Environmental Health- Waterborne

Assignment Description:

Michigan has over 11,000 inland lakes, 36,000 miles of streams, 3000 miles of freshwater shoreline and is the only state completely within the Great Lakes basin. There are over 22 million annual visitors to state parks and recreational areas. According to a Michigan Department of Environmental Quality (MDEQ) report, 209 water samples from 430 beaches exceeded water quality standards during six months of 2010. Confirmed outbreaks of Cryptosporidium in 2008 and 2011, associated with a community pool and a firefighting response to a barn fire, sickened 10 and 20 persons, respectively. In 2010, over 100 norovirus cases were identified in five outbreaks associated with recreational "splash pads" and beaches. In this position, the Fellow will be working primarily on waterborne disease surveillance and epidemiology, with access to multiple databases in MDCH including communicable disease reports, in-patient hospitalizations, the state's syndromic surveillance system based on emergency department chief complaint data, and poison control data sets.

Existing communicable disease and other data sources provide an opportunity to conduct a surveillance system evaluation and then to design one or more analytical projects. There will also be opportunities to explore new and emerging public health data systems and technologies for their utility in waterborne disease illness prevention. Potential projects are discussed below.

Day-to-Day Activities:

Activities will be dictated by the Fellow's goals and interests, but will typically focus on desk work at the office, field work, meetings and consultations. On a daily basis, the Fellow will learn to understand and use data sets of varying size and complexity, edit data and maintain quality control, and manage projects. He/she will participate in the design of studies, data collection, analysis and interpretation of results, and in their dissemination. The Fellow will be involved in a variety of communicable disease outbreaks, with a particular emphasis on those that are waterborne.

The Fellow will have opportunities to participate in other activities as time and interest permits, including other types of field investigations such as sewer and water inspections at a local health department. The Fellow will also have opportunities to participate in public health emergency preparedness planning, drills and exercises. He/she will be encouraged to develop professionally through seminars, professional meetings and trainings as described in Section C, "Support Structure".

Potential Projects:

MDCH has many data and other resources so that the fellow will have significant flexibility in choosing activities to further develop applied epidemiology competencies. The specific projects noted below are examples of things that can be done with actual projects based on the Fellow's specific interests. Further learning opportunities are available through MDCH and university-based epidemiology seminars and various conferences that the fellow will be encouraged to attend. The BoE has close collaborations between all three state universities in applied public health epidemiology projects.

Michigan's communicable disease and environmental health surveillance systems that are available to examine waterborne disease and illness include: laboratory reporting of communicable diseases; health care provider and facility reports of acute pesticide illness and injury, surveillance of harmful algal blooms, and other data sources such as hospital discharge data. Collectively, these systems have extensive demographic, medical and exposure data on numerous cases reported by providers and laboratories to these surveillance systems. Annual reports, special projects, and research studies are

carried out using many these data, most of which have data going back for many years, and have information from each individual case reports. In addition to analytical opportunities based on these data sets, the Fellow may accompany staff on site visits to collaborate on data collection, analysis and the development of educational interventions based on analytic findings. The following are potential Fellow projects related to these case-based public health surveillance systems:

- Perform a surveillance system evaluation for one of the existing systems in relation to waterborne disease illnesses, using the CDC surveillance system evaluation guidelines.
- Identify local environmental health (EH) practices related to beach water quality testing and beach closure criteria by surveying EH staff in local health departments to develop consistent approaches to public health recommendations on beach closure and re-openings..
- The Great Lakes Biomonitoring Project evaluates body burden levels of persistent bioaccumulative toxic substances in shore-line anglers living in the Detroit River and Saginaw Bay areas of concern who regularly consume local-caught fish from these waters. MDCH will use venue-based sampling to identify eligible participants and will collect blood and urine samples for analysis of levels of persistent bioaccumulative toxic substances. The Fellow may help MDCH project staff administer and analyze a questionnaire to gather details about local-caught fish consumption, the frequency and duration of their fish consumption, life style factors, current occupation, and demographic information.
- Map vulnerabilities to flooding and contamination in partnership with BoE climate change program staff. The data collected from the study would be used for disaster planning purposes.

Opportunities also exist for development of new public health surveillance systems. For example, there is the possibility to develop for surveillance for diseases/injuries from contamination of water bodies with non-infectious agents. The MDCH Division of Environmental Health has been reporting outbreaks and single cases of illness/injury associated with exposure to non-infectious agents in water since 2009 to CDC through the National Outbreak Reporting System (NORS). These are identified by the MDCH pesticides surveillance system from poison control center and hospital discharge data. Most have been related to application of pool disinfection products, although of the six reported cases in 2011, one was from exposure to a copper sulfate application (to control weeds) in a lake. There is a need to expand the surveillance system using multiple data sources to obtain case reports exposures to chemicals in bodies of water in Michigan beyond those detected by the existing pesticides surveillance system. This new surveillance system would be developed using multiple data sources. For example: (1) Special queries to detect water-related chemical poisonings could be established through the poison center (MDCH has direct access to the poison control center data base) and in Michigan's syndromic surveillance system. (2) MDCH has the regulations in place to require health care providers and health agencies to report these kinds of acute poisonings/injuries; MDCH can take actions to remind providers/agencies of these requirements and has the authority under these regulations to request hospital and ED medical records of cases. (3) By establishing working relationships with other agencies that receive reports of potential illness and exposures in Michigan water bodies, including the Department of Environmental Quality and Department of Agriculture and Rural Development, and local health departments, additional case reports are likely to be obtained. This project would give the Fellow an opportunity to develop and implement a new surveillance system based on multiple data sources, and then work with partners and stakeholders in developing public health interventions related to surveillance findings.

Although MDCH does not have a complete Emergency Department (ED) data set, MDCH has established a syndromic surveillance system, based on 11,000 real-time data feeds from 85 of the EDs in Michigan, using chief complaints data to identify aberrations in ED visit frequency primarily related to syndromes likely to indicate infectious disease outbreaks. The system captures approximately 90 percent of the ED

traffic in the state. This system has the capability of being programmed to customize the detection of other problems identified in chief complaints, and thus, there are opportunities to develop new detection algorithms, including those for occupational injuries, for example.

Preparedness Role:

The Fellow will participate in trainings and exercises, through the BoE and the MDCH Office of Public Health Preparedness. This may involve communicable disease, chemical, natural disaster, and radiological events. If a real emergency event takes place in communicable disease or environmental health, the Fellow will be assigned an epidemiology function within the Incident Command Structure. (Note: one of the previous Fellows spent three weeks in a Command Center under EPA direction following a large oil spill in Michigan.) All of MDCH's EIS and CSTE Fellows and other CDC assignees participated in Michigan's first implementation of a Community Assessment for Public Health Emergency Response (CASPER) during September, 2012, which involved door-to-door surveys using CASPER methodology. MDCH plans to perform at least one CASPER in 2013, which will give the Fellow another opportunity to be directly involved with a Preparedness activity.

Assignment Location:	Lansing, MI
Primary Mentor:	Jevon McFadden, MD, MPH Medical Epidemiologist/CDC Career Epidemiology Field Officer Michigan Department of Community Health
Secondary Mentor:	Mary Grace Stobierski, DVM, MPH State Public Health Veterinarian/Section Manager for Zoonotic Diseases & Special Projects Michigan Department of Community Health