



Integrating Data for Improved Public Health Surveillance: The Environmental Public Health Tracking Network

Overview

In 2001, Congress appropriated funding to the Centers for Disease Control and Prevention (CDC) for the creation of the National Environmental Public Health Tracking (EPHT) Program. Starting in 2002-2003, the CDC funded 21 states, 2 cities and several universities to develop a national environmental public health tracking network. Over the past four years, the Florida Department of Health (FDOH), Division of Environmental Health has been participating with the CDC and other national, state and local partners to lay the foundation for developing both a national and state surveillance system to track environmental hazards and potentially related diseases. Through the use of web-based data query systems (portals) and automated data transfer routines (gateways), the EPHT Network will provide an important resource to inform communities about their health status and environmental hazards.

The program's goals are to:

- (1) Build a sustainable national and state EPHT network,
- (2) Increase EPHT capacity,
- (3) Disseminate credible information regarding environmental hazards
- (4) Advance environmental public health science and research, and
- (5) Bridge the gap between public health and the environment.

In an effort to make the EPHT Network a reality, the CDC and state health departments have been collaborating with numerous federal, state and local agencies, professional organizations, and civic groups to mobilize electronic data sharing and support for the program. When completed, the fully developed EPHT program will do more than simply gather facts. It will connect electronic data sources from health and environmental agencies, provide the tools to analyze and link these data, and display the final information in an intelligent way to those who need to see it.

Background

The environment plays an important role in health and human development. Over the last fifty years, researchers have linked exposures to certain environmental hazards with specific disease outcomes. One example is the link between exposure to asbestos and lung cancer. Another example is the link between exposure to lead and decreased mental function in children. Although much progress has been made, there is still much work to be done. For example, other links remain unproven, such as the suspected link between bladder cancer and exposure to disinfectant byproducts in drinking water.

As pointed out in the 1988 monumental report, “*The Future of Public Health*,” by the Institute of Medicine (IOM), “the removal of environmental health authority from public health agencies has led to fragmented responsibility, lack of coordination, and inadequate attention to the health dimensions of environmental problems.” A supporting document issued by the Pew Environmental Health Commission and released to Congress, “*America’s Environmental Health Gap: Why the Country Needs a Nationwide Health Tracking Network*,” has expressed that the existing environmental health system is neither adequate nor well organized, and recommended the creation of a “Nationwide Health Tracking Network for disease and exposures.” The report further explained that there are currently no existing systems at the state or national level to track many of the exposures and health effects that may be related to environmental hazards; and in most cases, existing environmental hazard, exposure, and disease tracking systems are not linked together. Because existing systems are not linked, it is difficult to study and monitor relationships among hazards, exposures, and health effects.

Environmental public health tracking is one way to fill these gaps in knowledge. As shown in Figure 1, EPHT is the ongoing collection, integration, analysis, interpretation, and dissemination of data on environmental hazards, exposures to those hazards, and health effects that may be related to the exposures.

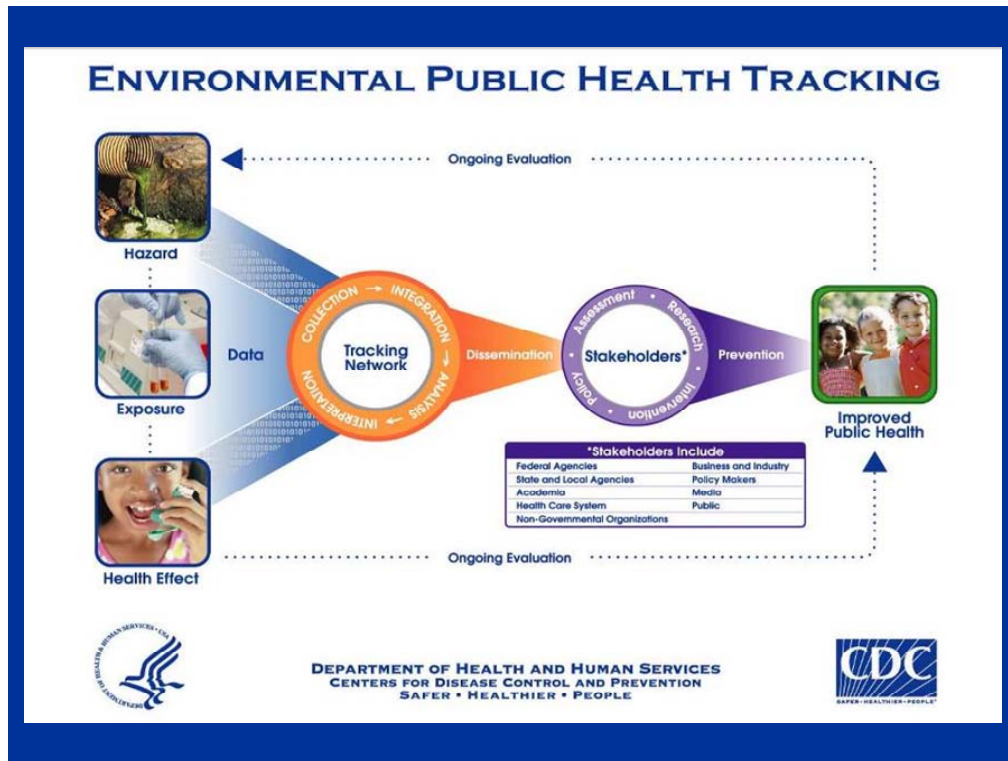


Figure 1 Environmental Public Health Tracking is Surveillance

The goal of EPHT is to monitor the occurrence of adverse health effects and environmental hazards, and to assess potential relationships between them for the purposes of improving information availability for the public, health professionals, and policy makers. Further, EPHT seeks to facilitate the enhancement and evaluation of environmental public health programs, such as asthma intervention or air pollution reduction programs.

National EPHT Efforts

In fiscal year 2002, CDC awarded \$14.2 million to 20 state and local health departments and 3 schools of public health to complete the following:

- (1) Build environmental public health capacity,
- (2) Increase collaboration between environmental and health agencies,
- (3) Identify and evaluate environmental and health data systems,
- (4) Build partnerships with nongovernmental organizations and communities, and
- (5) Develop model systems linking environmental and health data that other states or localities can use.

Funding for schools of public health (as “academic partners of excellence”) has been used to assist state and local health departments with EPHT activities and to investigate possible links between health effects and the environment. In FY 2003 and FY 2004, CDC also provided nine states and New York City with \$4.2

million annually for projects that linked environmental, exposure, and health effect data. During these same fiscal years, CDC awarded \$500,000 annually to national organizations such as the Association of State and Territorial Health Officials and the National Association of County and City Health Officials to (1) promote and increase knowledge of EPHT among state and local environmental health professionals and (2) enhance collaboration among public health, environmental and partner agencies to improve EPHT surveillance.

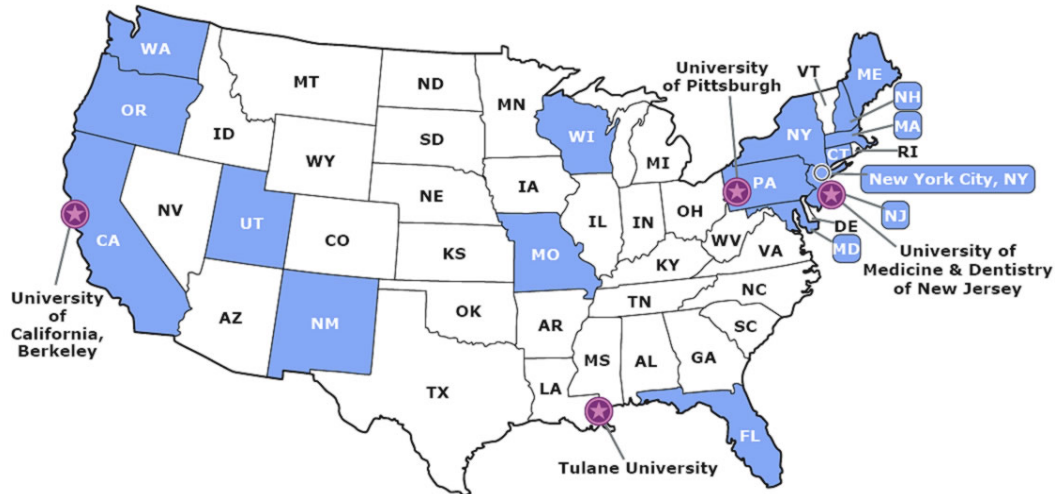


Figure 2 Funded EPHT states, universities, and city

In addition, CDC also established a memorandum of understanding (MOU) with the National Aeronautics and Space Administration (NASA) and the U.S. Environmental Protection Agency (USEPA) to promote collaboration on initiatives related to environmental public health tracking (e.g. data sharing).

Indicators

One way EPHT is achieving progress is through developing nationally consistent data measures (NCDM), also known as indicators. Indicators provide information about a population's health status with respect to environmental factors and may be particularly useful when clear measurable links are not available. As such, they can measure health or a factor associated with health in a specific population. For example, because the environmental hazard of lead-based paint in older homes is difficult to estimate, we also use blood lead measurements in children to indicate the magnitude of the lead paint hazard and the risk for childhood lead poisoning. Similarly, we measure microbial contamination in the water to indicate the risk for gastrointestinal illness.

To address this gap in our understanding of environmentally related diseases, EPHT has identified over 70 specific indicators of environmental hazard, health and exposure. Examples include air quality, birth defects, cancers, developmental disabilities, carbon monoxide, lead poisonings, and community environmental health indicators.

The EPHT Network is also working towards enabling data exchange among local, state, and national databases of environmental hazards, environmental exposures, and health effects in a standardized way. This will be a crucial component of the National EPHT Program, and will provide scientists, policymakers and the public with access to information about the incidence and prevalence of disease rates for their individual communities and for the nation as a whole. The EPHT Network web portal is scheduled to go “live” on the World Wide Web on September 2008.

Florida EPHT Activities

Since receiving CDC cooperative agreement funding in 2003, the Division of Environmental Health EPHT Program has been developing partnerships with universities, not-for profits, federal, state, and local agencies to lay the foundation for data sharing and to move the Tracking Program to the network implementation stage. The partners include the Florida Department of Environmental Protection (FDEP), Agency for Health Care Administration (AHCA), University of Miami, University of Florida, University of South Florida, Florida Cancer Data System (FCDS) and the Florida Birth Defects Registry (FBDR).



Figure 3 Florida EPHT Partners and Stakeholders

For the program to continue being successful, it is critical to continue these collaborations. The agencies and universities remain vital to the project for the following reasons: they provide the environmental and health data needed for

linkage and indicator development, they supply statistical support and technical expertise, and they offer important guidance for implementing the EPHT network. They are committed to working with the FDOH on selected EPHT projects to provide a better understanding of how environmental exposures may be associated with adverse health effects.

The Florida EPHT staff is also currently participating in national workgroups on the NCDMs, to determine: what data will be included, how the data will be presented, standards for electronic transfer of data, and risk communication messages.

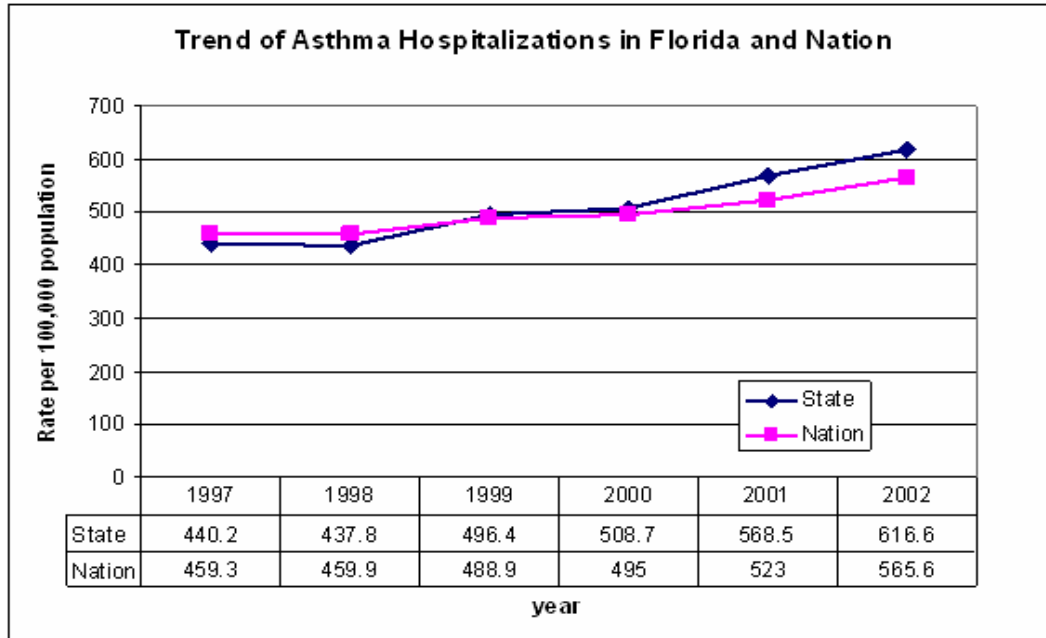
To date, four (4) indicators have been completed and posted on the web portal called Florida CHARTS, at the following location:

<http://www.floridacharts.com/charts/epht.aspx?Domain='05'>

The Florida EPHT Program plans to evaluate how well the indicators predict human health outcomes and hazardous environmental conditions. We will also continue to assess how best to enhance the indicator definitions and standardize data collection practices. We believe that a common set of reliable indicators for tracking environmental exposures and adverse health effects could be used by state programs focus on priority surveillance systems in order to better monitor the health status of Florida communities.

The linking of health data with environmental data requires a mutual agreement between agencies to share data, which is sometimes confidential, in a secure and effective manner. The FDOH and Florida data partners are working towards the ability to convey environmental health information about our state and its population in a manner that will protect confidentiality, while still providing web-based access.

The ability to foster relationships with other state agencies such as the Agency for Health Care Administration (AHCA) and the Florida Department of Environmental Protection (FDEP) has created opportunities for data linkage demonstration projects. One of the projects in Florida looked at air pollution and asthma hospitalizations. FDOH used FDEP's outdoor air quality monitoring data



- Data from Veterans Administration or military hospitals were not included in reviewed reports.

Figure 4 Asthma hospitalization data (courtesy of AHCA).

and AHCA's hospitalization data to evaluate the relative risk of ozone and particulate pollution on asthma hospitalizations. As shown in Figure 4, the trend for asthma hospitalizations from 1999 to 2002 in Florida exceeded the National rate. The preliminary results of these findings indicate that several counties in the south central area of Florida are demonstrating higher relative risks of asthma hospitalizations when compared to the entire state. Does this mean that there are significant problems with outdoor air quality and asthma hospitalizations in these counties? At this point, we are still not sure. The results are crude estimates and may not account for other underlying conditions (e.g. access to local health care and/or accurate outdoor air monitoring devices), which may impact the relative risk. Nonetheless, the results from this data linkage project signify that more detailed work should be done to better understand this environment/health relationship in these geographical areas of the state.

To help us better understand the relationship between environmental hazards and health effects, FDOH EPHT has been using cutting-edge technology to rapidly determine incidence and/or prevalence rates of disease in selected geographical locations. A spatial analysis tool called the Rapid Inquiry Facility (RIF), developed by the Imperial College of London, integrates environmental, health and population data into a geographical information system (GIS). With this tool, the relative risk of health outcomes such as cancers and birth defects near environmental hazards (e.g. hazardous waste sites) can be quickly analyzed and spatially displayed. One of the extraordinary benefits of the RIF

tool is that it minimizes the work effort to statistically model and spatially analyze health outcome data. The previous, manual estimation process used to take days or even weeks to complete relative risk calculations. With the RIF, it takes only a few minutes to calculate the incidence rates and confidence intervals, and display a map of the selected study area.

The use of GIS tools and traditional surveillance techniques will allow the EPHT Program to better communicate spatial and temporal trends of disease rates to our stakeholders in Florida. In addition, we have also constructed a program-specific Risk Communication Plan, in order to effectively disseminate public health messages about environmental hazards.

Future Efforts and Public Health Context

In 2008-2009, the FDOH will continue its initiatives with CDC and partners to build the state and national EPHT network, through the following activities:

- 1) obtain quarterly asthma and myocardial infarction hospitalization data from the Agency for Health Care Administration via a secure file transfer protocol (SFTP),
- 2) examine childhood lead poisoning prevention program (CLPPP) data at the zipcode level
- 3) Electronically receive outdoor air monitoring data from the FDEP and the United States Environmental Protection Agency (US EPA) to evaluate the delayed effects of ozone, PM 2.5 with asthma and myocardial infarction hospitalization data, and
- 4) Identify selected birth defects from the FBDR to explore prevalence rates near environmental hazards, such as hazardous waste sites.

In addition to its Florida stakeholders, the Florida Tracking Program is committed to working with other grant and non-grant funded states and the CDC to collectively implement the Tracking Program at the National level. Developing the National Tracking program will be a huge undertaking and will require extensive information technology (IT) knowledge and resources. It will require FDOH's continued participation on several CDC workgroups, including the Content Workgroup, Standards Network and Development Workgroup, Program Marketing and Outreach Workgroup, and the various sub-workgroups that are related to each health outcome and environmental hazard.

In terms of environmental health context, developing EPHT capabilities addresses several focus areas within the Division's Strategic Plan, including: a) Healthy People 2010 objectives for Environmental Health, Public Health Infrastructure, Educational/Community-Based Programs, and Health Communication; and b) the 10 Essential Public Health Services for Environmental Health, including monitoring environmental and health status to identify community environmental health problems.

Conclusion

In conclusion, the EPHT Program will continue to utilize the Department's extensive expertise in developing, implementing, and evaluating broad-based health promotion and prevention initiatives that can be adapted for environmental and health effect tracking and surveillance. As the EPHT Program matures and the relationship between environmental hazards and health outcomes becomes clearer, effective interventions can be designed to promote, protect and improve the health of all people in Florida.

For further information, please contact Greg Kearney, Florida Department of Health, Division of Environmental Health, at (850) 245-4577.



This publication was supported by CDC grant #U38EH000177-01 and may not necessarily reflect the views or opinions of the CDC.

References

Agency for Health Care Administration, Asthma Hospitalizations,
<http://www.floridahealthfinder.gov/Researchers/health-outcome-series.shtml>
Retrieved 10/31/07.

Michael A. McGeehin, Judith R. Qualters, and Amanda Sue Niskar, National Environmental Public Health Tracking Program: Bridging the Information Gap. *Environmental Health Perspectives*. 2004 October; 112(14): 1409–1413. Published online 2004 August 3.

The Future of the Public's Health in the 21st Century, Committee on Assuring the Health of the Public in the 21st Century, Board on Health Promotion and Disease Prevention, Institute of Medicine of the National Academies, The National Academies Press, Washington, D.C. www.nap.edu

Environmental Public Health Tracking, <http://www.cdc.gov/nceh/tracking/>,
Retrieved 09/12/07.

Environmental Public Health Tracking,
<http://www.cdc.gov/nceh/indicators/>, Retrieved 09/12/07.

Florida Department of Health, FloridaCHARTS,
http://www.doh.state.fl.us/planning_eval/phstats/index.html