Infectious Diseases, Environmental Health
West Virginia Department of Health and Human Resources (WVDHHR), Division of Infectious Disease Epidemiology
Charleston, West Virginia

Assignment Description
The Fellow will work under the supervision of the ZD Epidemiologist in DIDE and the CEFO in OEHS on a variety of public health projects encompassing field investigations; surveillance evaluations; trainings; and data analysis and feedback of surveillance data. The Fellow will be added to the sZD Program which currently includes the ZD Epidemiologist, State Public Health Entomologist, and ZD Data Analyst.

The mission of DIDE is to "manage communicable disease threats through technical assistance, investigations, education and prevention" through surveillance, outbreak response, and training. DIDE staff are responsible for covering 24/7/365 on-call consultations, conducting surveillance for reportable infectious disease conditions, and providing training to public health stakeholders on infectious disease topics. DIDE program areas include ZD, viral hepatitis, vaccine-preventable diseases, healthcare associated infections, surveillance, and outbreaks.

OEHS consists of a variety programs including public health sanitation, environmental engineering, and radiation, toxics, and indoor air. OEHS covers public health issues related to water, air, food, chemicals, pests, and wastes. The Fellow activities in OEHS will focus on analysis of historical environmental data as they relate to adverse health outcomes in West Virginia residents.
**Day-to-Day Activities**

While the Fellow's primary responsibilities will fall within DIDE, the Fellow may be called upon to participate in other public health projects within OEPS and OEHS, and WVBPH as a whole. The Fellow will rotate with other epidemiologists in DIDE to cover outbreak response duties (approximately 1-2 months/year) and emergency on-call consultation (2-3 days/month, six months after starting the appointment). This will give the Fellow experience in managing infectious disease outbreaks in healthcare and community settings experience and in responding to public inquiries. Outbreak investigations will give the Fellow practical hands-on experience through epidemiologic studies, field investigations, and intervention. He/she will be expected to make at least one site visit to an outbreak-affected facility and generate a report of findings and outbreak intervention recommendations.

The primary responsibilities of the Fellow will be driven by the projects he/she undertakes (see Project Description section). However, the Fellow's assignment also offers exposure to other activities occurring in DIDE and more broadly within the WVBPH. Weekly DIDE meetings allow for idea exchange, surveillance updates, professional development and review of consultations. DIDE staff meet with the Office of Laboratory Services monthly, with OEHS bi-monthly, and the ZD Taskforce quarterly. Recently developed from a previous journal club format was the WVBPH Professional Development group. This group meets monthly allowing the Fellow to learn about the variety of public health activities and initiatives happening within WVBPH on topics such as chronic disease, maternal and child health, and behavioral health.

The Fellow will also be expected to assist in developing material for public health trainings (e.g. tickborne disease surveillance training) offered to local health department staff and other public health partners over the two-year period.

All epidemiologists and trainees within WVBPH are encouraged to attend both local and national conferences and training opportunities as they become available. Our previous CSTE HAI Fellow was able to attend the SHEA Spring 2013 conference, ArcGIS training at West Virginia University (Summer 2013), state chapter meetings and annual conferences for APIC, the 2013 Convocation of Southern State Epidemiologists (CSSE), the annual ELC HAI Grantee’s meetings, annual WV Public Health Symposia, the annual WV Public Health Association conferences, the 2014 CSTE Conference, as well as a variety of other trainings offered by OEPS and the WV Center for Threat Preparedness.
Potential Projects

Surveillance Activity National Scout Jamboree Public Health Surveillance

The Summit Bechtel Reserve near West Virginia's New River Gorge National River became the new host site for the National Boy Scout Jamboree (NSJ) in 2013. NSJ is a 10-day mass gathering in which Boy Scouts of America and others participate in high adventure activities including zip-lining, BMX biking, and shooting sports. For the inaugural event, an estimated 200,000 scouts, troop leaders, and visitors descended on West Virginia, and a state of emergency was declared in nine counties in the region. It was considered the largest mass gathering to have occurred in the state’s history.

State public health response planning for the 2013 NSJ was coordinated by the Influenza Coordinator and the then CSTE Fellow in DIDE. Six response teams were created: on-site surveillance; off-site surveillance; public information and health promotion; scout health screening; electronic medical record surveillance; and logistics. Several stakeholders were engaged in planning and implementation stages for the NSJ public health response including local health, academia (West Virginia University GIS Technical Center), and other state offices and centers (Center for Threat Preparedness, Office of Laboratory Services and OEHS).

The Fellow is anticipated to work with the Influenza Coordinator and the primary and secondary mentors to plan the public health response for the upcoming NSJ scheduled to occur in July 2017 using recommendations generated from the 2013 NSJ public health response after-action report. Duties of the Fellow may include but are not limited to:

* coordinating recruitment of public health workers to response teams
* serving as a liaison between public health and key stakeholders
* creating databases for collection of health and GIS data
* developing forms (electronic or paper) needed for data collection (e.g. tick collection, active/passive surveillance forms)
* analyzing data and generating descriptive reports
* participating in “boots on the ground” surveillance as a member of the on-site surveillance team.
Surveillance Evaluation Evaluation of West Virginia's Animal Bites Surveillance System

Animal bites are reportable to the local health department within 24 hours in an effort to reduce the risk of rabies to zero through rapid reporting. Every year, an estimated 2,400 to 2,700 animal bites and other potential rabies exposures are reported in West Virginia. About 70-80% of investigations report dogs as the exposing animal species, though, only about one rabies-positive dog is reported each year. Animal bite case investigations are very burdensome to local health department staff given the current expectation that they collect surveillance data into two systems: the West Virginia Electronic Disease Surveillance System (as mandated by the WV Reportable Disease Rule) and Healthspace, an environmental health tracking system used by public health sanitarians for field data collection.

The Fellow will be expected to evaluate the current animal bites surveillance system and make recommendations on ways to improve it. Using CDC's "Guidelines for Evaluation of Public Health Surveillance Systems," the Fellow will engage stakeholders (e.g. local health staff, veterinarians, and healthcare providers) to assess current attributes of the system. The Fellow will also analyze animal bites surveillance data from both WVEDSS and Healthspace to assess current attributes of the system such as data quality, data completeness, and timeliness of reporting. Findings from the evaluation will be used to guide improvements that will make the animal bites surveillance system more efficient for stakeholders in the future.
Residents in the “Southern Counties” (Boone, Logan, MacDowell, Mingo, and Wyoming counties) in West Virginia are at high risk for many illnesses and conditions due to exposure to environmental health hazards (e.g. lack of potable water, proximity to mountaintop removal sites), behavior (e.g. drug use, tobacco use, consumption of nutrient-poor foods), and lack of access (e.g. low income, lack of healthcare infrastructure). Thousands of residents in these counties live with routine boil water advisories; residents of Keystone, West Virginia in MacDowell County have lived under a boil water advisory since 2010.

According to the 2013 Behavioral Risk Factor Surveillance System report published by the WV Center for Health Statistics, "Southern Counties" rank highest in the state for the following health outcomes: diabetes, hypertension, cardiovascular disease, asthma, disability, fair or poor health, and no exercise. Mingo and MacDowell counties had hepatitis B rates of 29.8/100,000 and 31.7/100,000, respectively, in 2014. McDowell and Mingo counties rank among the poorest counties in the United States. Given the significance of these public health issues and their geographic clustering, further investigation and analyses are needed in these counties to assess how social determinants of health and environmental factors play a role in the manifestation of poor health outcomes in the region.

The Fellow would assist in designing a Community Assessment for Public Health Emergency Response (CASPER) study to assess the severity of selected health outcomes and needs of residents in this region. The CASPER will be a synergistic project among several program areas within the Bureau to provide outreach to a highly underserved area of the state. The CASPER questionnaire designed by the Fellow would be divided into environmental health, behavioral health, maternal and child health, and infectious disease sections with questions tailored to ascertain the needs of the study population. The Fellow will also be tasked with amassing information packets containing literature related to the public health topics addressed in the questionnaire, for distribution to survey participants. Findings from the CASPER would be published and shared with key stakeholders with the hope of implementing interventions that would reduce the risk of poor health outcomes in this population.
Use of Syndromic Surveillance as a Tool to Monitor Tickborne Diseases and Weather-Related Health Outcomes

Public health syndromic surveillance is a relatively new tool to assist in detection and monitoring of health events. West Virginia is one of 35 jurisdictions supported by CDC’s Biosense 2.0 Cooperative Agreement. Biosense is currently being used by DIDE’s Influenza Coordinator to monitor influenza-like illness in the state.

Limited studies have been published showing the usefulness of syndromic surveillance in monitoring health outcomes as a result of weather-related events. As part of a Bureau-wide initiative to improve disaster epidemiology capacity, the Fellow will analyze data obtained from Biosense to determine if syndromic surveillance can be implemented as a new surveillance system to monitor health effects due to weather-related incidents in the state. For tickborne diseases, the Fellow will work with the ZD Epidemiologist to compare tickborne disease surveillance data collected through passive surveillance (WVEDSS) to data collected through syndromic surveillance (Biosense).

Active Tick Surveillance in Targeted Areas in West Virginia

The ZD Program piloted a structured active tick surveillance initiative in early 2015 in which surveillance sites were selected based on home zip codes of historical human Lyme disease cases and documented presence of I. scapularis, the Lyme disease vector. Parks and forests were identified and permission was granted to conduct active tick surveillance at sixteen sites: eight sites in the northern half of the state and eight sites in the southern half of the state. A tick surveillance protocol was created by the ZD Epidemiologist and Public Health Entomologist. Three tick surveillance interns were hired to conduct tick surveillance during the summer months.

Tick surveillance has been historically limited during spring and summer months due to increased workload for the ZD program during that time. While the Public Health Entomologist and ZD Epidemiologist will focus on mosquito surveillance and human zoonotic disease surveillance, respectively, the Fellow is anticipated to be the lead for coordinating tick surveillance activities for the 2017 season. Responsibilities would include:

- Creating a "tickborne disease" timeline outlining surveillance activities
- Conducting tick drag surveys
- Scheduling site surveillance visits and feeding back data to site contacts
- Collecting, organizing, and analyzing tick surveillance data
- Creating GIS maps displaying surveillance sites and sites where different tick species have been identified
- Creating surveillance reports during active tick surveillance periods.
**Preparedness Role**

Senior staff in DIDE split responsibilities for threat preparedness planning related to public health response. DIDE staff (including the previous CSTE Fellow) have worked closely with the WV Center for Threat Preparedness before, during and after the 2013 National Boy Scout Jamboree to provide public health preparedness and response to the largest mass gathering in the history of West Virginia, throughout the 2014 Elk River chemical spill, and in Ebola and avian influenza preparedness and response.

All epidemiologists in DIDE rotate outbreak response coverage on a monthly basis. Outbreaks are an excellent model for infectious disease emergencies and serve as good training for emergency response. During the 2009 influenza pandemic, all staff and trainees were involved in response.

The Fellow will also be encouraged to participate in any trainings or table tops related to public health emergency response. In the past, trainees have participated in training and table tops on pandemic influenza and avian influenza. The CEFO and EISO for West Virginia participated in the Kentucky CASPER in 2011. DIDE epidemiologists participated in a CASPER needs assessment in early 2012 and a CASPER related to the 2014 Elk River chemical spill. As similar opportunities arise, the Fellow would be encouraged to play a role in some capacity.

A major goal of WVBPH is to improve disaster epidemiology capacity through development of a structured program. Dr. Erica Thomasson, the CEFO in OEHS and the secondary mentor, is overseeing its implementation. The Fellow has a unique opportunity to contribute to the planning stages of building disaster epidemiology capacity for WVBPH while helping the agency meet national standards for public health preparedness (e.g. achieving Public Health Preparedness Capability 14 through implementation of ERHMS).
**Additional Activities**

The Fellow may be asked to complete small projects within DIDE and OEHS that will supplement a well-rounded applied epidemiology experience. One project would be to update a disease surveillance protocol giving the Fellow experience conducting literature searches using the WVBPH Digital Library. This activity is also a great way to teach the Fellow about the roles and responsibilities of laboratorians, local health, and state health officials in disease surveillance. Another project would be to develop a disease surveillance toolkit to assist local health staff in conducting disease case investigations. The Lyme disease toolkit is routinely used by local health and will serve a model. ([http://www.dhhr.wv.gov/oeps/disease/Zoonosis/Tick/Documents/lyme/lyme%20disease%20case%20investigation%20toolkit.pdf](http://www.dhhr.wv.gov/oeps/disease/Zoonosis/Tick/Documents/lyme/lyme%20disease%20case%20investigation%20toolkit.pdf))

All DIDE staff collaborate to deliver training material. These trainings are well-received by target audiences, and the trainings serve to enhance the skills of the epidemiologists. In the past, trainees have played an active role in these trainings. The previous CSTE Fellow in DIDE (Sarah Lineberger) developed content for the annual "Introduction to Epidemiology" training for sanitarians and "Just in Time" training for public health officials participating in the National Scout Jamboree public health response in 2013.

The State Epidemiologist regularly takes trainees to the legislature so that they can see the legislative process first-hand. This aids in understanding public health laws and regulations.

This variety of organized activities contributes greatly to the learning environment in DIDE and in WVBPH as a whole.

**Mentors**

**Primary**
- Miguela Mark-Carew, PhD
  - Zoonotic Disease Epidemiologist

**Secondary**
- Erica Thomasson, PhD, MPH
  - Career Epidemiology Field Officer