

Environmental Health

Assignment Description

The Fellow will be based in the Epidemiology and Surveillance Section of the Division of Environmental Health (DEH). Because of the collaborative structure of the Bureau of Epidemiology (BoE), the Fellow can readily get access and assistance in using data systems managed by other sections such as the Divisions of Genomics, Perinatal Health and Chronic Disease Epidemiology and Communicable Disease. Please visit our website at www.michigan.gov/epi. Environmental health issues can be associated with air and water quality, and, due to this, we have built and nurtured collaborations with state of Michigan programs outside of the BoE. The Fellow will have the opportunity to work with specialists in the Michigan Department of Natural Resources and Environment (MDNRE) air quality and water quality divisions and access specific specialized data sets, which are described in subsequent sections.

Day-to-Day Activities

The Fellow will have the opportunity to participate in a wide variety of applied epidemiologic activities in collaboration with knowledgeable and experienced scientists. Activities will be guided by the specific interests and career goals of the Fellow, and will include research and analysis in their office, with periodic fieldwork (depending on interests), meetings to discuss current projects, and consultations with experts. On a daily basis, the Fellow will learn to use data sets of varying size and complexity, including linkage of data sets, editing and maintaining quality control, and managing projects. He/she will participate in the design of studies, data collection, and analysis, interpretation, and dissemination of results. Academic collaborations exist with experts from the Michigan State University Departments of Epidemiology (MSU Epi) and Environmental and Occupational Medicine (MSU EOM), the University of Michigan School of Public Health, Departments of Epidemiology and Environmental Health (UM SPH), and the University of Michigan Medical School, Division of General Pediatrics, that afford the opportunity to engage in high quality scientific research. The Bureau also works closely with the MDNRE Air Quality Division on projects related to air pollutant exposure and health effects, including asthma and adverse birth outcomes. The Fellow is welcome to participate in other BoE activities as time and interest permits, including communicable disease, such as disease outbreaks, and environmental field investigations, such as mercury spills in homes or businesses or assessments of in-home air quality. He/she will be encouraged to develop professionally through departmental and university seminars, professional meetings, and trainings. DEH prospers in a collegial atmosphere and the Fellow would be working with intelligent and often humorous colleagues that are compassionate about their programs.

Potential Projects

This position provides the CSTE Fellow the opportunity to pursue a wide range of topics under the broad area of Environmental Epidemiology. Program areas, which are all available to the Fellow, are described below:

1. As part of our new CDC-funded program for addressing the public health effects of climate change, the Fellow could explore the relationship of temperature and other weather parameters on a variety of communicable diseases.
2. The Climate Change program will be working with local health departments throughout Michigan to develop and test tools for assessing vulnerabilities and planning for health impacts of extreme weather events in their communities. The Fellow would have the opportunity to gain experience in applied local public health by providing epidemiological support to local health department vulnerability and health impact assessment activities.

3. DEH currently generates Council of State and Territorial Epidemiologists (CSTE) State Injury, Occupational Health, Environmental Health (EH), and Climate Change Indicators. EH indicators are descriptive summary measures, written to be easy to understand and straightforward to calculate from existing environmental health data sources, can improve environmental health practice by improving the accessibility, availability and distribution of information for decision-making, and can facilitate appropriate allocation of resources by public health practitioners (CSTE 2010; Centers for Disease Control and Prevention, (CDC) 2010). DEH staff are active participants in the CTSE State Environmental Health Indicators Collaborative (SEHIC) and as such are working on developing and pilot testing some EH indicators including the climate change indicators. The development of climate change indicators is following the lead of the EH and other indicators developed previously. Ongoing surveillance of changes in climatic conditions and health effects from these changes are important to determine current impacts and estimate future impacts of climate change on human health and to develop and implement climate change adaptation strategies. When completed, climate change indicators will be used to assess the human health status of a population, the environmental health status of a specific area (such as a state), and, for a few indicators, the interaction between human health and the environment. For each indicator, baseline status, trends, and program goals and objectives can be tracked. The Fellow could select climate change indicators of interest and complete these indicators in collaboration with DEH and SEHIC. An important component of this project would be to improve the indicator by offering feedback to DEH and SEHIC.

4. The MDCH Asthma Control and Prevention Program (ACP) is a national leader in asthma surveillance and epidemiology. ACP conducts surveillance on asthma prevalence, quality of life for people with asthma, asthma management, indicators of asthma control, the quality of health care received, and the severe outcomes related to asthma, such as hospitalizations and death. In the spring 2010, the state of Michigan enacted a law that prohibited smoking in all public places; ACP staff are interested in looking at the effect of this law on asthma-related health outcomes, such as hospitalizations and emergency department (ED) visits for asthma. The Fellow could fully participate in this assessment, which will include analyses of asthma hospitalizations and ED visits before and after the law. The Fellow could also contribute to the ACP surveillance system, including yearly analyses of mortality, Medicaid claims, inpatient (hospitalization), ED, and pharmacy data. The Fellow could conduct an evaluation of a surveillance system component, such as use of Medicaid or the Asthma Mortality Review Project (AMRP). The AMRP panel reviews all adult and childhood deaths in Michigan from asthma, using interviews of family members, chart reviews, and assessment of death records. Additionally, ACP has been participating in the Behavioral Risk Factor Surveillance System (BRFSS) Asthma Call-Back Survey since 2005 and has extensive data on self-reported asthma control and exposure to asthma triggers that could be available for special analysis.

5. The DEH maintains surveillance systems based on mandatory reporting requirements for laboratory detection of mercury, arsenic, and cadmium in human blood and urine samples and, in collaboration with MSU EOM, has surveillance systems based on mandatory reports from health care providers and facilities for acute pesticide illness and injury, carbon monoxide (CO) poisoning, work-related amputations, and occupational diseases. MSU EOM also maintains the adult blood lead registry, which includes adults with both occupational and non-occupational elevated blood lead levels. DEH also works closely with the Michigan Poison Control Center and has access to all poisoning reports in their data base. Reporting of all chemical poisonings is mandatory, but MDCH currently only collects reports on selected types of poisoning (e.g. CO poisoning and acute pesticide illness/injury). However, at any time MDCH has the authority to request other types of poisonings. Annual reports, special projects, and research studies are carried out using these data sources, many of which have data going back 10 or

more years and have information from each individual case report, including contact information. The following are potential Fellow projects related to poisoning surveillance: A) Identify an additional significant source, risk factor, or vulnerability for poisoning that is of interest to the Fellow but not included in the current DEH surveillance activities. The Fellow would develop the surveillance protocol, obtain Institutional Review Board (IRB; human subjects protection) review, and implement the surveillance of the additional poisoning. This would provide experience in all aspects of surveillance system development and implementation. B) Conduct a follow-up study of hospitalized carbon monoxide cases to identify root causes of exposure; the data collected from the study would be analyzed to develop interventions and/or policy recommendations. C) Develop and implement a survey of non-occupational pesticide illness and injury case reports to collect additional information that will be used to inform the development of interventions to reduce these exposures. (Currently we only collect follow-up telephone interviews with individuals who had occupational pesticide poisoning.). D) Develop and implement a study to determine the reasons why physicians order heavy metals screening tests for their patients, most of which appear to be unnecessary (based on DEH surveillance data); these results would be used to develop recommendations for health care providers.

6. Our U.S. Department of Housing and Urban Development (HUD) Healthy Homes Asthma and Injury Hazards Intervention Demonstration Project involves in-home indoor air quality (IAQ) assessments, questionnaires, and asthma trigger interventions at baseline and three, six, and 12 months in 200 homes. The project staff members are currently collecting questionnaire data from participating households, and, at the end of the current calendar year (CY 2010), staff will analyze questionnaire data from the first two years of the project. In addition, a pilot project is being conducted in which dust samples are collected and tested at the baseline and 12 month home visits in 50 of the 200 participating households. These data will also be analyzed following CY 2010. The Fellow could assist in the analysis of the completed questionnaire and dust sampling data and/or assist in the collection, preparation, and analysis of data from participants.

7. A project team, including members from DEH, UM SPH, MSU Epi., and MDNRE, are currently conducting spatial and temporal analyses to determine the effects of exposure to specific air pollutants and proximity to and density of traffic on occurrences of asthma urgent care utilization in the pediatric Medicaid population in Detroit. Many of the planned analyses have been completed, including descriptive analyses of the health outcome and exposure data sets, assessments of correlations between roadway exposures and measured air pollutant levels, and modeling of the effects of both roadway and measured air pollutant exposures on asthma exacerbation. However, many important analyses have not yet been completed including analysis of specific subgroups and specific geographical areas in an effort to assess health disparities. This project team also assessed the relationships between exposure to specific air pollutants and occurrences of adverse birth outcomes in Detroit. The team conducted analyses of low birth weight, pre-term births, and births with intrauterine growth retardation (IGR); however, additional specific analyses that are of interest to the team were not yet completed. The Fellow could join our project team and examine the effects of exposure to a specific air pollutant on a health outcome, such as asthma exacerbation or births with IGR.

8. Opportunities are available for the Fellow to participate in communicable disease or environmental field investigations, as time and interest permits.

Preparedness Role

The Fellow is encouraged to participate in trainings and exercises through the DEH Chemical Terrorism and Emergency Preparedness Section, which provides support to the MDCH Office of Public Health Preparedness for chemical and radiological events.

Assignment Location: Lansing, Michigan

Primary Mentor: Robert Wahl, DVM, MS
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Secondary Mentor: Lorraine Cameron, PhD, MPH
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