. Additional Opportunities:

As opportunities arise, the Fellow will be invited to participate in field experiences such as site visits for environmental sampling, preparedness exercises, other emergency situation

simulations and outbreak investigations. The Fellow is strongly encouraged to present and publish results from surveillance or research activities. The mentors work with the Fellow to identify such opportunities and provide support, such as funds for travel to local conferences and workshop. Additionally, both mentors work with researchers at the University's Department of Population Health Sciences and can facilitate collaborations between the Fellow and these experts.

#### 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.

As previously mentioned the Fellow will sit in the BCDER 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 BCDER, particularly early in the Fellowship, will be related to the Fellow's cryptosporidiosis surveillance 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 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 WI DNR 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 will 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:

While working with the primary BCDER mentor the Fellow will have numerous opportunities to fulfill fellowship core competencies and develop analytic skills. In addition to the surveillance project the Fellow will have the opportunity to work on and eventually lead outbreak investigations. During 2012, four waterborne disease outbreaks, (2 norovirus, 1 E. coli O157:H7, 1 Legionella) were investigated and the Fellow will be expected to participate in the investigations of any waterborne outbreaks that occur. The Fellow, under the guidance of an experienced epidemiologist, would play a lead role in the state's component of the investigation which typically includes close collaboration with the local health

authority, development of an interview tool, development of and data-entry into an outbreak database, data analysis, coordinating collection of clinical and environmental specimens for appropriate laboratory analysis and making recommendations and summarizing the outbreak in a written report. In the addition the Fellow will be encouraged to lead at least one foodborne outbreak investigation. Additional opportunities for BCDER projects that the Fellow could consider include development of compressive written cryptosporidiosis control guidelines that would be available to LHD staff throughout Wisconsin and summarizing and evaluation of the giardiasis surveillance system. Depending on receipt of additional funding for the WSLH, the Fellow may have the opportunity to work with new cryptosporidiosis genotyping and subtyping data.

The Wisconsin Harmful Algal Blooms Surveillance program has established partnerships with multiple state and local agencies, including the Wisconsin Department of Natural Resources, Wisconsin Lakes, the State Laboratory of Hygiene and local lakes associations. Partner priorities that may constitute primary projects for the Fellow include linking water quality parameters to human health events, analyzing nutrient loading and occurrence of cyanobacteria blooms; developing state-based guidance on recreational water exposure to cyanobacteria; and piloting harmful algal bloom indicators for the Wisconsin Environmental Public Health Tracking program's climate change module.

**Preparedness Role:**

The state's emergency preparedness program is within BCDER and funds staff in many areas of public health. BCDER and BEOH staff regularly collaborates 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.

Assignment Location: Madison, Wisconsin

Primary Mentor: Rachel Klos, DVM, MPH  
Foodborne/Waterborne Epidemiologist  
Wisconsin Division of Public Health

Secondary Mentor: Henry Anderson, MD  
State Health Officer and Chief Medical Officer, Environmental Health  
Wisconsin Division of Public Health