DISTRICT OF COLUMBIA ENVIRONMENTAL PUBLIC HEALTH TRACKING PROGRAM

ENVIRONMENTAL PUBLIC HEALTH TRACKING ASTHO FELLOWSHIP REPORT

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Submitted to

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1. INTRODUCTION

The Centers for Disease Control and Prevention (CDC) recently launched a National Environmental Public Health Tracking Network. In order to enhance the capacity of state and territorial health agencies to conduct tracking related activities, the Association of State and Territorial Health Officials (ASTHO) launched the pilot "Environmental Public Health Tracking: State-to–State Peer Fellowship Program." Sixteen states are currently funded by CDC, but the District of Columbia is not a funded entity.

In April 2009, John Davies-Cole, PhD, MPH, State Epidemiologist, District of Columbia Department of Health (DC-DOH), Center for Policy, Planning & Epidemiology (CPPE), a prospective Principal Investigator (PI), was awarded a $3,000 State-to-State Peer Fellowship by ASTHO. The purpose of the ASTHO Tracking Fellows Program was to:

- Assist non-funded state and territorial health agencies gain first-hand experience from their peers in states that are funded for tracking activities.
- Strengthen peer networks across state and territorial health agencies, and
- Explore ways to integrate environmental epidemiology/data collection activities of non-tracking funded states into the National Tracking Network.

Several activities were initially planned for the period starting February 16 to May 31, 2009. Due to a delay in notification and award of fellowship funds, the timelines for the various activities were revised after consultation with ASTHO. The new timelines were adjusted to cover the period from May 20 to August 31, 2009. In April, ASTHO arranged and paid for the DC PI to visit the Utah Health Department, and in May 2009, the amount of $2,551.44 was transferred to DC-DOH for other planned fellowship activities. The planned activities are listed below (new dates are in parenthesis):

- Visit host state from February 16 to 18, 2008 (New date: April 15-16, 2009)
- Identify additional data sources and meet with key personnel by March 30, 2009 (New date: by June 30, 2009)
- Meet with key stakeholders to conduct focus group meetings with three communities that are affected by various environmental contaminants by April 30, 2009 (New date: by July 30)
- Reestablish an Environmental Tracking Advisory Workgroup by May 10, 2009 (New date: May 30, 2009)
- Produce a District of Columbia Environmental Public Health Tracking Report by May 31, 2009 (New date: August 30)

All of the above activities were accomplished, except the 3rd activity, which was modified as follows:

Planned activity: Meet with key stakeholders to conduct focus group meetings with three communities that are affected by various environmental contaminants by April 30, 2009. The reason for the change is described in section 2c below.

***New activity*: Work with students at the George Washington University School of Public Health and Health Services to identify core environmental public health data for tracking and describe the data using CDC's standard metadata profile elements.**

The District of Columbia Department of Health Environmental Public Health Program (DCEPHTP) worked with students at the George Washington University to give them the opportunity to gain knowledge and understanding of the Environmental Public Health Tracking (EPHT) Program as a culminating experience. All of the above-mentioned activities and accomplishments are described in detail in section 2 below:

2. REPORT ON ACTIVITIES

a. Visit host state from February 16 to 18, 2009

The Principal Investigator will visit the state of Utah that has implemented the EPHT program. DC DOH currently has a very good working relationship with the Center for Health Data at the Utah Department of Health. The DC-DOH recently adopted Utah's web-based data query system and has been receiving assistance from that state. DC-DOH has developed an EPHT Network architecture (J2EE Architecture) which will be reviewed and compared with Utah's EPHT Network and its relationship with its Web Query system. The strengths and weaknesses of Utah's EPHT program will also be reviewed.

Accomplishments:

The principal investigator (PI) visited Utah from April 14 to 16, 2009. The PI was unable to visit in February because the award was made in March, and the Utah Department of Health (UDOH) was unable to schedule the visit for an earlier date due to other commitments. The visit was well planned by the UDOH Environmental Public Health Tracking Program. All aspects of the EPHT Program were presented and discussed with the DC PI. Dr. Sam LeFevre, Director, Division of Environmental Epidemiology and Dr. John Contreras, Program Manager, Environmental Public Health Tracking Program, Utah Department of Health welcomed the PI and introduced him to other members of the EPHT Program staff. On the first day of the visit, Dr. John Contreras gave an overview of the EPHT Program including the EPHT Network and its components. Various presentations

were made by Utah EPHT staff and their collaborators. Details of the presentations and discussions are briefly described below:

Establishment of the Utah EPHT Program

The PI was informed that Utah established its EPHT Program within the Environmental Epidemiology Program in 2003, and in 2005 received a grant from CDC to carry out the implementation phase. This was a 5-year program that was funded to develop a standardized web-enabled data warehouse, leverage existing hardware and platform resources, leverage existing department public portal and develop a the EPHT Network.

The Utah EPHT Network consists of the following data:

- Utah Birth Defects Registry
- Utah Cancer Registry
- Child Blood Lead
- Utah Poison Control
- UDOH Office of Vital Records
- UDOH Office of Health Care Statistics, Hospital and Emergency Discharge.
- COPD,
- Ischemic Heart Disease,
- CO Poisoning
- UDOH Injury Registry
- Utah Division of Motor Vehicle, Drivers License
- Utah Department of Environmental Quality (UDEQ), Division of Air Quality
- PM
- Ozone
- Division of Drinking Water
- Arsenic
- Lead
- Chlorination by products

Figure 1 is a diagrammatic representation of the components of Utah data warehouse and figure 2 shows the components of the EPHT Network.

Figure 1. Utah Environmental Public Health Tracking Network Data Warehouse

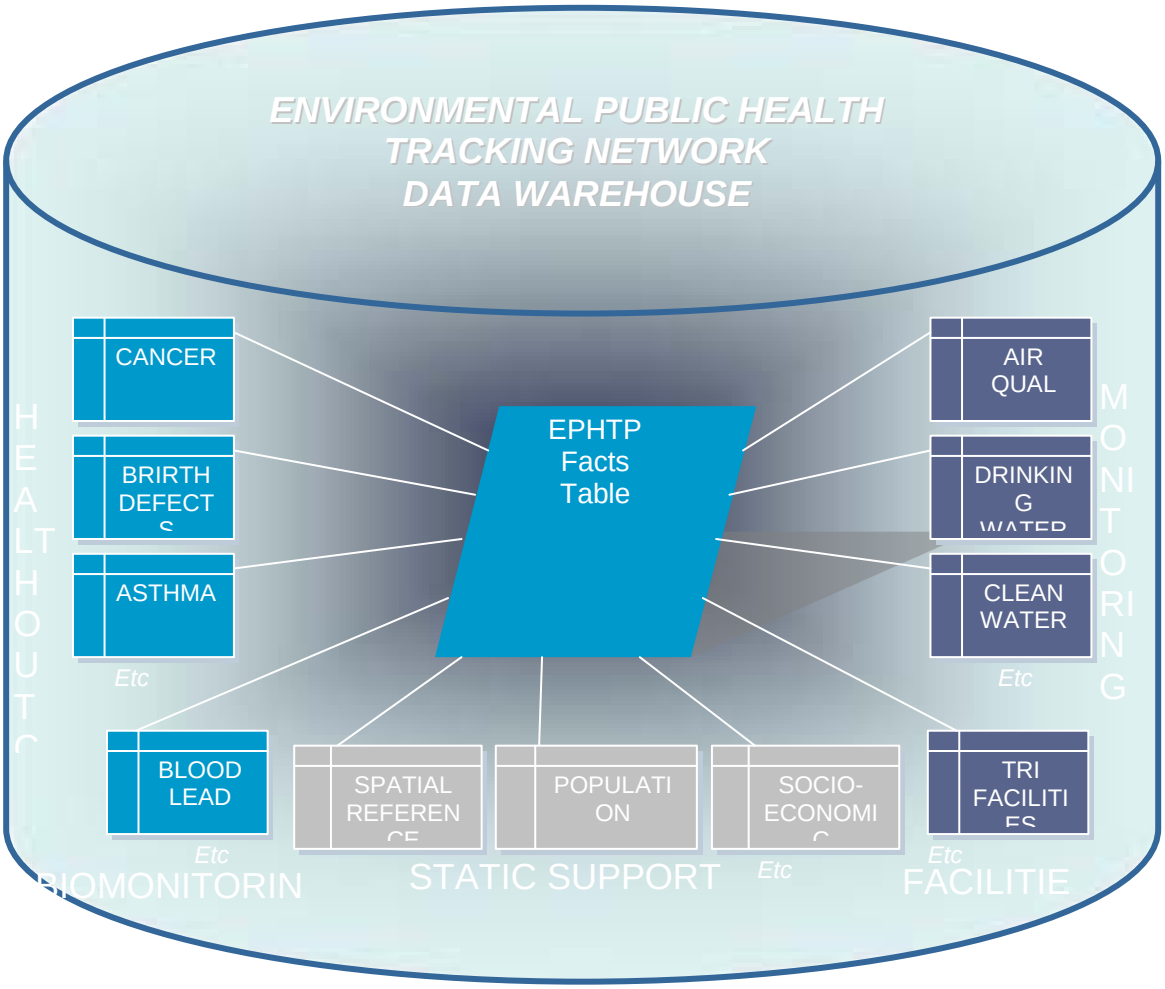
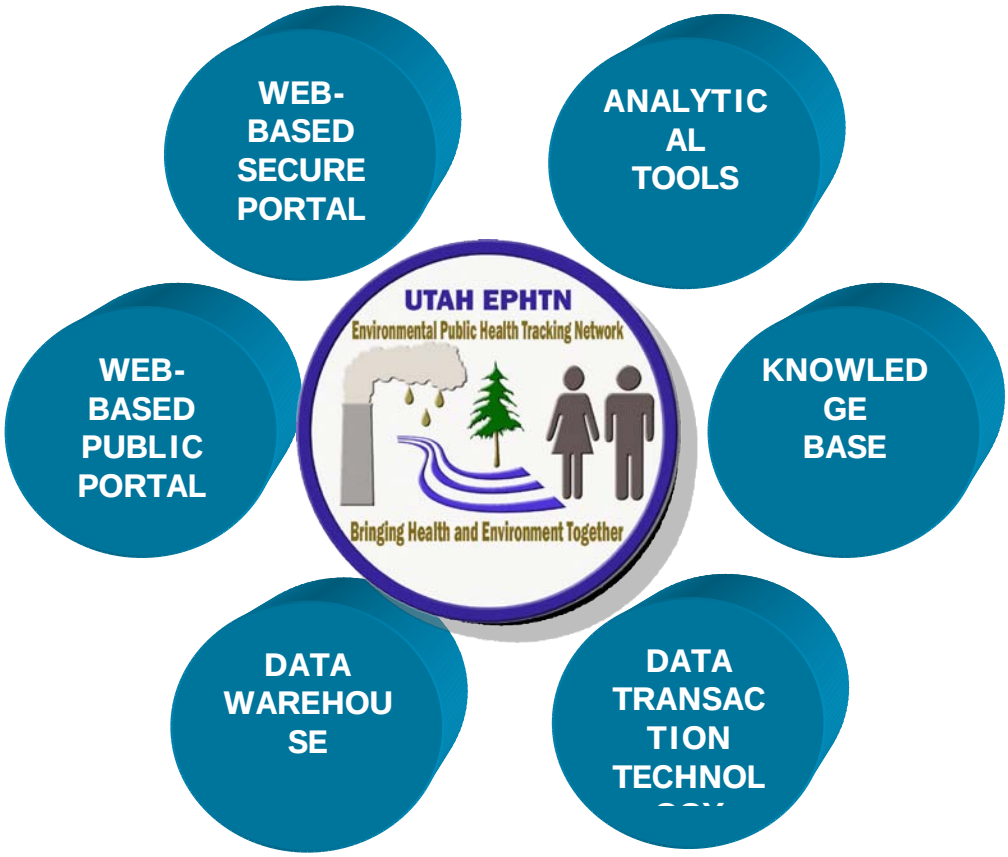


Figure 2. The Utah Environmental Public Health Tracking Network



Analytical Tools

The analytical tools used by the Utah EPHT Network include ArcGIS/ArcMap & Extensions, a SAS component and freeware. Utah has developed a Rate Ratio Calculator, data management tools, focal testing tools and dispersion modeling capability. This allows them to conduct exposure assessment, disease Mapping, cluster detection and focal / risk analysis.

Data Transport

Utah uses PHIN-MS for data transport. PHINMS is a generic, standards-based, interoperable and extensible message transport system. It is platform-independent and loosely coupled with systems that produce outgoing messages or consume incoming message. PHINMS has three major components: the Message Sender, Message Receiver and the Message Handler.

The Message Sender functions as the client. It is a Java application that runs on a workstation or server. The Message Sender polls the Transport Queue for outgoing data. The Transport Queue can be a database table or a file system directory. When outgoing data is found, the Message Sender packages the data as an ebXML (Electronic Business using eXtensible Markup Language) message and sends it to the Message Receiver.

The Message Receiver functions as a server. It is a servlet that runs on a J2EE compliant application server. When the Message Receiver receives a message, it processes the message envelope, decrypts the message, verifies the signature and then forwards the message payload to the Message Handler or writes the message directly into a worker queue. Afterward the Message Receiver waits for an application status from the Message Handler and when it receives the status it forwards it to the Message Sender.

The Message Handler functions as a server. It is a servlet that runs on a J2EE compliant application server. The Message Handler and the Message Receiver can reside on the same system. When the Message Handler receives the message payload from the Message Receiver it processes the message payload and then sends a response, which contains the Message Handler's status, back to the Message Receiver.

Determining Exposure to Environmental Hazards

Utah uses the Rapid Inquiry Facility (RIF) in determining risk of exposure to an environmental hazard. RIF is a geographical information system designed in the United Kingdom for epidemiological study. The RIF can produce estimated relative risks for any given condition for the population within defined areas around a point source, relative to the population in a local reference region. Potential point sources of pollution are identified and the zones around them are grouped into bands, according to the distance of their central point from the source. Routine data on morbidity, mortality and population are then used to calculate risk rates. These are then compared across bands to assess whether there is a higher risk in regions closer to the point source. The distance from the

source is used as the proxy for population exposure i.e. the nearer the distance to the point the higher the potential exposure for all members of the population regardless of age or sex. Higher risks observed in closer bands therefore possibly indicate the presence of a risk factor.

In risk analysis, questions asked include

- *Where* is the risk factor?
- At what *distance* does it have an impact?
- Is the risk factor's effect *short or long term*?

Utah IBIS

The Information System for Public Health (IBIS-PH) is the application that provides the public access to health data which includes static content, health indicator profile reports, and an interface which allows custom queries of SAS public health datasets. The View System provides three basic types of pages:

- Static content type web pages. These types of pages include introduction pages, pages which give information about the site, the health department, and any other web page content that is not the result of a dynamic, data driven web page.
- Indicator Profile reports. Dynamically generated health indicator report pages are based on data stored in a database and maintained by various health agency offices via the Data Admin system.
- Custom dataset queries. This include dataset selection pages, query builder pages, and query result pages.

Utah's Tracking Network is integrated into the IBIS-PH and the Tracking use environmental public health indicators (EPHIs) to measure the health of a community. EPHIs provide information about an environmental hazard, exposure, or health outcome, or a plausible relationship among them. When observed over time or across geographies, an EPHI may show patterns or trends relative to health risk, and is intended to inform policy makers and guide action.

IBIS community practice

Utah has introduced Community of Practice (CoP) for states that are using the IBIS-PH software. The CoP members have common goal or common purpose and it is often the case that the CoP is internally motivated i.e. driven by the members themselves as opposed to some external driver. Relationships are key to a CoP and what makes it possible for a team to become a CoP. These relationships key to the issues of trust and identity in a CoP. Staff working on developing and maintaining the software; share ideas for use, training and provide mutual technical support.

Members could benefit from this relationship in a number of ways. Health programs, policy-makers, community members can gain greater access to data. Analysts are freed of some tedious data reporting tasks. Members can leverage Utah's 14 years of

development experience. There is little out-of-pocket software and hardware costs for enterprise class applications. UTAH also benefits from additional perspectives, knowledge and experience. As IBIS is open source, it is expected that others will enhance and share their enhancements with the community, thus allowing the applications to continue to evolve.

UTAH 2009 Program Plan

The Utah 2009 EPHT program plan includes the following:

- Increase outreach and indicator areas (public portal).
- Monitor and distribute information about environmental hazards and disease trends.
- Advance research on possible linkages between environmental hazards and disease.
- Develop, implement, and evaluate regulatory and public health actions to prevent or control environment-related diseases.

b. Identify additional data sources and meet with key personnel by March 30, 2009

DC EPHTP has selected 6 data sources to provide data for the proposed DC DOH EPHT Network. These data sources were identified during an inventory of internal DC DOH databases and external DC DOH databases. Of the selected data sources, the EPHTP receives data from 5 public health data sources and 1 environmental data source. CPPE will hold interagency discussions to identify other possible data sources.

Accomplishments:

The DC EPHT Program will track various key indicators as described by CDC. This will include hospitalizations for asthma; hospitalizations for myocardial infarction; ozone and particulate matter hazards and exposures; data/information on key water contaminants as defined through content workgroup processes; birth defects, data information on cancer, childhood blood lead levels, reproductive health outcomes and carbon monoxide. For each year, additional core tracking health and exposure and environmental measures based on the recommendations of the content workgroup will be included. To address these requirements, the DC EPHTP program has established relationships with the owners of the data indicated above and each source has expressed its willingness to not only provide data but become members of the Technical Advisory Committee (TAC).

The DC EPHT program has identified nine data sources, and already has access to six of the nine nationally consistent data and measures (NCDMs). These databases are: hospitalizations for asthma; hospitalizations for myocardial infarction; birth defects; reproductive health outcomes; and drinking water hazards and exposures. Of the six databases, CPPE routinely collects or receives five on a regular basis. Of the remaining three databases, cancer deaths are routinely collected by CPPE through its vital records

deaths reporting system and also through exchanges of data with the DC Cancer Registry. CPPE has received support for exchanging and making key data elements on both the local and national networks.

CCPE has received support from the District of Columbia Department of the Environment (DDOE), in particular the air quality division, has expressed its willingness to share data on ozone and particulate matter hazards. The Poison Control Center is currently sharing data with DC-DOH through its syndromic surveillance system, but needs additional resources to continue providing data, especially for the EPHT Network. The DC EPHT Program currently receives water hazards and exposure data from the District of Columbia Water and Sewer Authority (WASA). The air quality database can be obtained from both the EPA Website and the District of Columbia Department of the Environment (DDOE). (See table 1 below for core data already received by CPPE).

Table 1. CORE DATA SOURCES

		Data Source	**Current Status**
	Environmental Data		
1	Air Quality (ozone & particulate matter)	DDOE Air Quality Division	Can access through the EPA website or will be transmitted by DDOE
2	Drinking water hazards or exposures		
3	Carbon monoxide		
	Health Data		
4	Hospitalizations for asthma	DC hospital discharge data	Submitted annually to CPPE
5	Hospitalizations for myocardial infarction	DC hospital discharge data	Submitted annually to CPPE
6	Birth defects	CPPE Vital Records Division	Collected by CPPE through its vital records reporting system
7	Cancer	DC Cancer Registry & DC Vital records Division	Deaths data collected by CPPE through its vital records reporting system
8	Childhood blood lead levels	DDOE	Not yet collected by CPPE

9	Reproductive health outcomes from vital records	CPPE Vital Records Division	Collected by CPPE through its vital records reporting system

CPPE is currently developing a Web Query System based on the Utah IBIS System. The system was acquired by DC-DOH from Utah and is now being customized. DC-DOH has entered 10 years of data (1997-2007) into the secure portal of system. These are data on hospitalizations for asthma, hospitalizations for cardiovascular diseases, birth defects, reproductive abnormalities (in the vital records database), and cancer. The first phase of the web-query system will be available to the public this year, and when funds become available, possibly through a CDC grant, it will include other databases as required by the EPHT Program.

c. ***Meet with key stakeholders and conduct focus group meetings with 3 communities that are affected by various environmental contaminants, by April 30, 2009***

There are several examples of possible environmental hazards that may be related to negative health effects in various parts of the District. Two focus group meetings will be held with two communities to discuss identify key data elements for inclusion in the EHPT program.

Accomplishments:

The EPHT program was unable to meet with affected communities because of political issues regarding possible environmental exposures within those communities, and the need for more funding, which DC-DOH cannot provide at this time. Instead, we embarked on another project with MPH students at the George Washington University School of Public Health and Health Services. The students reviewed EPHT programs in 12 states, various indicators currently identified by DOH, and recommended additional ones. They also developed metadata for carbon monoxide, birth defects, childhood lead poisoning, asthma, water quality and cancer. The report is attached.

d. Re-establish an Environmental Tracking Advisory Work Group by May 10, 2009

DC DOH previously established the DC Environmental Public Health Tracking Program's Planning Partnership Consortium as an advisory body. At the inception of this group the members of the Consortium assisted the program in identifying data sources; selecting the most relevant health and environmental indicators in the District of Columbia to analyze; and developing procedures to select future health and environmental indicators. The Planning Partnership Consortium also reviewed and critiqued the development of major program documents such as the data dictionary, information dissemination plan, staff assessment surveys, and training modules. This group will be re-established during this funding cycle as an advisory group to the program.

Accomplishments:

The EPHT Program established a Technical Advisory Committee (TAC) which met on May 14 and June 15, 2009. The next meeting is scheduled for September 10, 2009. The committee is composed of DOH program mangers, DDOE program managers, the DC-DOH assistant general counsel, university professors and data owners, environmental health professionals, and laboratorians. The group will meet quarterly or as necessary. It is currently composed of 15 active members. The EPHT Program will identify new members as the project progresses. The group will assist with the technical policy requirements, and provide assistance in meeting specific program objectives. It will also be involved with monitoring and evaluating the program. The EPHT Program staff will participate in all activities of the TAC to ensure that the DC EPHT Network's content development is on track with the national system. Staff will volunteer to work on specific subgroups within the Workgroup to ensure that DC is fully engaged in developing the content of the EPHT Network. Staff will further participate in all activities of the Standard and Network Development Workgroup, which will be formed soon, to ensure that the standards and architecture of the National EPHT Network are incorporated or adopted by the DC EPHT Network.

3. OTHER ACTIVITIES CARRIED OUT DURING THE FELLOWSHIP

3.1. Collaboration with the Maryland Environmental Public Health Tracking Program

After a series of preliminary discussions by phone, the PI of the District of Columbia Environmental Public Health Tracking Program met with the PI of the Maryland Public Health Tracking program, Dr. Clifford Mitchell, on June 16, 2009, to discuss issues of mutual interest. The main issue for discussion was the Maryland EPHT Network. The District of Columbia wanted to know more about the system and if it could be adopted by DC. Maryland had floated the idea of developing a regional EPHT Network and using the same system was thought to be a good idea. Dr. Mitchell described the Maryland Program and the EPHT Network. He also introduced DC-DOH staff to the developer of the system, Dr Ming Qi Wang, an assistant professor at the University of Maryland. Discussions were held with Dr. Wang who described the Maryland system in more detail and expressed his interest to work with DC-DOH to customize the Maryland system if DC-DOH was able to secure CDC funding for its program.

The DC EPHT Network will consist of the following:

- ArcGIS® 9.3 Server – the most current version with significantly improved capabilities.
- Windows 2003 Server (.net 3.5 with IIS 7.0)
- Database: Oracle 10g
- 2005/2008 Visual Studio
- Dundas graphics server version
- Aspose for Web file creation (i.e., MS Word, PDF)

Through the secure portal, users may, based on their established roles, gain access to restricted data. The DC EPHTN intends to build a minimum of three groups of anticipated users who would have role-based access to different levels of data. EPHT Program staff will have expanded access to enhance and manage data. Internal public health and environmental professionals at state and local agencies, as well as other data exchange partners will have full access to their own data, but limited access to data from other programs without obtaining approval from the data owners. Public users will have access only to aggregated data in the public portal. The system will be PHIN-compliant and will use PHIN-MS for data transmission.

3.2. Regional Environmental Public Health Tracking Meeting

On June 23, 2009, The Maryland Department of Health and Mental Hygiene hosted the Mid-Atlantic Environmental Health Directors meeting in Baltimore, Maryland, to review the progress of the state and national environmental public health tracking programs, including the first releases of both the Pennsylvania and Maryland public environmental public health tracking websites (portals); review with CDC the progress on the national portal; discuss both the opportunities and challenges of having national data publicly available for both grantee and non-grantee states in the CDC public portal, and discuss the challenges of putting together the state and national environmental public health tracking programs. Lessons learned, and the implications and opportunities for non-grantee states to learn from and partner with regional partners involved in the tracking program were discussed. Also discussed were possibilities for regional cooperation around data and information-sharing related to environmental public health challenges, and the possible uses of the environmental public health tracking network for data-sharing. The states, which included, Maryland, Virginia, Pennsylvania, and West Virginia, agreed to work together and exchange data. However, only Maryland and Pennsylvania are currently funded by CDC.

3.3. Grant Application:

The DCEPHTP forwarded a grant application to CDC on June 29 in response to RFP Number: CDC-RFA-EH09-907. The application was approved but not funded. The executive summary is attached (See Attachment 1).

4. PLANNED DC EPHT PROGRAM ACTIVITIES FOR OTOBER 2009 - SEPTEMBER, 2010

The following activities are planned for the next fiscal year. However, some of them will change if funds are received from CDC to implement the EPHT Network. Throughout this period, the DC EPHT Program will collaborate with and seek assistance from the Utah EPHT Program and the Maryland EPHT Program.

- Develop Metadata template based on metadata standards
- Work with all data custodians to develop metadata elements
- Plan for transmitting data to CDC
- Review and revise DC EPHTP's Information Dissemination Plan
- Develop a local EPHT-focused risk communication strategy in accordance with guidelines established by CDC's National EPHTP
- Develop and authorize data sharing agreements with DOH and DDOE Programs including DC WASA
- Provide EPHTP 101 training to data owner partners (i.e., Asthma Program, Cancer Registry, and Vital Records, etc) within DC DOH and DDOE
- Continue to hold meeting with Technical Advisory Committee Members
- Establish Technical Advisory Subgroups
- Expand the Technical Advisory Committee
- Populate the DC IBIS system with additional data, especially environmental exposure data.

5. DC EPHT Staff

The DC-EPHT staff includes public health analysts, epidemiologists, statisticians, program analysts and GIS analysts. It was expected that with CDC funding, two new staff would be hired: a program manager and an epidemiologist.

Table 2. DC EPHT Staff

No	Name	Title/Administration	Role in EPHTP
1	John Davies-Cole, PHD, MPH	State Epidemiologist	**Principal Investigator**
2	TBD	Public Health Analyst, CPPE	**EPHT Program Manager/Coordinator**
3	TBD	Environmental Epidemiologist	**Environmental epidemiologist**
4	Fern Johnson-Clarke, PhD	Chief, Research, CPPE	**Vital records statistician**
5	John Sumner, PhD	Statistician, CPPE	**Data analyst/statistician**
6	Joseph Kim	Public Health Analyst/GIS	**GIS analyst**
7	DOH CIO (IT)	Chief Information Officer	**DC EPHT Information Technology Controller**
8	Maurice Knuckles	Director, DC Public Health Laboratory/Environmental Health Specialist/ Toxicologist	**Advisor**

ATTACHMENT 1:

GRANT APPLICATION EXECUTIVE SUMMARY

In 2003, the District of Columbia's Department of Health's (DC-DOH) Environmental Health Administration (EHA) was awarded a grant from the Centers for Disease Control and Prevention (CDC) to build capacity for environmental public health tracking, which would ultimately lead to development of an environmental public health tracking network in the District of Columbia. This was considered necessary because the District has some of the worst indicators in the nation for cancer, heart diseases and asthma. The District is also faced with several environmental health issues such as exposure to arsenic in Spring Valley and exposure to bi-products of gasoline in Riggs Park. The Environmental Health Administration separated from DC-DOH in 2006 to form a new Department of the Environment (DDOE).

In this five-year project, DC-DOH will implement the District-wide Environmental Public Health Tracking (EPHT) Network. It will meet the standards established by the CDC for interoperability and the assessment of the state of environmental public health. The goals and major activities of the DC EPHT program are listed below:

DC EPHT Program Goals and Major Activities

GOALS	MAJOR ACTIVITIES
Year 1-5	
GOAL 1: Develop and implement the DC EPHT Network	• Define core DC EPHT program measures • Develop standards • Identify access procedures • Develop the information technology for the network • Compile metadata using the CDC standards and tools • Coordinate with data owners • Track core environmental public health indicators
GOAL 2: Strengthen capacity to track environment and health data	• Train DC Department of Health staff • Train DC Department of Environment staff • Train DC community leaders
GOAL 3: Expand the DC EPHT Technical Advisory Group to provide recommendations for implementing the DC EPHT Network	• Identify new members of the DC EPHT Technical Advisory Group • Inform the Technical Advisory Group about DC EPHT Network

	development • Incorporate recommendations of the Technical Advisory Group into the development of the DC EPHT network
GOAL 4: Promote active participation in the CDC workgroups to help develop the National EPHT Network	• Participate in workgroup activities and incorporate the results into the DC EPHT program development
GOAL 5: Promote active participation of the stakeholders in the development of the DC EPHT Network and program	• Inform all stakeholders about the DC EPHT program activities and the development of the DC EPHT Network • Incorporate the recommendations of stakeholders into the development of the EPHT program
GOAL 6: Complete an annual comprehensive evaluation of the DC EPHT Network	• Complete annual DC EPHT program evaluation • Complete evaluation of the DC EPHT system
GOAL 7: Contribute to the CDC Annual State of the National EPHT Program Report	• Contribute to the annual report via quarterly performance reports, mid-year reports, and an annual report

The DC EPHT Network will be a tracking system that integrates data about environmental hazards and exposures with data about health outcomes that are possibly linked to the environmental hazards. It will follow the standards and guidelines of the Public Health Information Network (PHIN) standards. This network will (1) track nine specific core conditions; (2) provide role-based access to information; and (3) link to the national network.

To develop the Network, the DC Department of Health (DC-DOH) created a detailed workplan plan with concrete goals, objectives, tasks, performance measures, responsible parties, and timeframe for the completion of each objective. DC –DOH has also identified major stakeholders, resources, and staff for this project with the requisite skills, experience, knowledge, and commitment to meet the project's goals. DC- DOH will closely collaborate with District government programs and stewards of data to access, manage, and analyze data in the DC EPHT network, especially the District of Columbia Department of the Environment (DDOE). DC-DOH will also closely collaborate with the CDC in ensuring that the program is successfully implemented.