Infant Mortality Environmental Public Health Tracking Project

Environmental Public Health Tracking
ASTHO Fellowship Report

Submitted by

Dawn L. Ebron, MS, MPH, CPH
Epidemiologist

Public Health – Dayton & Montgomery County
117 South Main Street
Dayton, Ohio 45422

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INTRODUCTION

The Association for State and Territorial Health Officials (ASTHO) awarded Public Health - Dayton & Montgomery County (PHDMC) a peer-to-peer environmental public health tracking fellowship to foster the development of environmental tracking capabilities of a non-funded health agency. The fellowship accomplishes this by requiring the grantees to develop a pilot project that would advance environmental public health tracking in their jurisdiction, by visiting a CDC grantee mentor to gain first-hand tracking experience, and by facilitating communication and collaboration between funded and non-funded territories.

Addressing the issue of increasing infant mortality rates and the clear racial disparity between White and Black residents is a high priority for Montgomery County. PHDMC's pilot project focused on determining which areas within the county were most impacted by infant mortality and its associated risk factors.

During the fellowship timeframe, PHDMC attended a two-day site visit with the CDC funded state of California. During this trip, the PHDMC travel team acquired valuable knowledge on how best to prepare and present public health data to the community. Additionally, they learned the value in having an advisory group as part of the tracking program and how the environmental tracking data can be used for meaningful research projects.

ASTHO and the CDC organized a tracking fellowship in-person networking session where current fellows were able to meet with the CDC tracking branch personnel and hear presentations about the other fellows' tracking projects. During this session, the PHDMC representative was able to exchange ideas with other fellows, learn of new tracking resources available through the CDC, and share the progress PHDMC has made in their portal development.

This report highlights the tracking activities in which PHDMC participated and our other planned activities to include our long-term goals and the strategy we developed to reach those goals.

REPORT OF TRACKING ACTIVITIES

Host State Site Visit – California Department of Public Health

Summary

A three person team from PHDMC participated in a two day site visit (April 17-18, 2013) with the California Environmental Health Tracking Program (CEHTP) within the California Department of Public Health (CDPH). The team consisted of two epidemiologists and one web administrator. We were invited to attend their Tracking Implementation Advisory Group (TIAG) on the first day of the visit, and on the second day, we sat down with the California team for a more in-depth discussion about creating a tracking network.

Day 1 -

The TIAG was convened after CEHTP received their initial funding from the CDC. Their role is to provide guidance, recommendations, and support toward the continuous development of California's EPHTN. The group is comprised of members from CEHTP, non-governmental and community organizations, CDPH employees and retirees, local health departments, Environmental Protection Agency representatives, and academia.

After introductions, the TIAG began reviewing their current vision statements as part of the strategic planning process for the next five years so that CEHTP can prepare to apply for CDC funding next year. The process involved reviewing the current core values and vision statement. The TIAG decided not to change their current core values. Members of the CEHTP

prepared a brief presentation on each element of the current vision statement and discussed the success and challenges they faced in accomplishing those vision elements. The group discussion that followed was supposed to be centered on keeping, changing, or removing that element for 2017, but much of the discussion related to possible strategies to address the challenges.

The 2013 vision elements were:

1. The CEHTP is supported by a diversified and sustainable funding base.
2. Tracking in CA supports and is supported by local, national, and international collaborations with community, government, academic, and private partners.
3. The CEHTP is an established entity within the CA state public health infrastructure.
4. Tracking supports and creates innovation and promotes responsiveness to emerging issues.
5. Tracking tools and education/outreach activities enhance accessibility, understanding, and usability of data for all stakeholders.
6. The CEHTP has collaborations and processes in place for routine transfer and integration of data.
7. The CEHTP has the capacity for active surveillance using real-time data.
8. Tracking data stimulate and support evidence-based public health policies and actions that help to prevent illness and disease related to the environment.

Overall the CEHTP has been very successful at building the tracking network, obtaining data, and conducting many worthwhile and meaning research projects with the data. The challenges associated with each vision element seemed to be related to a lack of funding and resources. They also struggled with how to inform other governmental and non-governmental agencies and the community of the services CEHTP provided. Overall, they felt public health tracking was not seen as priority. The strategic planning process will be continued at the next TIAG meeting.

The next two agenda topics were related to outreach and communications. The first presentation was titled "The Role of Outreach and Communications in Moving Data to Action." The focus was on three of the seven steps in environmental health tracking; product development, information dissemination, and capacity building. In this presentation, CEHTP provided great examples of how they have addressed these steps. They have been involved in breast cancer mapping, creating a water boundary data set, and portal training in one of the most rural areas of California. The presenter also addressed challenges and considerations related to moving data to action; the most prominent being finding and appealing to the correct end user of the portal and working strategically given limited time and resources.

Next, the TIAG also discussed the possibility of applying for a grant to host a state level tracking conference in 2014. CEHTP wanted to know if this would be something the group would want to pursue even if they were not awarded the grant. The TIAG saw the benefit in hosting the conference so that all the end users and stakeholders could convene in one location. They also saw the conference as a means of bringing much needed awareness to the CEHTP. The conversation concluded with the consensus that the conference was a great idea and that it would be less costly and have higher attendance if it was conducted in tandem with the annual local public health conference.

Before adjourning for the day, CEHTP announced some details of a final report on a controversial study that was conducted related to pesticide use and proximity to schools. They were not allowed to release the final results at this time.

Day 2 –
    The second day's visit was to the offices of the CEHTP. PHDMC first gave a brief presentation of our project and highlighted our expected learning objectives of the site visit. These objectives were:
1. What is the best way to visualize our data?
2. How do we create a data portal that will be accessible to the public?
3. What are some strategies to expand this tracking program beyond the pilot project?

    In a little more detail than at the TIAG meeting the day prior, the group introduced us to CEHTP. They explained their mission, goals, and guiding principles; each employee's position and responsibilities; CEHTP's relationship with CDPH; and history of the program. Most interesting was their demonstration of their web portal; specifically the maternal and infant health tracking activities. This was a great segue into a long, technical discussion between our web administrator and their geospatial science director. At the end of their discussion, our web administrator had developed a plan to begin the process of visualizing our data with maps and creating a complete portal.

    After lunch, the conversation turned to issues surrounding data gathering. PHDMC does not have too many issues with collecting data, but California shared many of the problems they have encountered. Their data needs are a little different than ours at this stage of the process, but it is important to be aware of issues that may arise as we continue to expand our program.

    The CEHTP produces a fair amount of published research using their tracking data. PHDMC's two epidemiologists spent time with their principle investigator to discuss research methodology. He offered several suggestions for researching infant mortality using mapping techniques. The site visit ended with a discussion about building partnerships, disseminating data, and community outreach.

Application of what was learned
    This site visit answered the questions PHDMC proposed at the beginning of the meeting. Following the site visit, PHDMC had several options to create and publish maps. This was the biggest issue PHDMC struggled with prior to the visit. As a result of the visit, PHDMC realized the importance of creating an advisory group with stakeholders within the community. It does not seem necessary to bring a group like this together at this stage in our portal development. If the project expands to include regional data, an advisory group would be worthwhile. The epidemiologists are also looking forward to applying some of the research methodology suggested by CEHTP.

<u>In-Person Networking Session</u>
Summary
    One member of the PHDMC tracking team attended a one-day networking session hosted by ASTHO and the CDC tracking branch in Atlanta, GA. The day was filled with presentations by 2013 Fellows and Phase II grantees. The CDC tracking branch also provided an overview of the resources that national EPHTN has to offer.

    Being a new fellow, the presentations by the Phase II fellows provided insight into the challenges associated with building and sustaining a network. It was especially interesting to understand the process of uploading data to the national tracking portal. The research conducted by the new fellows highlighted interesting challenges that faced obtaining useable data and

displaying data collected in their research. The unavailability of funding and manpower was a common thread in all presentations. In the end, meaningful relationships were developed with all fellows and the national EPHTN staff members.

Pilot Project
Project Summary
  Infant mortality rate is an important index of the overall health of a society and how well that society cares for its women and children. With a rate of 7.7 per 1,000 live births, Ohio had the 11th worse infant mortality rate in the United States in 2010; a rate that has remained the same from 2006 through 2010. PHDMC also recognized the extent of this issue within Montgomery County. The infant mortality rate in the county was 7.4 in 2010; 5.9 among White residents and 12.4 among Black residents.
  An Infant Mortality Coalition, co-chaired by the health commissioner and the director of health initiatives from the Greater Dayton Area Hospital Association, has formed with representation from numerous community organizations all committed to the issue of reducing infant mortality and morbidity. The coalition has chosen to use Perinatal Periods of Risk (PPOR) data as a basis in which to identify and prioritize evidence-based interventions.
  Data from the first phase of the PPOR analysis in Montgomery County indicated that a preponderance of excess infant deaths in Blacks were in the maternal health/prematurity period. The rate in this period was 6.0 compared to the reference population's rate of 2.4. Babies born to Black mothers are more often born with very low birth weight (<1500g). The majority of excess infant deaths among White mothers (1.4 per 1,000 live births) occurred in the infant health period; post neonatal, normal weight infants. This data analysis gave the coalition a detailed overview of the infant mortality problem within Montgomery County. Phase 2 of the PPOR analysis is still in progress, but a preliminary list of risk and causal factors has been developed.

Specific Aims
  Infant mortality is complex. It is not only important to consider the health of the mother while she is pregnant, but a woman's preconception health is also crucial to her baby's development and survival. Once a newborn leaves the hospital, their environment and social determinants significantly contribute to their health. The overarching goal of this project was to determine where in Montgomery County are these excess deaths located and which risk factors are most significant in these areas.

Benefit and Significance to Montgomery County and EPHTN
  PHDMC's vision is to be an innovative leader in achieving the highest possible health and well-being for Dayton and Montgomery County residents and visitors. One of the seven pillars that support PHDMC's vision for improving the health of the community is that we serve as the public health information resource. By providing the community with access to infant mortality and other birth outcome data, the level of awareness surrounding the issue of infant mortality will increase. This bolsters support for the coalition and its efforts to implement an evidence-based, data-driven intervention.
  After the fellowship was awarded, PHDMC was selected to be a member of two different birth outcome equity institutes; one at the national level and one at the state level. The members of the state and national teams are being trained to implement evidence based interventions that

address the risk factors of infant mortality. The results of this pilot project and future data analysis will be important in evaluating their success.

Finally, this project also connected PHDMC with the EPHTN. It the goal of the health department to continue to expand the tracking network to the regional public health level and eventually to the state level.

Research design/Methods/Key Personnel

This project used data available in fetal death files, birth files, and birth-death linked files. Shape files used with Esri's ArcGIS were downloaded from the United States Census and Montgomery County Auditor's Office websites. By using a combination of geographic information system (GIS), CartoDB.com, and zip code level data from the vital statistics records; maps were generated for use in a tracking portal.

Data from the vital records was the core source of information for this project. The Ohio Department of Health allows PHDMC access to fetal death, birth, and death files for the state of Ohio, including residents of Montgomery County.

Data Elements:
Demographic/General Information
- Number of live births
- Number of infant deaths
- Number of fetal deaths
- Race of mother
- Mother's zip code of residence

Risk Factors
- Late or no prenatal visit
- Preterm birth (Gestational age <37 weeks)
- Premature rupture of membranes
- Smoking during pregnancy (Smoked during last trimester)
- Low and very low birth weight

Rates/Calculations
- Infant, fetal, and feto-infant mortality rates
- 5 year average infant mortality rate

Results

During the fellowship timeframe, data was collected, analyzed, and mapped in ArcGIS by zip code and race for the years 2006 to 2008 and 2009 to 2011. Infant, fetal, and feto-infant mortality rates were only calculated for the years 2006 to 2008 since death data for 2011 had not been finalized. Percent of preterm births, premature rupture of membranes, low and very low birth weight, late and no prenatal visits, and mothers who smoked during pregnancy were calculated for each Montgomery County zip code. Ohio five year average infant mortality rates for 1991 to 2010 for all races, Blacks, and Whites were also collected and mapped by county. A complete list of data collected is listed in Appendix A.

Using these data, maps were created using ArcGIS and shapefiles with the joined data were exported and uploaded into CartoDB.com so that PHDMC can begin the displaying the maps in an environmental public health tracking portal. An example of a map produced by CartoDB can be found in Appendix B.

Discussion

By mapping infant mortality rate by zip code, the areas of concern were very apparent. When a risk factor and feto-infant mortality rate (FIMR) were mapped side-by-side, the zip codes with a high FIMR rate and high percentages of the chosen risk factors become more evident. It is obvious that zip codes in the center of Dayton, Ohio have the worse birth outcomes in the county; these are also the zip codes where the greatest percentages of Black residents live within the county. See Appendix C.

The state and national birth outcome equity teams are using the results of this project to narrow down the areas where their planned interventions can make the biggest impact. As a long-term plan of monitoring infant mortality and some of its associated risk factors, the PHDMC environmental public health tracking portal will be available.

PLANNED ACTIVITIES
Action Plan for Future Tracking Activities

A project proposal has been written and submitted to PHDMC leadership outlining the team's accomplishments within the fellowship time frame and the next steps in the process of creating a portal. A monetary and personnel time commitment will be required to reach our goal of having an environmental public health tracking portal for Montgomery County.

The approved proposal had three phases. The first phase would use the data collected during the pilot project to create a portal that will be available through the PHDMC website. The proposed timeline is:

- June 1, 2013 – Receive approval to develop a PHDMC Environmental Public Health Tracking Portal
- July 1, 2013 - Begin work on the portal
- July 1 - September 30, 2013 – Complete portal design
- October 1 - 30 – Test portal internally and make revisions
- November 1 - 30 – Complete data upload of remaining indicators
- December 1 - 30 - Final internal and external testing and review
- January 1, 2014 – Go live!

Phase II involves the collection and addition of other health outcome and health behavior data to the portal to include, but not limited to, birth defects, cancer, asthma, alcohol use, smoking, physical activity, and BMI. In Phase III, the project would expand to include the environmental health division and the Regional Air Pollution Control Agency (RAPCA). Climate, air quality, drinking water, radon, and lead exposure data as well as data related to access to healthy foods, fast food restaurants, and neighborhood walkability would be added during this time. A project overview will be presented at the next Office of the Health Commissioner staff meeting. Employees in this division perform the majority of their work in the community therefore they will be able to offer relevant suggestions in the development of the portal based on community needs.

The epidemiologist intends to present the plan for the development of the environmental public health tracking portal at the next regional Epidemiologist meeting. There may be a county that would like to join PHDMC in the initial steps of this process. The long-term goal is to involve all regional counties. Further into the portal development process, the portal can also be presented at the state Epidemiologist meeting. Marketing the portal so that the community is

aware of its existence will be a key part of its success. PHDMC has many avenues to pursue to inform community groups, universities, and hospitals of the portal's capabilities.

CONCLUSION

PHDMC benefited from being a part of this year's peer-to-peer environmental public health fellowship program opportunity. This is an endeavor PHDMC wanted to pursue but did not have all the needed tools for successful implementation. During the site visit with CEPHTP, we gained valuable information pertaining to the successes and roadblocks that can occur in this process, tips on building a web based portal, and the usefulness of these data to conduct extensive research. PHDMC has completed and submitted a written plan that will use the knowledge gained in this experience to build a local tracking network that will effectively serve Montgomery County's residents.

SUPPORTING MATERIALS

APPENDIX A

Data Collected During the Infant Mortality Pilot Project

1. 2010 population by zip code
   - Total Population
   - Percent White
   - Percent Black

2. IMR in Ohio by county
   - IMR 2006 to 2010
     - IMR 2006
     - IMR 2007
     - IMR 2008
     - IMR 2009
     - IMR 2010
   - IMR 5 year average 1991 – 2010
     - IMR 1991 to 1995
     - IMR 1996 to 2000
     - IMR 2001 to 2005
     - IMR 2006 to 2010
   - IMR 5 year average; White – 1991 – 2010
     - IMR 1991 to 1995; White
     - IMR 1996 to 2000; White
     - IMR 2001 to 2005; White
     - IMR 2006 to 2010; White
   - IMR 5 year average; Black – 1991 – 2010
     - IMR 1991 to 1995; Black
     - IMR 1996 to 2000; Black
     - IMR 2001 to 2005; Black
     - IMR 2006 to 2010; Black

3. Birth outcomes by zip code - 2006 through 2008
   - Infant Mortality Rate
   - Feto- Infant Mortality Rate
   - Fetal Mortality Rate
   - Percent LBW
   - Percent VLBW
   - Percent Premature Rupture of Membranes
   - Percent Preterm Birth
   - Percent No Prenatal Care
   - Percent Late Prenatal Care
   - Percent Who Smoked While Pregnant

4. Birth outcomes by zip code - 2009 through 2011
   - Percent LBW
   - Percent VLBW
   - Percent Premature Rupture of Membranes
   - Percent Preterm Birth
   - Percent No Prenatal Care
   - Percent Late Prenatal Care
   - Percent Who Smoked While Pregnant

5. Birth outcomes by zip code and race - 2006 through 2008
   - White
     - Percent LBW
     - Percent VLBW
     - Percent Premature Rupture of Membranes
     - Percent Preterm Birth
     - Percent No Prenatal Care
     - Percent Late Prenatal Care
     - Percent Who Smoked While Pregnant
   - Black
     - Percent LBW
     - Percent VLBW
     - Percent Premature Rupture of Membranes
     - Percent Preterm Birth
     - Percent No Prenatal Care
     - Percent Late Prenatal Care
     - Percent Who Smoked While Pregnant

6. Birth outcomes by zip code and race - 2009 through 2011
   - White
     - Percent LBW
     - Percent VLBW
     - Percent Premature Rupture of Membranes
     - Percent Preterm Birth
     - Percent No Prenatal Care
     - Percent Late Prenatal Care
     - Percent Who Smoked While Pregnant
   - Black
     - Percent LBW
     - Percent VLBW
     - Percent Premature Rupture of Membranes
     - Percent Preterm Birth
     - Percent No Prenatal Care
     - Percent Late Prenatal Care
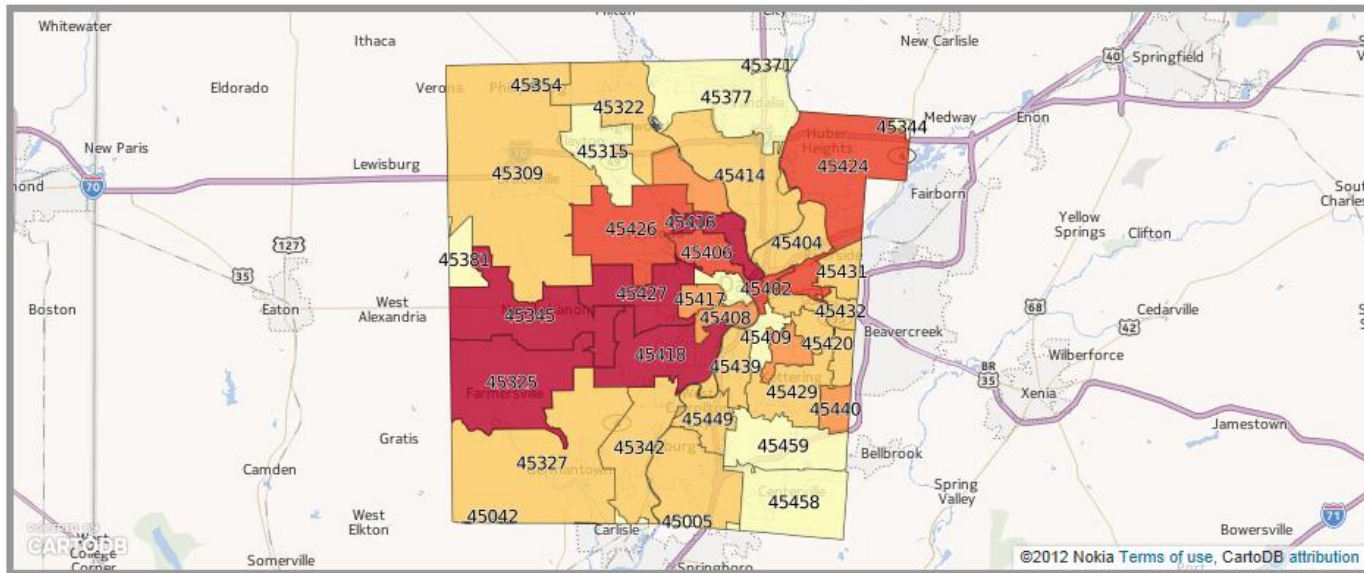   - Percent Who Smoked While Pregnant

APPENDIX B

Sample Map Produced by CartoDB

Map created by PHDMC

Infant Mortality Rate 2006-2008

Montgomery County, Ohio

Number of infant deaths under 1 year of age per 1,000 live births

| All births | IMR 0.0 - 1.2 | IMR 1.3 - 6.5 | IMR 6.6 - 9.3 | IMR 9.4 - 11.5 | IMR 11.6 - 16.9 |

DESCRIPTION   Infant mortality rate is mapped by zip codes in Montgomery County, Ohio.

SOURCES   Center for Public Health Statistics and Informatics. Ohio Department of Health. *The department specifically disclaims responsibility for any analyses, interpretations, or conclusions.*

FIMR and VLBW in Montgomery County Ohio

Birth Outcomes by Zip Code 2006-2008
Montgomery County, Ohio

Feto-infant Mortality Rate

Very Low Birth Weight

Feto-Infant Mortality Rate

- 0.0 - 4.3
- 4.4 - 9.5
- 9.6 - 13.9
- 14.0 - 17.5
- 17.6 - 29.5
- No births

Percent Very Low Birth Weight

- 0% - 0.6%
- 0.7% - 1.3%
- 1.4% - 1.8%
- 1.9% - 2.9%
- 3% - 5.9%
- No births