Environmental Health

New Mexico Department of Health, Epidemiology and Response Division, Environmental Health Epi Bureau

 Santa Fe, New Mexico

Assignment Description

The Fellow would be working in the Epidemiology and Response Division (ERD) of the New Mexico Department of Health (NMDOH). The ERD provides the primary epidemiology capacity for NMDOH. Within that division s/he would be working in the Environmental Health Epidemiology Bureau (EHEB), which curently has 17 staff members, of which 10 are epidemiologists. The Fellow would be learning about and contributing to epidemiology work in the EHEB, which is both extensive and diverse. Since EHEB is a fairly small bureau, the Fellow would be fully integrated by attending meetings, working with other staff members, and providing feedback and work products. Programs within the bureau include: 1) Environmental Public Health Tracking (EPHT), 2) Birth Defects Surveillance and Prevention, 3) Private Wells Surveillance, Occupational Health Surveillance, 4) Asthma Control Program, 5) Biomonitoring, and 6) Childhood Lead Poisoning Prevention.

Day-to-Day Activities

1. Attend monthly EHEB and ERD all-staff meetings
2. Attend Quarterly Epidemiology Meetings, which alternate between Santa Fe and Albuquerque. This meeting is a forum for epidemiologists across the state (in state government, private businesses, and academia) to present on their current research and to discuss topics that impact data analysis in general, such as population estimates.
3. Fellow will provide one day of on-call duty per month. Members of the public can call the NMDOH about a variety of issues. EHEB provides on call Monday through Friday from 8 am to 5 pm and answers questions about environmental health. Analyze on-call data on a monthly basis.
4. Conduct heat-related illness surveillance activities; work with appropriate data stewards in the Health System Epidemiology Program to request and analyze data.
5. Evaluate the feasibility of developing a neurodegenerative disease surveillance systems utilizing all available datasets.
6. Present results of at least one epidemiology project at the Quarterly Epidemiology Meeting and at the annual CSTE meeting.
7. Work with EPHT Social Services Coordinator and other staff members to identify potential Public Health Actions and provide documentation to CDC.
8. Participate in epidemiologic investigations, which may include working with the Cancer Concerns Workgroup on cluster inquiries, working with Occupational Health Surveillance staff on chemical exposures in the workplace, such as hydrofluoric acid, and working with Private Wells Surveillance staff on analysis of waterborne gastrointestinal illness.
9. Utilize GIS and applications to conduct at least one spatio-temporal analysis.

Potential Projects

**Surveillance   Conduct Heat-related Illness Surveillance
Activity**

During the time period of 1960-2016, maximum daily temperatures in New Mexico increased (data not shown). State land weather station data analysis using time series models reveal that high temperatures increased 0.08 degrees Fahrenheit each year during this period. Annual maximum temperature increased 6 degrees Fahrenheit.

This trend of increasing temperature is likely to continue, based on projections of the future climate of New Mexico derived from global and regional climate model data with the assumption that global anthropogenic emissions of greenhouse gases will continue to increase. Specifically, these climate models project the following substantial changes in New Mexico climate over the next fifty to one hundred years: a) average air temperature will become substantially warmer by 6-12 degrees Fahrenheit (3.3-6.7 degrees Celsius) and b) there will be more episodes of extreme heat, heat waves and fewer episodes of extreme cold.

To address this projected trend of increasing temperatures in the state on a regional basis, the EHEB has taken initial steps to utilize real-time data, which can ultimately help prevent heat-related illness. Specifically, EHEB has started using the Health System Epidemiology Program's Syndromic Surveillance System (based on emergency department visits) to assess heat-related illness hospitalizations. The Fellow will evaluate how predictive the existing algorithms EHEB has set up are, including chief complaint terms, and how this can be used to improve preparedness and response by local emergency managers and residents during periods of extreme heat. The first full year of implementation for syndromic surveillance of heat-related illness will be during the summer of 2018. The Fellow will have the opportunity to 1) request syndromic surveillance data from participating hospitals, 2) follow up to obtain ICD-10 diagnoses, 3) obtain temperature data for the cities being most affected, 4) communicate with local emergency preparedness staff, and 5) work with health educators/health promotion staff to improve prevention messaging.

**Surveillance   Evaluation of Birth Defects Prevention and Surveillance System (BDPASS)
Evaluation**

EHEB recently received additional funding through CDC to evaluate birth defects data for outcomes associated with Zika Virus exposure in utero, such as microcephaly. As a result, the registry (BDPASS) has improved dramatically, by increasing surveillance of birth defects from 12 to all birth defects. Additionally, children with birth defects are now consistently referred to services available through NMDOH. The Fellow would quanitify this improvement through a formal evaluation of the surveillance system. The Fellow will work closely with staff members from the Birth Defects Surveillance and Prevention Program and assist with streamlining documentation on the registry.

To perform a formal evaluation of the existing BDPASS, the CSTE Fellow will conduct activities including the following 1) indentify the BDPASS stakeholders, 2) describe the existing system (e.g., public health importance of births defects, purpose and operation of the current system, resources used to operate the system), 3) propose/design evaluation methodology, 4) gather evidence about performance (e.g., system usefulness and system attributes such as: simplicity, flexibility, data quality, acceptability, sensitivity, predictive value positive, representativeness, timeliness, stabilit/reliability), 5) develop recommendation , and 6) describe lessons learned.

Major Project   Descriptive Analysis of Uranium-related Health Outcomes

This assignment stems from the interest of the community in NW NM about uranium exposure from historic mines and mills. For example, two years ago, there was a request to compile and evaluate the existing health data to develop an environmental health profile of communities within the Grants Mineral Belt. This would be the Fellow's assignment. Specifically, this health profile would serve as a baseline of the current health status of communities in which mining and milling activities have occurred.

The Fellow would perform the following activities:

1. Conduct literature review to provide a complete picture on the evidence in peer-reviewed, published literature on health outcomes associated with uranium exposure.
2. Based on the evidence in the literature, focus the baseline health studies on the health outcomes with the most evidence. The Fellow would then determine which population-based datasets should be consulted.
3. Once datasets are identified (such as hospitalization data, cancer data, birth defects data, etc.) a plan would be developed for how to create the health profile.

    Some elements/considerations might include:
- For each dataset, determine how many years of data should be aggregated to provide confidence about the conclusions of the data.
- For each dataset, determine the smallest geographic unit that could be analyzed for each dataset. In some cases, based on the available information in the dataset, the smallest unit is county.
- Based on the above two bullets, determine how the health profile will be described: by county or by varying definitions of 'community,' including small areas.
- Analyze each health outcome using statistical software such as STATA or SAS to determine age-adjusted rates and confidence intervals.
- Add years of data as necessary to ensure that rates are stable.
- Summarize each health outcome at finest geographic level possible while protecting individual health information.
- Make a comparison among different 'communities' to determine if one had a higher burden than another.

- For completeness, the Fellow will identify and evaluate the risk factors in the community that can also be correlated to health outcomes potentially associated with uranium exposure. One example is the effect on kidney function. The literature indicates that uranium exposure can lead to effects on the kidney. However, individuals who are obese have an increased risk of diabetes and diabetes can lead to impacts on the kidney. Co-existing exposure to other heavy metals can also impact kidney function.

Major Project   Determine Feasibility of Developing a Neurodegenerative Disease Surveillance System

Currently, there is no surveillance system in place for neurodegenerative diseases in New Mexico. Registries are typically person-based while surveillance systems are intended to estimate the burden of disease from hospitalizations, death certificates, emergency department visits and other datasets. During past legislative sessions in New Mexico, a number of concerns have been raised about the prevalence of neurodegenerative diseases such as Parkinson's and Alzheimers. Additionally, one community requested an analysis of the prevalence of Amyotrophic Lateral Sclerosis in one location and comparison to the National prevalence.   The CSTE fellow will work closely with staff members from the EPHT program to explore the feasibility of and methods for developing a neurodegenerative disease surveillance system, including Alzheimer's, Parkinson's Disease, Huntington Disease, and Multiple Sclerosis.

Specifically, the Fellow will 1) define the purposes for which the neurodegenerative diseases surveillance activities are to be undertaken, including defining how the data will be used (e.g., epidemiologic surveillance), 2) select 3-4 health outcomes to be included in the surveillance system, 3) develop a case definition for specific outcomes and identify issues with this case definition, 4) identify varied data sources (e.g., multiple cause mortality files, hospitalization data) that could be used to develop a neurodegenerative disease surveillance system, 5) conduct a gap analysis to evaluate usability of these data sources for surveillance of neurodegenerative diseases, including easy of applying a case definition, cost-benefit analysis for each data source, data quality needs for inclusion in the surveillance system, challenges or barriers to the surveillance, 6) develop a plan for creating a neurodegenerative diseases surveillance.

Preparedness Role

The CSTE Fellow will either work with the new Environmental Health Preparedness Epi (if hired) or initiate the work for this epidemiologist, including (with mentor and bureau chief help), leading the chemical emergency response planning team in the development of the Emergency Operations Plan (EOP) annex. The Fellow will 1) participate in the testing and training on chemical response emergencies, 2) assist the department in the development of an environmental vulnerability assessment for the jurisdiction, and 3) address vulnerability and planning gaps for environmental emergency preparedness.

Mentors

Primary   Barbara Toth MS, PhD, DABT

Environmental Public Health Tracking Program Manager/Epidemiologist

Secondary   Heidi Krapfl MS

Bureau Chief