ASTHO Environmental Public Health Tracking Peer-to-Peer Fellowship Program

Final Report

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Environmental Health Tracking: State-to-Sate Peer Fellowship Program
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Background

For over 30 years, the Texas Department of State Health Services (DSHS) Environmental and Injury Epidemiology and Toxicology (EIET) Unit has used the principles of epidemiology and toxicology to protect and promote the health of Texans. DSHS staff conduct surveillance, carry out epidemiologic investigations and studies of environmental exposures and diseases, and, through a collaborative grant with the Agency for Disease Registries, are responsible for conducting human health risk assessments related to hazardous waste sites in Texas.

Texas is the second largest state in the nation. Covering an area of 267,339 square miles (7.4% of the nation's total area) in 254 counties, the distance across Texas is 801 miles north to south and 773 east to west. According to U.S. Census Bureau estimates, Texas is the second most populous state, with more than 27 million inhabitants. It is culturally and ethnically diverse: 38% are Hispanic or Latino and 20% are foreign-born. Texas has the second largest Hispanic, third largest Black, and third largest Asian populations in the U.S. Compared to other states in the U.S., Texas has the largest rural population (3,847,522 people, or 15.3%) and 17.3% of all Texans live below the poverty level.

There are a number of environmental public health issues with the potential to impact the health of Texans, including hazardous waste, agricultural practices, air and drinking water quality, and natural weather events (prolonged periods of heat, floods, drought, and hurricanes).

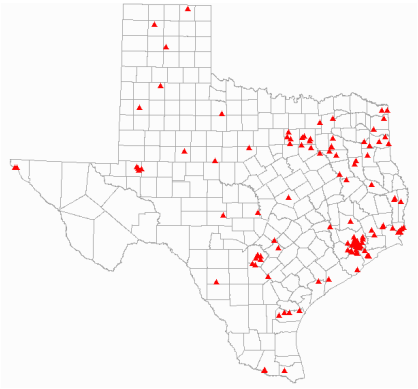


Figure 1. Superfund sites in Texas. Available from: https://www.tceq.texas.gov/assets/public/gis/metadata/images/superfund.gif

Over time, some industrial activities have led to contamination of a wide range of environmental media that the general public might be exposed to. As of June 22, 2017, there are 54 final or proposed hazardous waste sites in Texas on the National Priorities List (NPL)[1]. The Texas Commission on Environmental Quality (TCEQ) also oversees state Superfund sites and other contaminated sites participating in programs such as the Voluntary Cleanup Program[2].

The state also faces challenges related to air quality. Several of the largest municipal areas in the state are considered non-attainment areas with the National Ambient Air Quality Standards for ozone (Dallas-Ft. Worth and Houston-Galveston-Brazoria) or particulate matter [PM_{10}] (El Paso). These contaminants have been shown to be associated with hospital admissions for respiratory, cardiovascular, and cerebrovascular disease[3], as well as all-cause mortality[4]. Portions

[1] Environmental Protection Agency. *Superfund Sites in Texas*. Retrieved 6/22/2017, from https://www.epa.gov/tx/cleanups-texas#sites.

[2] Texas Commission on Environmental Quality. *Remediation: Cleaning up Contaminated Sites*. Retrieved 8/22/2016, from https://www.tceq.texas.gov/remediation/index.html.

[3] Dockery , D. W. and P. H. Stone (2007). *Cardiovascular Risks from Fine Particulate Air Pollution*. New England Journal of Medicine **356**(5): 511-513.

[4] Turner, M. C., et al. (2015). *Long-Term Ozone Exposure and Mortality in a Large Prospective Study*. American Journal of Respiratory and Critical Care Medicine **193**(10): 1134-1142.

of several counties are considered non-attainment areas for carbon monoxide [CO] (El Paso County), lead [Pb] (Collin County), and sulfur dioxide [SO2] (Freestone, Anderson, Panola, Rusk, and Titus County)[5].

Groundwater contamination is also an environmental public health issue of concern. There are an estimated 8,860 monitor wells in place under TCEQ's Voluntary Cleanup Program, and in 2015 approximately 15,062 groundwater samples were collected from 828 sites. Approximately 3,726 of these samples showed groundwater contamination (276 new cases)[6]. According to the 2016 TCEQ Public Drinking Water Program 2015 Annual Compliance Report, TCEQ determined that 20% of all Public Water Systems (PWS) in Texas had monitoring and reporting violations.

While programs within DSHS already maintain and analyze many environmental data sources pertaining to environmental hazards, exposures, and health outcomes, the data are not currently compiled in a manner that is easily accessible to the public. To enhance environmental public health surveillance, EIET began investigating the feasibility of establishing a state Environmental Public Health Tracking (Tracking) network in Texas according to the Centers for Disease Control and Prevention's National Tracking Network guidelines and specifications.

EIET was given the opportunity to participate in the 2016 Association of State and Territorial Health Officials' (ASTHO) Environmental Public Health Tracking Peer-to-Peer Fellowship Program. The main goal of EIET's participation in the fellowship was to learn, through applied activities, about the technical, data, and resource requirements needed to build a state Tracking network. This goal was achieved through a fellowship pilot project, as well as peer mentorship from the Colorado Department of Public Health and the Environment's (CDPHE) Environmental Public Health Tracking (Colorado Tracking) Program. This report provides a summary of activities conducted during the fellowship.

Pilot Project

Objectives

EIET proposed a pilot project to increase the program's knowledge about the technical, data, and resource requirements needed to build a state Tracking network. The specific objectives were:

[5] Texas Commission on Environmental Quality. *Texas State Implementation Plan*. Retrieved 8/22/2016, from https://www.tceq.texas.gov/airquality/sip/.

[6] Texas Groundwater Protection Committee (2015). *Joint Groundwater Monitoring and Contamination Report–2015*. Available at https://www.tceq.texas.gov/assets/public/comm_exec/pubs/sfr/056-15.pdf.

1. To obtain hospital discharge data on heat-related illness, carbon monoxide poisonings, asthma, and acute myocardial infarction for 2006-2015, and prepare the data according to National Tracking Program guidelines.

2. To create a Texas Tracking dashboard using Tableau software to be used to build buy-in for Tracking among key stakeholders.

3. To create an inventory of needed Tracking data sources and corresponding data stewards.

4. To identify stakeholders to participate in an interdisciplinary/interagency Tracking workgroup.

Pilot Project Activities

Objective 1:

EIET planned to obtain hospital discharge data for emergency room visits (available for 2015) and inpatient admissions (2006-2015) for heat-related illness, carbon monoxide poisonings, asthma, and acute myocardial infarction from the DSHS Texas Health Care Information Collection (THCIC). Once the data were obtained, EIET planned to follow the National Tracking Program's how-to guides to create Nationally Consistent Data and Measures[7] (NCDM) datasets, create metadata files, and prepare the data for submission. While significant progress was made towards this objective, EIET was unable to obtain the needed data within the timeline of the project. One of the variables needed to prepare the data is only available as a research data file that will take a longer period of time to obtain. EIET is in ongoing discussions with the data steward, THCIC, about the how these data will be provided, and what type of data use agreement will be required.

Given this unexpected delay, activities related to this objective had to be modified. First, EIET prepared an alternate dataset, child blood lead, according to the NCDMs and related How-To guide. This was accomplished using SAS code provided by EIET's mentor, the Colorado Tracking Program (see below). Additionally, EIET used the THCIC hospital discharge public use data file (PUDF) to prepare modified versions of the measures originally identified for development during the fellowship. Other than hospital admission date, all required data fields are present in the PUDF.

Due to the delays in obtaining data, the activities related to this objective are still ongoing, and the metadata and xml files have not yet been finalized. While the objective was not completed in the manner initially planned, EIET was still able to gain important knowledge about the processes for obtaining and preparing the data according to NCDMs, and the time period needed for these activities. The program still plans to complete all originally-proposed activities.

[7] Centers for Disease Control and Prevention. *Standards for Nationally Consistent Data and Measures within the Centers for Disease Control and Prevention's National Environmental Public Health Tracking Network, v. 4.0*. (2017). Retrieved 5/24/2017 from https://www.cdc.gov/nceh/tracking/pdfs/ncdm_requirements_april2017.pdf

Objective 2:

EIET built a pilot Texas Tracking dashboard with Tableau using the datasets prepared as part of Objective 1 (see Appendix). This was an important exercise that will allow the program to more accurately plan the amount of resources needed to create and maintain the Texas Tracking portal. The final product will be shared with DSHS leadership to gain additional support for a state tracking network. Additionally, the Texas Childhood Lead Poisoning Prevention Program will be able to use the childhood blood lead dashboard as a tool to assess lead exposure risk.

Objective 3:

First, EIET reviewed all Tracking data submitted by states to the National Tracking Program and identified all corresponding data sources. EIET determined that DSHS is the owner of or has access to all NCDM data currently provided by states to the National Tracking Network. Data housed in EIET or partner programs include childhood blood lead, birth defects, and cancer data. EIET has also received drinking water quality data from the Texas Commission on Environmental Quality (TCEQ), and receives a daily data feed from the Texas Poison Control Network (TPCN). DSHS Center for Health Statistics (CHS), the hospital discharge and vital statistics data stewards, have committed to work with the program to provide the remaining health outcome data sources.

EIET also identified data sources and stewards for several state-specific Tracking measures that will be developed. These include additional air and water quality data maintained by TCEQ, public water system boundary data maintained by the Texas Water Development Board (TWDB), and Texas motor vehicle crash data from the Department of Transportation (TXDOT).

In addition to creating a data inventory, EIET surpassed the original objective. The program contacted each data steward, and all committed to collaborating with EIET to provide the data required for the Texas Tracking network.

Objective 4:

During the process of identifying data stewards, EIET also identified many internal and external stakeholders to participate in the Texas Tracking Technical Advisory Group. These include data stewards and subject matter experts from DSHS, TCEQ, and other partner agencies. Many have already agreed to participate in the group. Additionally, EIET began identifying and building relationships with external stakeholders from academic institutions who have agreed to participate.

<u>Outcomes</u>

The expected outcome of the pilot project was that EIET would have increased knowledge of the resource and technical requirements needed to build a state tracking network. Through the pilot project activities described above, combined with mentorship from CDPHE, this outcome was achieved. EIET established a foundation for future activities, obtained and began preparing many NCDM data sources, and gained stakeholder buy-in needed. Through this fellowship,

EIET determined that the program has the resources and capacity needed to establish a state Tracking network, and is now prepared to implement the Texas Tracking portal.

Site Visit

The Colorado Tracking Program mentored EIET during this fellowship and hosted EIET for a two-day site visit at CDPHE in Denver, CO, on March 23-24, 2017. The Colorado Tracking Program has been part of the National Tracking Network since 2009. During the site visit, Colorado Tracking staff shared a wide range of knowledge and insights gained since the program began. Topics covered included:

- Overview of the Colorado Tracking Program:
    - Tracking 101
    - History and current status of the Colorado Tracking Program;
    - Non-Portal Tracking Activities
    - Building partnerships
- Tracking Portal IT: Colorado Portal IT history and overview; Portal walk-through
- Tableau for Tracking:
    - Portal dashboards
    - Other uses: Leadership dashboards, geography-specific reports, etc.
- Data Call How-To: Data preparation and submission
- Hospitalization Data: overview of NCDM preparation
- New measure development
- Tracking and GIS collaborations
- Communications and Outreach
- Public Health Actions: Making data useful
- Health Impact Assessments using Tracking data
- Data Utilization examples

These topics were selected based on an introductory conference call between the Colorado Tracking Program and EIET prior to the site visit, and addressed many of EIET's questions related to resource and technical needs for state Tracking network creation. The Colorado Tracking Program began by giving an overview of the program's development since 2009, including lessons learned, changes in technology, data use for public health actions, and the importance of integrating Tracking into the jurisdiction's fundamental public health surveillance efforts. Additionally, they provided important insights into collaborations that have been important for the Program's success.

The Colorado Tracking Program also provided in-depth information on the process of preparing NCDM datasets, and submitting data to CDC. This practical, applicable information included details such as an estimated number of hours needed to respond to CDC data calls. They also provided information on how to submit data through CDC's Secure Access Management System (SAMS) and what to expect during the data submission process.

The overview of the Colorado Tracking portal was extremely informative. Staff shared specific details shared regarding IT infrastructure and technology requirements, as well as technology currently being implemented, such as the use of Application Programming Interfaces (API) to obtain data from CDC and other sources. This information helped EIET more accurately assess Texas's capacity to build a state portal. In addition to these technological consideration, Colorado Tracking staff provided important ideas and resources for designing with user experience best practices in mind, and other communications considerations for developing a public portal.

The Colorado Tracking team also shared the program's communications plan, education and outreach materials, examples of public health actions in Colorado, and analyses of Tracking data. These materials provided excellent examples of how Tracking data can be used to identify populations at risk, identify public health actions, and promote environmental public health.

The Tracking program also provided EIET with SAS code for implementation of the EPHT childhood blood lead confirmation algorithm specified in the corresponding NCDM How-To Guide. Following the site visit, the Texas Childhood Lead Poisoning Prevention Program was able to use this code to rapidly prepare childhood blood lead data according to NCDM requirements. As a result, EIET was able to include childhood blood lead data in the Tableau dashboard created as part of the fellowship pilot project (see Appendix).

The information generously shared by Colorado Tracking Program provided invaluable guidance to EIET. The mentorship component of this fellowship was vital for the fulfillment of EIET's expected fellowship outcome of having a more complete understanding of the resources needed for a state Tracking network. Furthermore, knowledge gained during this mentorship has allowed EIET to further develop plans for implementation of the Texas Tracking network.

Conclusion

This fellowship gave EIET staff practical knowledge related to how to collect, format, and prepare data for submission according to NCDMs, and identified the resource and technical requirements for building a state network in Texas. As a result, EIET was able to more accurately assess the technical, data, and resource requirements for building a state Tracking network, and determine that the program has the needed resources and capacity to sustain the Texas Tracking network.

Over the next year, EIET will continue to develop its state Tracking network, with the goal of joining the National Tracking Network. EIET will continue with preparation of NCDM datasets according to CDC guidelines. Existing DSHS IT infrastructure will be used to build the Texas Tracking public portal. DSHS has already begun making agency data available online through the public-facing Texas Health Data platform (http://healthdata.dshs.texas.gov/Home) using Tableau. EIET will use this standing Tableau Server and web platform to compile and display environmental hazard, exposure, and health outcomes data in the Texas Tracking public portal. This will allow decision-makers and the general public to easily view and use Texas

Tracking data. EIET will also conduct routine Tracking data analyses to monitor trends over time and recommend public health measures to decision makers. The experience and information gained during this fellowship was vital to enhancing EIET's capacity to conduct environmental public health tracking in Texas.

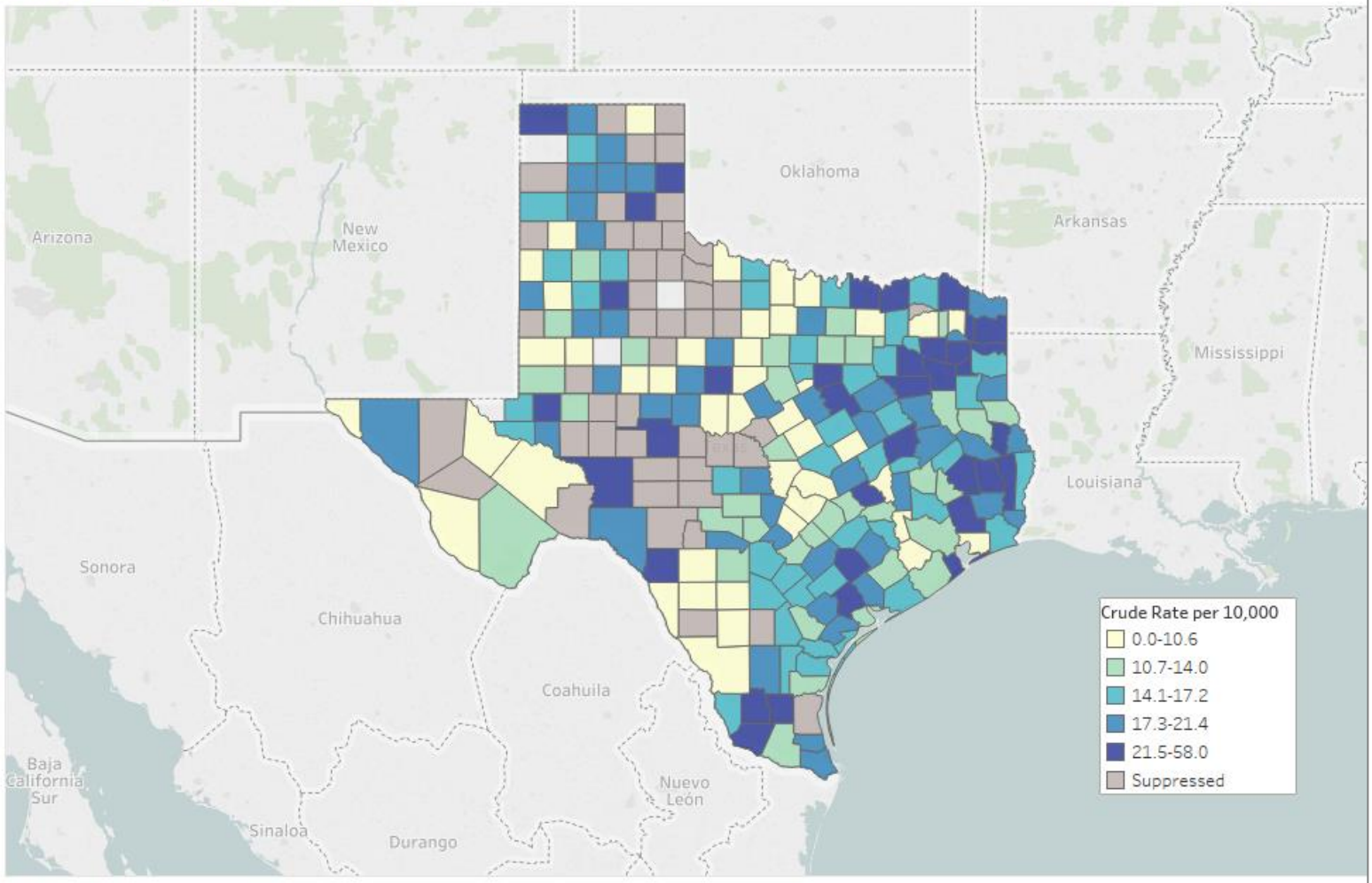
Appendix

Texas Environmental Public Health Tracking Dashboard Mockup

Heart Disease - Texas

Year
2013

Crude Rate of Hospitalization for Heart Attack



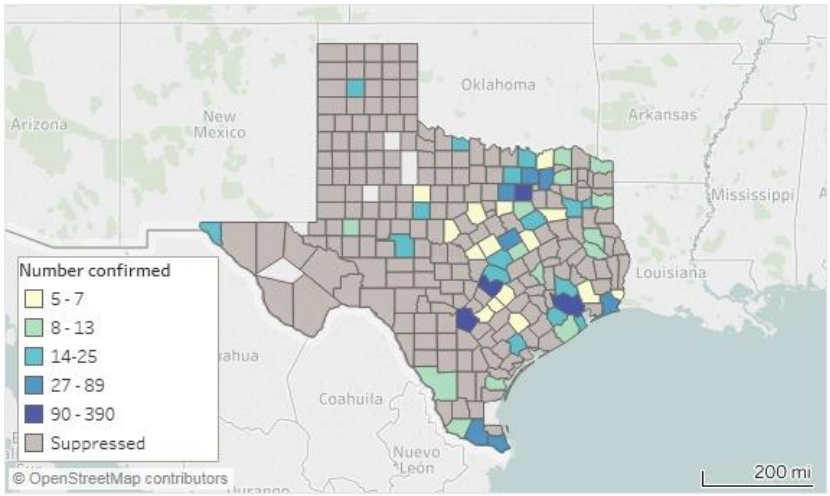
Childhood Blood Lead Surveillance - Texas

Search by County

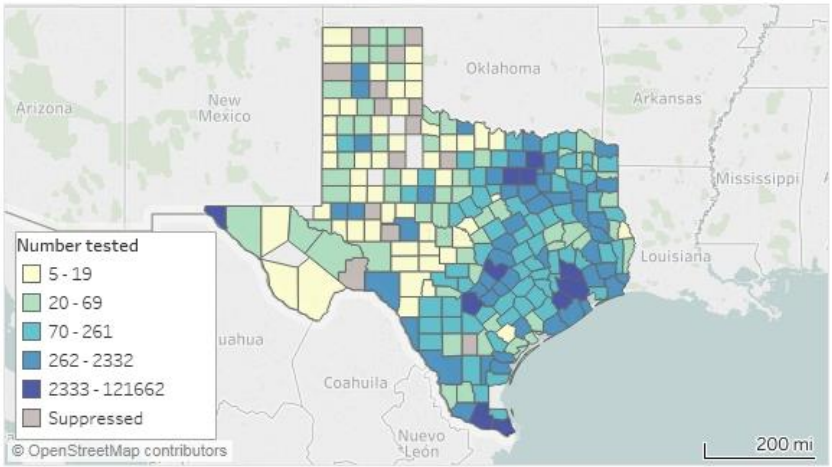
Year

2016

Number of Children Tested with confirmed blood lead test greater than or equal to 5 mg/dL



Total number of children tested



Percent of children tested with confirmed blood lead levels greater than or equal to 5 mg/dL