

# ASTHO Environmental Public Health Tracking: State-to-State Fellowship Program

## FINAL REPORT



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## BACKGROUND

The Arkansas Department of Health (ADH) is the statewide public health agency responsible for protecting and improving the health and well-being of all Arkansans. ADH provides more than 100 services statewide to ensure that where Arkansans live, work, and play is safe and healthy. ADH recognizes the importance of understanding the influence that the environment has on health, and relies on the ADH Epidemiology Branch, Environmental Epidemiology Section to manage environmental conditions and hazards that may pose a risk to human health.

Environmental epidemiology identifies and quantifies exposures to environmental contaminants; conducts risk assessments and corresponding risk communications; provides surveillance for adverse health effects; and provides health-based guidance on levels of exposure to potential contaminants. The ADH Environmental Epidemiology Section is comprised of nine epidemiologists that perform data analysis and surveillance that is incorporated in the following statewide programs and activities:

- Mercury/Fish Advisories
- Medical Waste
- Agency for Toxic Substance and Disease Registry (ATSDR)
- Emergency Preparedness and Response (Chemical, Biological, Nuclear and Explosives (CBRNE))
- Syndromic Surveillance
- Lead-Based Paint
- Mold
- Indoor Air Quality
- Geographical Information System
- Occupational Safety
- Health Education/Community Outreach

The environmental epidemiologists have a long standing relationship with the Arkansas Department of Environmental Quality (ADEQ), Arkansas Game and Fish (AGFC), the Arkansas State Plant Board (ASPB), the University of Arkansas for Medical Science (UAMS), and many other constituents of environmental data. The Environmental Epidemiology Section is currently comprised of five federally or state funded programs: ATSDR, medical waste, syndromic surveillance, emergency preparedness, and lead-based paint. These programs receive funding from the Environmental Protection Agency (EPA) and/or the Centers for Disease Control and Prevention (CDC) to provide public health surveillance, enforce state regulations, and provide health education and community outreach. The ADH Environmental Epidemiology Section has a reputation for rapid data analysis in regards to environmental health concerns, thus the expertise of the section often extends beyond the scope of funding. In the absence of funding from CDC, Arkansas's participation in the Environmental Public Health Tracking Network (EPHTN) program to date has been limited.

## INTRODUCTION

The Association of State and Territorial Health Officials (ASTHO) 2016-2017 Environmental Public Health Tracking: State-to-State Fellowship Program was awarded to ADH in October 2016. The Phase I Fellowship was designed to enhance capacity of states and territories not currently funded as part of CDC's National Tracking Network. The fellowship provided the Arkansas fellow with the opportunity to:

- Gain one-on-one, in-depth mentorship from the New York State Tracking Program.
- Learn key tracking techniques and information technology (IT) infrastructure that can be modeled around the needs and environmental challenges specific to Arkansas.
- Join the national tracking conversation.

The fellow was required to propose and implement a small tracking project as a new initiative or as a part of an existing initiative in Arkansas. The fellow was also required to complete a written report on the learning experience, the benefits that tracking could potentially have for Arkansas, and the results or projected outcome of the pilot project. This document will serve as the final report for ADH's 2016-2017 ASTHO Environmental Public Health Tracking: State-to-State Fellowship.

## MENTORSHIP

The New York State Department of Health (NYSDOH) agreed to serve as ADH's mentor program state for the State-to-State Fellowship. New York State has been a part of CDC's Tracking Program since 2002. NYSDOH initiated the development of their state Environmental Public Health Tracking (EPHT) in 2006, and it was launched in 2009. Since then, New York State has been making substantial contributions to the expansion of the national EPHT network through State-to-State mentorships, research, and outreach. Neil Muscatiello served as the mentor for the ADH fellowship. Mr. Muscatiello is an epidemiologist with the New York State Department of Health, and oversees the EPHT program. Throughout the mentorship Mr. Muscatiello provided project support, programming assistance, and educational enrichment to the ADH fellow through conference calls and a site visit.

### **Initial Conference Call:**

The initial conference call occurred on February 16, 2017, with Quinyatta Mumford (fellow), Mr. Muscatiello (mentor), and Samantha Williams (ASTHO). During this call Mr. Muscatiello provided background information on New York State and the development of the tracking program and discussed the mentee's proposed project.

### **Summary:**

Building a tracking network hinges on strong relationships with the data stewards, thus it is imperative that these relationships are nurtured from the beginning. Data stewards need to trust that their data will be viewed from a scientific perspective, and utilized to advance the understanding of health and the environment. The first step to building an EPHT program is identifying what data are available. The New York State tracking team spent a good portion of their first year identifying and qualifying data sources. Mr. Muscatiello provided the ADH fellow with an Environmental Exposure Data Set report for reference.

### **Proposed Project (Initial Discussion):**

During the conference call, the ADH fellow and New York State mentor discussed the limitations and concern of the proposed project. At that time, the fellow was having difficulty acquiring the health data needed from internal sources. Due to this being a new process there were a number of logistical issues, which led to a Memorandum of Understanding (MOU) between the Environmental Epidemiology Section and the Hospital Discharge Section. However, the air quality data were readily available. The fellow had concerns about the generalizability of the monitoring data, and the ability to use it to make an inference about overall air quality in neighborhoods that were not within a reasonable distance of the monitors. The mentor provided insight about his experience with monitoring data, and provided some suggestions for overcoming the concerns. The fellow and mentor agreed to further discuss the project at the upcoming site visit.

### **Site Visit:**

The New York State EPHT Program hosted ADH at a 2-day EPHT site visit March 23-24, 2017. The site visit began with a meet-and-greet with the New York State Tracking Team, which consists of Doug Done (GIS/Geocoding), Gwen Laselva (GIS/SAS), Tabassum Insaf (Epidemiology/Statistics), Seema Nayak (Epidemiology/Statistics) Wan-Hsiang Hsu (Epidemiology/Statistics), Arjita Rai (Epidemiology/Statistics), Melissa Frisbie (Communications), and Karen Davda (Communications). During the meet-and-greet, the team members provided an overview of tracking in New York State, their organizational structure, and the priority areas that the team members are currently focused on. The meet-and-greet was followed by presentations by the Tracking Team showcasing their respective areas of expertise.

### **Day 1:**

#### **EPHT Web Portal Demonstration and Information Technology:**

##### **Summary:**

Karolina Schabbes provided an overview of the infrastructure of the portal, the pros and cons of utilizing internal IT personnel, and the challenges the team faced when designing the web portal.

**Application:**

Prior to the site visit, the ADH environmental epidemiologists discussed the benefits of utilizing external contractors for building the Arkansas EPHT portal. However, this will require further research. The pros of utilizing internal IT support include increased flexibility, decreased cost, and complete ownership. The cons include limited personnel and time constraints.

**Communication and Outreach:****Summary:**

Ms. Frisbie, Ms. Davda, and Mr. Muscatiello provided an overview of how the Tracking Team utilized the EPHT data to craft public health messages and risk communications. The team highlighted the importance of leveraging the data and associated research for funding, and supporting current grant activities.

**Application:**

Public Health Actions (PHA) aid in educating the general public, promoting use of the EPHT network, and inspiring interest in environmental health. A well written PHA has the potential to reduce and prevent harmful environmental factors, guide intervention and prevention strategies, or inform policy makers. The fellow was provided a PHA checklist and reference materials from the 2011 National EPHT Conference that will serve as resources for future projects.

**Building Partnerships:****Summary:**

During the first year of the EPHT program development, the New York State EPHT team invested a substantial portion of their time identifying criteria by which to evaluate databases; producing an inventory of databases; prioritizing them for their utility for EPHT; identifying needs for additional, or improved, data; and developing recommendations to address those needs. Health Outcome and Hazard/Exposure reports were crafted for each of the available datasets. These reports detailed the strengths and weaknesses of each of the datasets, and enabled the team to determine which sources of data would be most conducive for the Tracker.

**Application:**

*Health Outcome Databases: Review, Inventory, Recommendations*, a white paper – provided to the fellow – highlighting the process employed by the New York State EPHT Program, will be an invaluable resource for ADH when developing the Arkansas Tracker. This document details the criteria, procedure, and recommendations the work group utilized during the initial phases of program development. NYSDOH also provided ADH with a timeline and additional reference materials for accessing and quantifying available state resources.

**Geographical Information System (GIS) Work:****Summary:**

GIS is an integral portion of the National EPHT system, and has proven to be very complex in New York State as well. Mr. Done, Ms. Laselva, Ms. Rai, and Mr. Muscatiello provided information on the layers utilized in the Tracker, the geocoding process, and the geographical aggregation tool (GAT). The EPHT team also provided details on the custom tools they utilize to make accessing the data easier. We had an in depth conversation about some of the potential challenges of geo-coding large batches of addresses.

**Application:**

The ADH fellow will work with internal GIS personnel to identify useful tools as identified during the site visit. As Arkansas continues to explore establishing a Tracker, additional GIS personnel or training may be needed. The GIS conversation also proved helpful in addressing concerns with the proposed project. Mr. Done, Ms. Laselva, Ms. Rai and Mr. Muscatiello provided insightful feedback on the ADH proposed project.

**Day 2:****Climate Change:****Summary:**

The NYDOH EPHT Tracker has enabled the team to make great strides in climate change research. Ms. Nayak presented data on the heat vulnerability index and Ms. Insaf presented data on the health effects of heat stress. The presenters clearly demonstrated the benefits of the Tracker in engaging the general public about climate change, preparing for climate related emergencies, and the impact of public health practice driven by scientific data.

**Application:**

The ADH fellow received a number of resources to aid in Arkansas's advancement in climate change work utilizing the National EPHT network and in the future the state-specific Tracker. In the meantime, the ADH fellow plans to employ some of the foundational techniques to advance Arkansas's current system and prepare for the advancement of an Arkansas EPHT network.

**FELLOWSHIP PROJECT****Description:**

In 2016, the Asthma and Allergy Foundation of America (AAFA) named Arkansas as one of the Non-Honor Roll of Asthma and Allergy Policies for Schools states (1). AAFA commended Arkansas for its adherence to 13 of the 23 core policy standards and three of the 13 extra credit indicators. Despite the strides that Arkansas is making in ensuring a healthy school environment for children suffering from asthma, policy gaps in relation to asthma management and awareness as it pertains to outdoor air quality remain. In

addition to the lack of legislation, Arkansas does not have active asthma surveillance and tracking. As a result, ADH chose to focus the fellowship project on asthma-related hospitalizations, emergency room visits, and outdoor air quality.

The fellow utilized existing air quality and hospital discharge data to analyze, evaluate, and identify linkages to assess the correlation between poor air quality days and increased asthma-related hospitalization and emergency department visits. The project objectives were to:

- establish a data sharing agreement between ADH environmental epidemiology and the data stewards (ADEQ and ADH Health Statistics Branch);
  - *Completed*
- assess the quality of existing health and environmental databases (hospital discharge data and ADEQ air quality data);
  - *In progress and will be continued beyond this fellowship cycle*
- utilize GIS to link patient-centered data (asthma) with geographic-centered data (air quality); and,
  - *In progress and will be continued beyond this fellowship cycle*
- identify target areas for health education and outreach.
  - *Completed*

### **Collaboration**

The environmental epidemiologists have a well-established relationship with ADEQ and the ADH Health Statistics Branch. These collaborations were essential to the success of the project, as ADEQ is the steward of the required air quality data, and the ADH Health Statistics Branch maintains the hospital discharge and emergency department data. The initial steps of the fellowship entailed efforts to educate the partners on the importance of establishing an EPHT system, determining common goals, and initiating data sharing agreements.

#### **Health Data:**

In December 2016, the fellow initiated conversation with ADH Health Statistics about EPHT and the proposed project. On May 3, 2017, the data sharing agreement was completed and the fellow took possession of the hospital discharge data for years 2009 through 2014, and emergency room discharge data for years 2013 and 2014. This process proved to be lengthy due to internal communications, staffing, and legal concerns. To acquire the data, the ADH Epidemiology Branch and Environmental Epidemiology Section signed a MOU with the Health Statistics Branch agreeing to both the costs, and data sharing regulations set forth by Health Statistics. Although the process of reaching an agreement was long, the data acquisition was a seamless process and progressed quickly.



**Air Quality Data:**

On December 13, 2016, the fellow attended the initial meeting with ADEQ. This meeting included Ms. Tricia Treece, who detailed the data available from ADEQ. However, the fellow learned that it was not necessary to coordinate the data retrieval from Ms. Treece and her colleagues as the data is publicly available. The meeting served more as an information session about ADH's interest in EPHT, and the role ADEQ could potentially play. Immediately following the meeting, Ms. Treece provided the ADH fellow with a list of links that housed the daily air monitoring and air permit data.

**Preliminary Analysis:****Asthma:**

The fellow analyzed the distribution of emergency room visits associated with asthma for the years 2013 and 2014. The highest frequency of emergency room visits occurred among residents within Pulaski (2,654 visits), Mississippi (376 visits), and Faulkner (335 visits) Counties. Pulaski County residents accounted for more than 41 percent of the asthma-related emergency room visits in the state. Likewise, the fellow analyzed the distribution of hospital discharges associated with asthma for the years 2009-2014. The highest frequency of hospital discharges occurred among residents in Pulaski (2,468 hospitalizations), Benton (851 hospitalizations), Jefferson (778 hospitalizations) and Garland (710 hospitalizations) Counties. Pulaski County residents accounted for more than 15 percent of the asthma-related hospitalizations over this five year period. Due to the heavy burden of asthma-related visits among this community, this project focused on identifying key areas for health education targeting in Pulaski County. Pulaski County is the largest county in the state with a population of 392,664. The state's National Core Multipollutant Network (NCore) site is located near the center of Pulaski County, making the area ideal for a small-scale environmental health project such as that required for the State-to-State Fellowship.

**Air Quality Data:**

The fellow obtained air quality data from ADEQ's monitoring network. The monitoring network is comprised of one NCore monitoring station and 16 other State and Local Air Monitoring Stations (SLAMS). ADEQ operates the following monitors: one carbon monoxide, one surrogate lead, two nitrogen oxide, eight ozone, twelve PM<sub>2.5</sub> Federal Reference Method (FRM), five PM<sub>2.5</sub> Tapered Element Oscillating Microbalance (TEOM), one PM<sub>2.5</sub> speciation, two PM<sub>10</sub> monitors, two sulfur dioxide, and two Interagency Monitoring of Protected Visual Environments (IMPROVE). The majority of the monitors are located in urbanized areas of the state; therefore, they provide air quality characterization data that are pertinent to highly susceptible individuals. For the purpose of this project, the fellow limited the analysis to the NCore site located in central Pulaski County (see Figure 1).

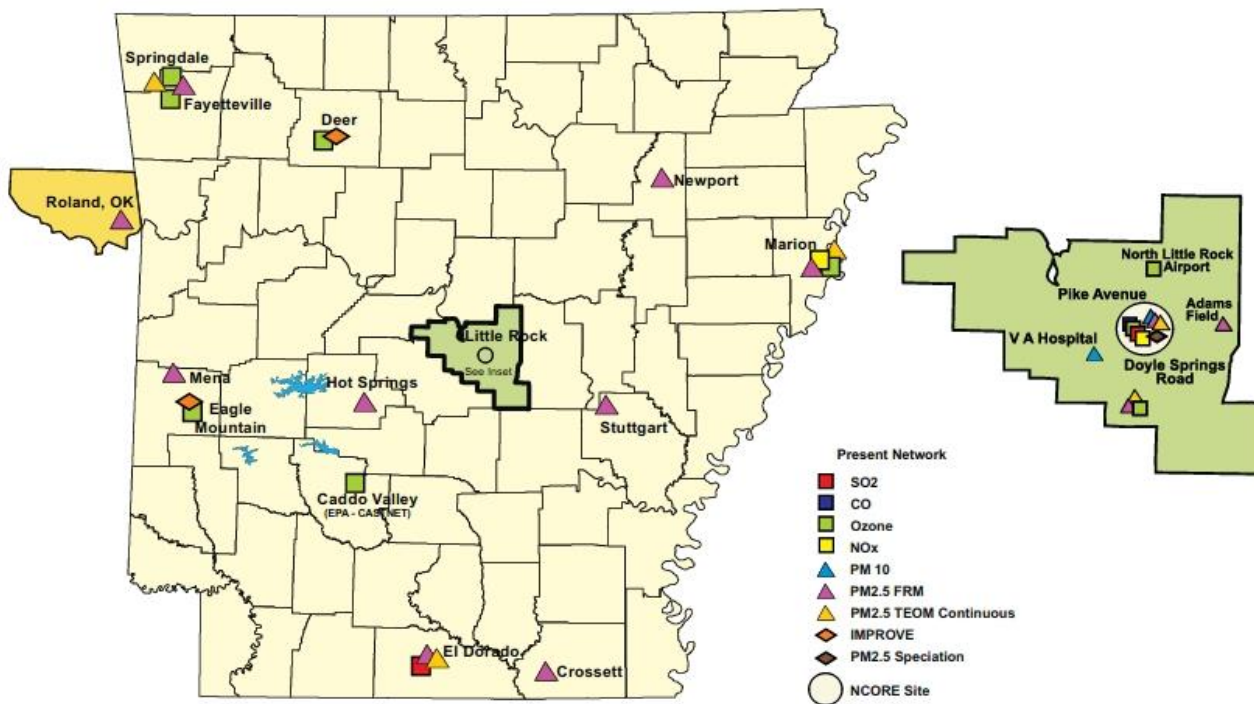


Figure 1. Arkansas Department of Environmental Quality air monitoring network

Figure 2 shows the variation in concentrations of PM<sub>2.5</sub> from January 1, 2009- December 31, 2014. Figure 3 depicts the average maximum concentration of PM<sub>2.5</sub> by month. Preliminary review of the data does not show an obvious correlation between asthma-related inpatient/outpatient visits and PM<sub>2.5</sub> concentrations. The fellow has noted that PM<sub>2.5</sub> concentrations are generally higher during the month of March which does not consistently coincide with the asthma-related hospitalization trends across Pulaski County. During the next phase of the Fellowship, the fellow will conduct a case crossover project to better assess potential correlations.

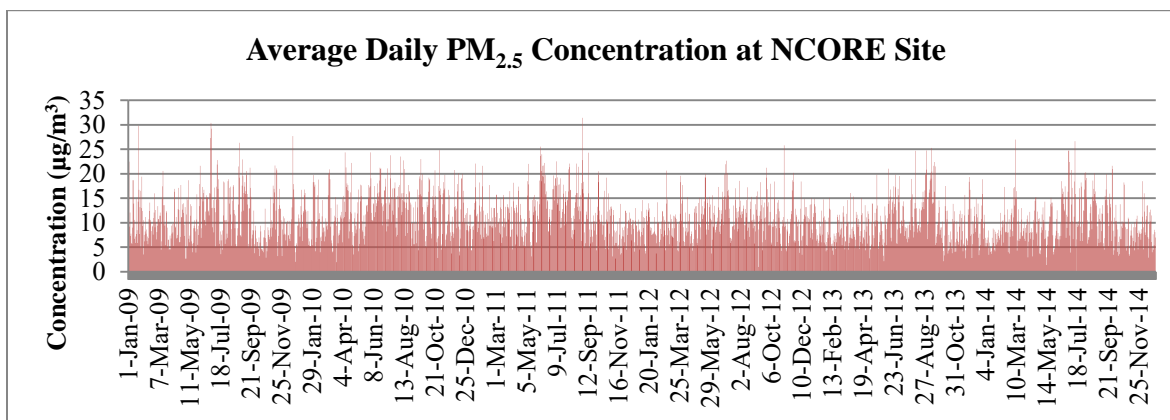


Figure 2. Average PM<sub>2.5</sub> daily concentrations for monitors located at the National Core Multipollutant Network (NCore) site from 2009-2015

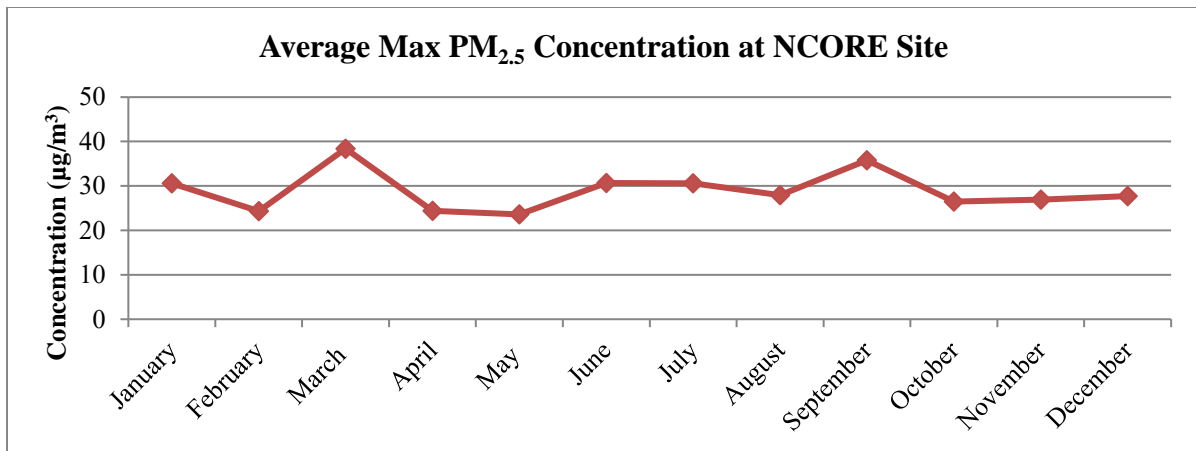


Figure 3. Average PM<sub>2.5</sub> monthly max concentrations for monitors located at the National Core Multipollutant Network (NCore) site from 2009-2015

### Challenges:

In September 2016, the state of Arkansas began to see an increase in the number of mumps cases in a portion of the state. This soon developed into an outbreak that limited the time that the fellow and other environmental epidemiologists were able to dedicate to the tracking project. However, the preliminary data analysis provided insight on the distribution of asthma-related inpatient and outpatient visits. Additional analyses are needed to truly understand the influence air quality has on asthma-related hospitalizations in Arkansas.

### Accomplishments:

On February 14, 2017, the fellow introduced EPHT to agency epidemiologists and physicians in a research scholar's forum. During this presentation, the fellow obtained buy-in from colleagues that are interested in expanding tracking into the state. This in-house interest will be pivotal to the future expansion of tracking in Arkansas. In addition to increasing awareness among those within ADH, the fellow began to foster interest in the future of tracking in Arkansas with outside agencies to include UAMS and ADEQ. These internal and external relationships will aid in the next phase of establishing EPHT in Arkansas, identifying and qualifying available data sources.

### FUTURE ACTIVITIES:

The site visit proved to be a very valuable experience that provided the fellow and ADH with a wealth of knowledge regarding state EPHT programs. Establishing a viable EPHT program relies heavily on ensuring that the necessary data are readily available and complete. The next phase of establishing a tracking system in Arkansas is to complete a comprehensive analysis of the data sets available. If selected to continue with the State-to-State Fellowship

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program, the fellow will utilize the resources provided by the NYSDOH EPHT program to identify and qualify potential data sets.

**CONCLUSION:**

The ASTHO 2016-2017 Environmental Public Health Tracking: State-to-State Fellowship Program provided ADH with a better understanding of the infrastructure, staffing, collaboration, and investment needed to establish a viable EPHT program. The fellow gained firsthand knowledge about the use of tracking data, and the impact on communities. The NYSDOH provided tremendous support and insight making the experience educational and inspiring. Moving forward, ADH will continue to expand upon the use of the environmental and health data acquired during the Fellowship process for more advanced analyses.

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## References

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2. New York State Department of Health Center for Environmental Health (2005). Health Outcome Databases: Review, Inventory, Recommendations. Troy, NY.