**Infectious Diseases, Environmental Health**

**Michigan Department of Health and Human Services, Emerging and Zoonotic Infectious Disease Section**

Lansing, Michigan

**Assignment Description**

The Michigan Infectious Disease Fellow would have a truly unique opportunity to act as a member of Michigan’s infectious disease epidemiology team, with special emphasis on zoonotic, vectorborne, waterborne, and emerging infectious disease opportunities. The Fellow will work closely with mentors Dr. Mary Grace Stobierski and Dr. Susan Peters in the Emerging and Zoonotic Infectious Diseases (EZID) Section of the Bureau of Infectious Disease Prevention, as well as other members of the Section. The mentors will oversee the training, research, and field activities of the Fellow, ensure that the Fellow is familiar with the processes and responsibilities of the Section, and encourage the overall professional development of the Fellow.

The Fellow will be involved in all aspects of the work of the section, including reportable disease surveillance, outbreak response, educational outreach, interagency collaborations, and response planning. Outbreak investigations may require working in multi-disciplinary teams. The EZID Section works closely with local public health staff, as well as state partners at the Departments of Agriculture and Rural Development; Environment, Great Lakes, and Energy; and Natural Resources, and federal partners including the CDC, EPA, NOAA, and USDA’s Veterinary Services and Wildlife Services Divisions. The fellow will also be involved in intra-agency waterborne work that is highly integrated with the MDHHS Division of Environmental Health within the Bureau of Epidemiology and Population Health.

Recent investigations or surveillance projects that Fellows within the Section have been involved with include: enhanced surveillance of Histoplasmosis infections, development and analysis of rabies post-exposure prophylaxis reporting protocols, a cluster of tularemia infections in falconers, Shiga-toxin producing E. coli infections associated with a local petting farm, multi-state Salmonella outbreak associated with contact with live poultry, transfusion-associated Babesiosis, outbreak of human H3N2 variant influenza associated with contact with swine at agricultural fairs, Mycobacterium tuberculosis infection in research macaques, ongoing emergence of Lyme disease in Michigan, and the first case of plague in Michigan with exposure in an endemic area of Colorado. In addition, the EZID Section has recently expanded its waterborne disease epidemiologic capacity and is eager to involve a Fellow in that work.

While this host site application includes a major project suggestion, once the Fellow is acquainted with the activities of the EZID Section, they may choose to develop an alternate project based on their interests as well as the current activities and needs of the EZID Section. In addition to a major project, MDHHS will support the candidate’s completion of the required activities related to this CSTE Fellowship, including a surveillance system evaluation. Previous fellows have completed their required activities well ahead of schedule. The CSTE Fellow will have the opportunity to support acute outbreak investigations requiring immediate public health response, under the guidance of the lead epidemiologist. This may include working first-hand with the CDC, federal, state, and local regulatory
partners on local and multi-state investigations. The Fellow will learn how to communicate effectively about health risk and utilize those skills to develop and disseminate messages for a variety of audiences.

The EZID Section also provides unique opportunities for the Fellow to meet core requirements. The Fellow will be trained to develop and edit content for Michigan’s Emerging Diseases website. The Fellow will participate in organizing and developing content for EZID’s One Health webinars provided to public health partners in Michigan. The Fellow will also attend and have the opportunity to present at the annual statewide Communicable Disease Conference; the target audience includes all Local Health Departments, as well as infection control practitioners and clinical laboratory directors from health care systems and nursing homes. Our previous Fellows have had the opportunity to present their work at this and other statewide meetings. The Fellow will be encouraged to seek out educational and training opportunities, as funding and resources allow. Fellows at our agency have traditionally participated in fieldwork for Lyme disease surveillance, including tick dragging and mammal trapping. The Fellow will also get an introduction to mosquito surveillance for the vectors of West Nile, Eastern Equine Encephalitis, and Zika viruses through our ongoing community mosquito surveillance project with select local health departments.

**Day-to-Day Activities**

- Assist in surveillance, outbreak investigations, and data analysis for zoonotic, vectorborne, and waterborne diseases in Michigan.
- Participate in regularly scheduled meetings within the EZID Section, Bureau, and Department.
- Participate in existing state-level working groups and discussions on topics of zoonotic and waterborne diseases, including the Michigan Arbovirus Working Group, and the Michigan Rabies Working Group, the monthly Michigan One Health conference call, the Michigan Harmful Algal Bloom Interagency Working Group, and the Michigan Microbial Source Tracking Group.
- Attend local, state, and national level meetings on topics including public health, epidemiology, infectious disease, and environmental health.
- Assist with field investigations and outreach MDHHS may undertake to better understand the epidemiology and prevention of zoonotic, vectorborne, and waterborne diseases in Michigan.
- Develop the knowledge and skills necessary to field calls and questions from the public and other stakeholders on zoonotic, vectorborne, and waterborne disease topics.

**Potential Projects**

**Surveillance Activity**  **Impact of High Rain Events on Rates of Gastrointestinal Illness**

Previous studies have linked increased emergency room visits due to gastrointestinal illness to preceding rain events. This connection has not been well studied in Michigan. The Fellow would evaluate the existing literature surrounding this topic and conduct an analysis to explore this phenomenon in Michigan. The Fellow would gather data from the Michigan Syndromic Surveillance System (emergency room visits), the Michigan Disease Surveillance System (lab-confirmed reportable GI illnesses), and precipitation/high rain events and analyze them on a regional and county level to identify any relationships and seasonal variation.
Surveillance Evaluation Evaluation of Cryptosporidiosis Cases Reported to the Michigan Disease Surveillance System

The Michigan Disease Surveillance System is the statewide surveillance system used to report infectious diseases in Michigan, including cryptosporidium. However, cryptosporidium reports have not been analyzed at a statewide level to assess long-term trends, geographic distribution, potential transmission sources, and adherence to case definitions. In addition, no systemic evaluation of the quality and completeness of cryptosporidium reports has been done. This analysis will lay the foundation for future MDHHS work on cryptosporidiosis, including potentially informing environmental sampling of private drinking wells for Cryptosporidium.

Major Project Harmful Algal Bloom Program Expansions and Enhancements

The MDHHS EZID Section has recently received funding to support public health responses to harmful algal blooms (HABs), which are an increasing public health concern for freshwater recreation sites and drinking water sources in Michigan and the United States. While MDHHS has been responding to HABs for several years, many aspects of a comprehensive response strategy and plan are still being developed. This project would support and improve multiple aspects of MDHHS’s HAB program, including updates to local health department toolkits, creating reports, working with staff on a new public-facing mapping project, developing educational materials, assisting with education and outreach efforts, and other items as identified. The fellow would also be involved in efforts to improve surveillance for human and animal HAB-related illnesses, including health care provider outreach and establishing a partnership with Poison Control.

Additional Project Disease Vectors and Invasive Mosquito Species

The MDHHS EZID Section works with its local health department partners to monitor mosquito-borne disease in select areas of the state. In 2017 and 2018, two separate introductions of invasive mosquitoes capable of transmitting tropical arboviruses occurred through the tire trade. Working with the Michigan Department of Environmental Quality, local health departments, and academic partners, the EZID Section would like to improve surveillance and control of mosquitoes in certain tire distributing environments to protect the public health. This project would focus on educating businesses that are currently not required to conduct mosquito control by promoting a community focused integrated mosquito management program through the development of educational materials, webinars (YouTube videos), and potentially assisting with the drafting of proposed environmental regulations.

Additional Project Evaluation of Zoonotic Disease Prevention Tools

The National Association of State Public Health Veterinarians (NASPHV) has developed the Compendium of Measures to Prevent Disease Associated with Animals in Public Settings, a guidance document for public health and venue operators on decreasing zoonotic disease transmission to people. There are a variety of health risks associated with these settings, but most serious are those involving potential exposure to dangerous pathogens such as Shiga-toxin producing E. coli. Despite this guidance, outbreaks associated with these settings continue to occur and challenge public health authorities. There is interest among public health authorities in Michigan to improve the tools available to investigate these outbreaks, to learn more about which aspects and activities present the greatest risk, and to improve the public’s compliance with public health prevention messages. The Fellow would evaluate the
document, compare it to current Michigan efforts and regulations, and propose and rank the feasibility of future actions recommended by the Compendium.

**Preparedness Role**

Michigan has an established Bureau of EMS, Trauma, and Preparedness (BETP), which has drawn staff from both the epidemiology and laboratory programs of the health department and thus maintains close ties with both of these programs. The Fellow would have many opportunities to participate in trainings, tabletop exercises, discussions, and projects with this Bureau. Among these would be:

**Incident Command Training:**

The availability and completion of Incident Command System training for better integration with the National Incident Management System structure employed throughout Michigan's public health community in response to emergent public health issues. This structure is mandated for incident response at the federal, state, and local levels.

**Bioterrorism Education:**

The Fellow would also be encouraged to take advantage of the many Bioterrorism Preparedness education opportunities and regional exercises offered through a variety of sources, including the MI-TRAIN portal (https://mi.train.org), a learning resource for professionals who protect the public's health.

**Additional Activities**

The CSTE Fellow can choose among several focused areas to tailor experiences leading to advanced skills in applied epidemiology, as well as policy and program development. The Fellow, together with both mentors, will be able to choose a project suited to the background of the Fellow and current needs of the Bureau. Past projects have included developing and distributing education materials about Lyme disease targeted to healthcare providers and assessing their effectiveness, a KAP survey of veterinarians in Michigan regarding Leptospirosis, collaboration with Michigan State University researchers conducting field research on the ecology of Lyme disease in Michigan, and development of the Michigan Beg Bug Manual, to name a few. MDHHS has been collaborating with partners at Michigan State University on an ongoing Lyme Disease project; this project has provided previous Fellows with valuable field experience, an opportunity to contribute to a meaningful epidemiologic investigation, understanding of the relationships between infectious diseases and environmental health, as well as means to meet some of their Fellowship objectives.

**Mentors**

**Primary**

Mary Grace Stobierski DVM, MPH, DACVPM

Emerging & Zoonotic Infectious Diseases Manager; State Public Health Veterinarian

**Secondary**

Susan Peters DVM, MPH

Waterborne Disease Epidemiologist