ENVIRONMENTAL PUBLIC HEALTH TRACKING ASTHO FELLOWSHIP FINAL REPORT

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Environmental Public Health Tracking: State-to-State Peer Fellowship Program
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Introduction

In 2014, the Tennessee Department of Health's (TDH) Environmental Epidemiology Program (EEP) participated in the Association of State and Territorial Health Officials' (ASTHO) Environmental Public Health Tracking (EPHT) State-to-State Fellowship Program for submission of Hospital Discharge Data to the Centers for Disease Control and Prevention's (CDC) National Environmental Public Health Tracking Network (EPHT).

Since 1982, the Environmental Epidemiology Program (EEP) has been Tennessee's environmental public health response program. EEP is part of TDH's Communicable and Environmental Diseases & Emergency Preparedness (CEDEP) group. EEP's participation as an Agency for Toxic Substances and Disease Registry (ATSDR) Cooperative Agreement partner has helped us become a successful, efficient, and trusted environmental public health program. We have investigated many different types of environmental exposures and, in response, have implemented action plans to protect public health. We have provided assistance to ATSDR, the US Environmental Protection Agency (EPA), our state regulatory agency the Tennessee Department of Environment and Conservation (TDEC), the Tennessee Department of Agriculture, as well as to concerned citizens, local governments, and legislative officials. We maintain a surveillance system as part of the ATSDR's National Toxic Substance Incidents Program (NTSIP). We record acute toxic chemical release incidents to develop prevention and outreach activities. On January 1, 2013, carbon monoxide (CO) poisoning became a reportable event in Tennessee. EEP is now tracking carbon monoxide poisoning events throughout the state.

In 2013, TDH's EEP participated in the ASTHO's Tracking Peer-to-Peer Fellowship Program. Missouri (MO) was our mentor state. Major accomplishments of the fellowship included a site visit to MO and an in-person networking session at CDC. During the site visit, TDH EEP developed a good working relationship with MO. MO's EPHT staff explained their online, interactive, and queriable EPHT portal. TDH EEP learned the strengths of a good EPHT portal as well as some pitfalls to avoid. During the in-person networking session, the CDC tracking branch shared emerging methods, upcoming events, and ongoing work being done within the EPHT network on the national scale. The "Future of the Fellowship: Hospitalization Data" was discussed. This discussion helped EEP immensely by talking about problems and solutions of implementing EPHT. Another benefit was the networking opportunity with other EPHT fellows and CDC staff. The contacts made by our ASTHO fellowship will be useful resources as Tennessee moves forward to implement EPHT.

Project description

The purpose of this project was to acquire and submit hospital discharge data for four health outcomes: asthma, carbon monoxide poisoning, heart attacks, and heat stress illness.

Some cities in Tennessee are always on the list of the 10-worst cities for allergies in the nation according to Asthma and Allergy Foundation of America. According to Hospital Discharge Inpatient Data, Tennessee's asthma rate for 2012 was 9.8 per 100,000 populations. Tracking hospitalizations and emergency department visits data for asthma can be used to guide planning efforts, to target interventions, and to serve as a baseline to track asthma trends and evaluate efforts to decrease the burden of this disease.

Heart disease is the leading cause of death for Tennesseans, with stroke closely following as the third leading cause of mortality. Tennessee ranked 6th highest among states in mortality due to heart disease. According to Tennessee Hospital Discharge Inpatient Data, the rate of heart attack was 24.5 per 100,000 populations for 2012. Tracking heart attack data can be used to target susceptible populations and provide public health messaging, prevention and intervention activities for these two costly and destructive conditions.

Hospital Discharge Inpatient Data reported Tennessee carbon monoxide (CO) poisoning rate for 2012 was 9.8 per 100,0000 population. CO poisoning occurs as the result of routine domestic, occupational, and recreational activities. Because of its frequency, severity, and preventability, as well as the effectiveness of simple preventive measures such as the installation of a CO alarm, CO poisoning is a critical health issue for public health surveillance. CO poisoning is now reportable in Tennessee. A comprehensive national CO poisoning surveillance framework is needed to obtain accurate estimates of CO poisoning burden and guide prevention efforts. Tracking hospitalization data will allow TDH EEP to develop targeted messaging for vulnerable populations. It will also support national public health prevention and intervention activities to reduce associated morbidity and mortality.

Each year many Tennesseans suffer from heat-related illnesses, with some cases resulting in death. According to Hospital Discharge Inpatient Data, the rate of heat stress in 2012 was 4.9 per 100,0000 in Tennessee. The elderly and the chronically ill are more vulnerable to the effects of high temperature and humidity. Monitoring high temperatures and humidity can help prevent heat-related illness and death.

REPORT ON TRACKING ACTIVITIES

I. Participated on web conference kick-off meeting - Feb 25, 2014

On February 25, 2014, Dr. Sutapa Mukhopadhyay, the principal investigator (PI) of this project, Mr. Craig Shepherd, Director of Environmental Epidemiology, and Mr. David Borowski, Assistant Director of Environmental Epidemiology participated in a web conference with ASTHO staff, the CDC tracking branch, and other 2014 awardees. EEP is grateful to ASTHO for making the fellowship possible.

Accomplishments
Tennessee EEP has a better understanding of CDC's Standard for Nationally Consistent Data Measures (NCDM) guidelines for hospital discharge data. After the Q/A session, Tennessee gained a comprehensive understanding of the process of data collection, data cleaning, and data formatting.

II. Participated on a CDC SharePoint guided tour webinar - March 12, 2014

On March 12, 2014, our PI participated in a webinar focused on the EPHT SharePoint website. From this webinar Tennessee learned more about the EPHT SharePoint website, data submission guidelines, guidance for data measures, and metadata creation.

Accomplishments
Tennessee EEP has a better understanding of EPHT's SharePoint website. How to look and where to look for data submission guidelines, metadata creation tools, and the necessary contacts for different areas of expertise.

III. Meeting with data stewards - March 14, 2014

TDH's Division of Policy Planning and Assessment (PPA) is responsible for collecting all the hospitalization data in Tennessee. On March 14, 2014, the EEP team had a planning meeting with the PPA team. During this meeting, PPA stated that TDH could not share unsuppressed aggregate data with CDC.

Accomplishments
PPA provided all the necessary steps to request raw data for each of the four health outcomes for this project. Tennessee EEP learned each and every step of the data request process.

After several TDH leadership discussions and meetings, it was determined late July 2014 that TDH could submit unsuppressed aggregate data to CDC EPHT.

IV. Working with data

Hospital discharge data are a complete collection of patient demographic, clinical, and billing data for all payer types for all patients admitted to a licensed acute care hospital in a state during a calendar quarter or year. Hospital discharge data are population-based, representing a known population residing in a defined geographic area. These data contain all patient hospitalizations from short-term-care facilities excluding federal hospitals (U.S. Department of Veterans Affairs and Indian Health Service) as well as specialty-care hospitals.

EEP worked with PPA to identify the hospitalization data for tracking. EEP signed data use agreements with PPA including a 'Request for Data Form' and a 'Data Release Awareness Statement'.

Hospital discharge data were collected and compiled from hospitals by the TDH. Some hospitals send their data directly to the TDH; some send their data to TDH via the Tennessee Hospital Association. All data goes through the same editing and processing. The TDH verifies the data with the reporting hospitals and creates several additional fields based on the submitted data. The data are then available to the TDH for research and for responding to information requests.

For EEPs EPHT initiative, TDH PPA provided the data files and the relevant data manuals to EEP's PI. PPA uploaded the Statistical Analysis System (SAS) data file onto our File Transfer Protocol (FTP) server using FileZilla. They provided secure e-mail with password to open the files. We had two separate inpatient and outpatient data files for each year. PPA also provided the technical support to understand the data files.

Accomplishments
TDH EEP established a strong collaboration with TDH PPA. EEP learned about the data file and data dictionary in great detail.

V. Processing data

Tennessee provided hospitalization data for four health outcomes for 12 years from 2000-2011. We are not able to provide 2012 data because calendar year 2013 data will not be ready until January 2015. In order to have complete admission date information using discharge-based datasets, it is necessary to have the dataset of the year of interest and the subsequent year.

After acquiring the data, it was cleaned and formatted to the national standards using a SAS program. We received tremendous support from our PPA team to understand the format of the data. We also received support and guidance from CDC's EPHT team throughout this project. Our mentor state, MO, shared SAS code with us and some examples of their metadata records. We also received enormous help from the New York State's tracking team as we used their NCDM tool. CDC's tracking team gave technical support for processing and formatting the data.

Patient count was based on admission date not the discharge date. The dataset was extracted from the Tennessee Hospital Discharge Data System (HDDS). HDDS contains inpatient hospitalization and emergency department data. The records for all four health outcomes were selected based on admission date occurring in calendar year 2000-2012, the appropriate diagnoses in all the diagnoses field, state of residence of Tennessee, and hospitals located in Tennessee. Once the relevant records were selected, duplicate records were deleted using combinations of admission and discharge dates, patient discharge status, age, race, sex, ethnicity, patient control number, county and residence zip code, and hospital number. Ethnicity was collected as part of race item in 2000-2006 data files.

The variables such as age, sex, race, ethnicity, and county were formatted according to the *CDC's Standard for Nationally Consistent Data Measures Guidelines.* The data had been categorized based on age, gender, race, and ethnicity for all four health outcomes. We also included the number of unintentional fire and non-fire related CO poisoning cases.

The diagnosis codes used for different data measures were based on *CDC's Standard for Nationally Consistent Data Measures Guidelines*. CDC's tracking team gave support for case definitions for each health outcome. Their How-to-Guide listed step-by-step instructions on how data should be processed in preparation for submission, data dictionaries which described data variables and required formats, and indicator templates that provided formal documentation of a particular indicator and its measures.

Accomplishments
EEP learned about the data file, data dictionary, and data processing steps in detail. EEP also learned in depth about CDC's NCDM.

VI. Working with metadata

Metadata records were created for each dataset by using the EPHT Metadata Creation Tool, Version 1.1. The CDC tracking team gave support for the metadata template which described the standard for metadata records on the Tracking Network. Our mentor state, MO, shared some examples of their metadata records. TN EEP used their examples and modified them for our use accordingly. Completeness of the source data was checked and calculated using SAS and incorporated in the metadata record. A total of eighty-four (84) metadata records were created for four health outcomes over 12 years. We shared the metadata records with our data steward. Our data steward reviewed the metadata records before sending to CDC for validation.

Accomplishments
Tennessee EEP gained understanding and experience using the metadata creation tool for EPHT.

VII. Attended Grantee Meeting in Atlanta - August 2014

On August 18-20, 2014, Dr. Mukhopadhyay and Mr. David Borowski attended CDC's EPHT Grantee Meeting in Atlanta. EEP was grateful to have this opportunity. The meeting was an eye-opening experience for EEP as we were able to understand different aspects of tracking and what can be done. This meeting showcased the diverse ways grantee states were applying EPHT. The CDC tracking branch shared emerging methods, upcoming events, and ongoing work being done within the EPHT network. Grantee states shared different projects based on EPHT data.

Accomplishments
Tennessee EEP has a better understanding of EPHT as a whole. A substantial benefit of attending was the networking opportunity with CDC's EPHT staff and also with different grantee states. The contacts made during the session will be useful resources as Tennessee moves forward with EPHT.

VIII. Participated on a fall data submission training webinar- September 2014

On September 4, 2014, our PI participated in a webinar focused on data submission. From this webinar, TDH learned more about the data submission guidelines, guidance for data measures, and metadata submission.

Accomplishments
TDH EEP has a better understanding about the data submission process.

IX. Creating XML file for data submission

Once our metadata record was validated we created data files using New York's NCDM tool. Eighty-four (84) xml data files were created for four health outcomes over 12 years. We created two zip files: one an inpatient data file and another data file for emergency visits. We submitted the data files securely to CDC. We got tremendous help from New York's tracking team in every step of creating the xml files.

Accomplishments
Tennessee EEP has a better understanding about the data submission process. It was beneficial for EEP to understand the xml file and the process of creating xml files. We established a great relationship and communication with the New York's EPHT team.

Learning experience

One learning objective for TDH EEP was to understand hospitalization data. A second objective was to learn about the four data measures. Another objective was to get guidance on how to prepare data for CDC's EPHT network. Lessons learned are summarized below:

- Tracking is a partnership program. Building a partnership with data stewards is the first step of data acquisition.
- NCDM guidelines are critical for a tracking program. We learned how data is formatted to meet national standards.
- Hospitalization data is an important component for a tracking program. Participation in this fellowship allowed TDH EEP to understand hospitalization data in greater detail.
- Communication is a key component for tracking. TDH EEP learned about the importance of communication between data stewards, ASTHO, and CDC.

Application

TDH EEP will share this fellowship report with our data steward and with TDH management. After completing this fellowship, our next step will be to develop a strategic goal to implement EPHT in TN. Creating Tennessee's own EPHT portal will be our long-term goal.

Anticipated challenges

Without dedicated funding, implementing an EPHT portal will be a challenge. Tennessee needs dedicated staff to maintain a statewide program. Without staff funded and dedicated to EPHT, we can only shuffle our existing staffs' responsibilities for a limited amount of time to address additional workload and projects. Using this approach does not allow us to sustain momentum. We are optimistic our participation as an ASTHO fellow will increase our ability to qualify for funding to sustain and support a statewide EPHT program in the future.

Future directions

TDH EEP is planning to sustain the scope of this project by continuing to upload data for the four conditions in CDC's Tracking Network beyond the project period. This will enable us to determine the morbidity and mortality of adverse health outcomes within the state and subsequently determine trends in incidence, identify locations of increased disease, and ultimately link them with information on levels of environmental contaminants.

The future outcome of this project will be to identify Tennessee's high risk populations for those health outcomes as determined by social factors and geographic areas. Tracking data will help identify health disparities among Tennesseans. With this knowledge, TDH will be in a position to institute changes in public health policy with the goal of preventing and reducing adverse health outcomes.

EEP's focus will be to prepare a strategic plan to implement EPHT in Tennessee. Our long-term objective will be to build a tracking portal to provide comprehensive environmental and public health data as outlined in CDC's *Guide to Building an Environmental Public Health Tracking Network*.