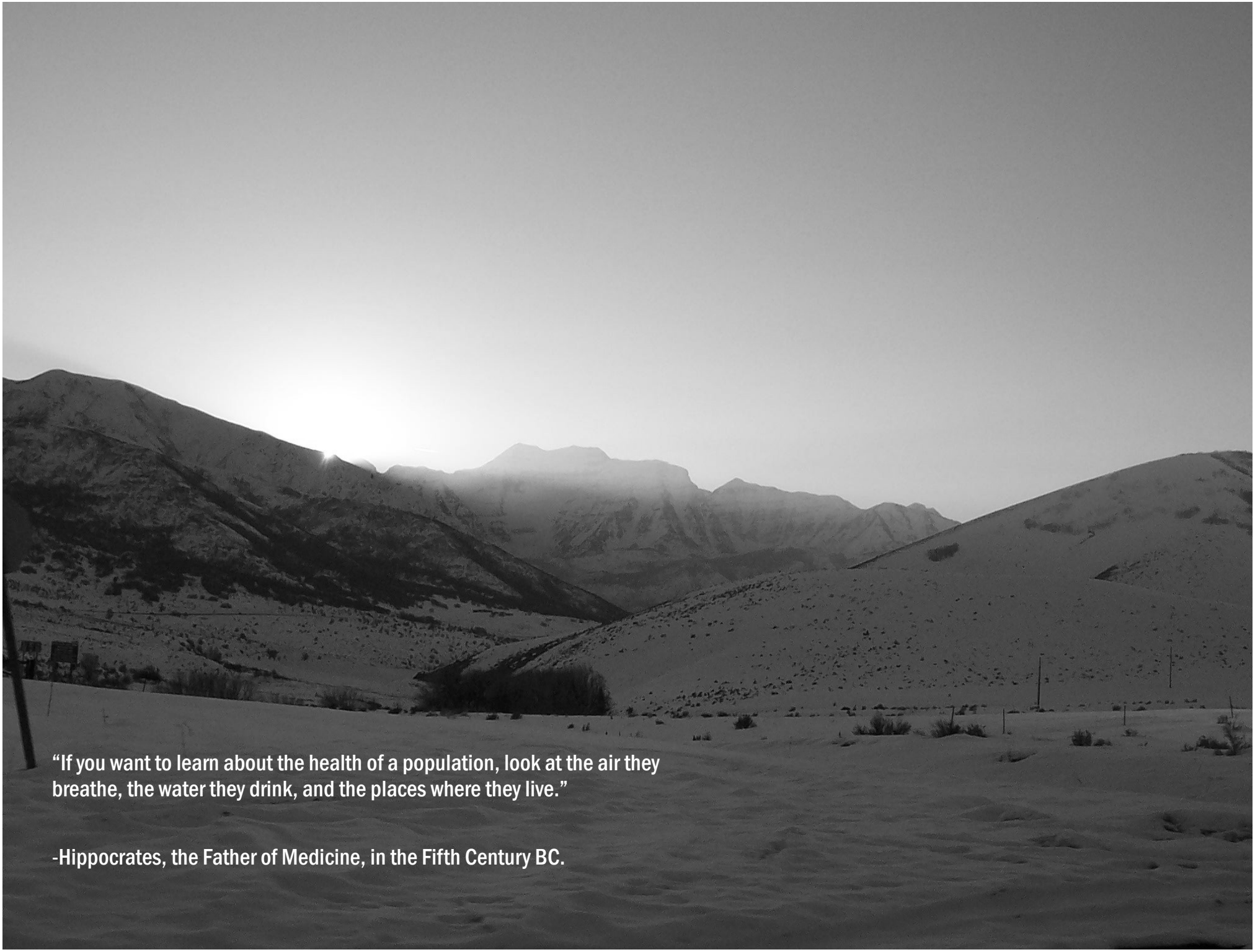
Utah's Health and Environment

Information on Utah's EPHTN



“If you want to learn about the health of a population, look at the air they breathe, the water they drink, and the places where they live.”

-Hippocrates, the Father of Medicine, in the Fifth Century BC.

Foreword

Many of the most important achievements in public health over the past century involved improvements in the environment, including water sanitation, air quality, removing lead from gasoline, and fluoridation of water. However, many new environmental hazards remain, both from natural sources such as radon and arsenic and from the ever Increasing number of chemicals used to make the products we enjoy.

In addition, the "built environment" has emerged as an important concept in both injury and chronic disease prevention. The designs of our neighborhoods and communities substantially influence many aspects of health. For example, things like safe, "walkable" neighborhoods affect the risk of pedestrian-motor vehicle injuries and the frequency of physical activity that can prevent cardiovascular disease and osteoporosis.

John Snow stopped an 1854 cholera outbreak in London by plotting points on a map that led officials to a downtown water pump. The pump handle was removed, and the outbreak diminished. If we are to build on such successes in environmental health of the past century, we must understand how our environment affects our health. The Environmental Public Health Tracking Network is a critical initiative that will enable us to examine relationships between environmental hazards, exposure to those hazards, and human health outcomes. It will be the tool that allows us to identify the "pump handles" of the next century.

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Executive Summary

In 2003, the Environmental Epidemiology Program of the Utah Department of Health (UDOH) in collaboration with state, local and national partners and key stakeholders, proposed an important project. The project involved the design, development and implementation of a data warehouse, information exchange gateway and supporting infrastructure to be known as the Utah Environmental Public Health Tracking Network (EPHTN).

The statewide EPHTN will consist of these five key elements recommended by the Pew Environmental Health Commission:

1. A statewide information system to track diseases and hazardous exposures
2. A statewide warning system for critical environmental health threats
3. Pilot programs for developing approaches for statewide and national tracking information systems
4. Improved capacity to investigate and respond to environmental hazards
5. Tracking links to communities and research (PEW 2000)

The Utah EPHTN will allow health agencies, health care professionals and the public to identify populations at risk and respond to disease outbreaks, clusters and emerging threats. Information gained from the EPHTN will guide intervention and prevention strategies in Utah and improve the public health basis for policymaking. The project will also help establish the relationship between environmental hazards and health outcomes. Linking exposure data to health outcome data will enable the Utah Department of Environmental Quality (UDEQ) to identify, reduce and prevent harmful environmental risks in Utah.

Table of Contents

The EPHT Network	3
EPHTN Vision and Guiding Principles	4
The Environment and Our Health	5
Diseases Related to Environment	6
The Cost of Diseases Related to Environment	8
Utah in Perspective	9
Public Perceptions of Environmental Health Risks	10
Benefits and Uses of the EPHTN	11
Pilot Projects	12
Environmental Justice and Vulnerable Populations	17
Conclusion	18
Partner Agencies	19
Definitions of Terms	20
References & Additional Resources	21

The EPHT Network

In September of 2000, the Pew Environmental Health Commission wrote a report titled "America's Environmental Health Gap: Why the Country Needs a Nationwide Health Tracking Network." The report noted the need to focus on how pollutants affect chronic disease and human development.

In September of 2002, the Centers for Disease Control and Prevention (CDC) provided funding to the UDOH and 16 other states to participate in the national EPHTN development process. The EPHTN is a nationwide network for bringing together health and environmental information. The EPHTN is an ongoing collection, integration, analysis, and interpretation of data about environmental hazards, human exposure to those hazards, and adverse health effects.

Environmental hazards are tracked by state and federal agencies that collect data to monitor compliance to regulations and environmental quality. Tracking hazards however, does not provide data on human exposure. Human exposures to hazards must be estimated or determined by testing blood, urine or hair for a specific chemical.

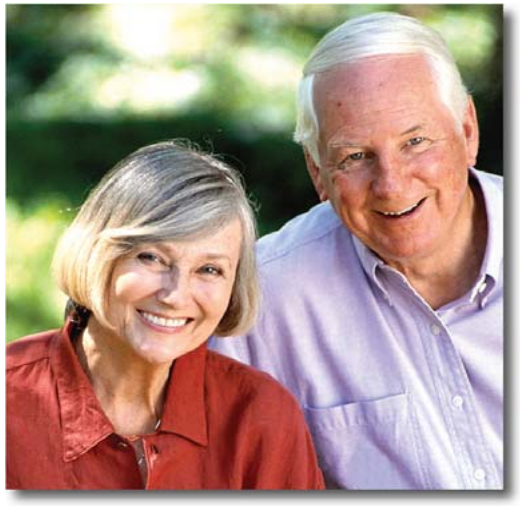
Information from the Utah EPHTN will be available to the public using Web-based applications such as the UDOH Indicator-Based Information System for Public Health (IBIS-PH) at http://ibis.health.utah.gov/home/welcome.html.

The EPHTN is a nationwide network for bringing together health and environmental information.

EPHT Vision and Guiding Principles

The first goal of the EPHT Project is to reduce illness, injury and death related to environmental risk factors. The second goal is to increase the understanding of the relationship between hazardous environmental exposures and health. The EPHTN will help reach these goals by providing researchers, policymakers and the general public with meaningful environmental health data.

The EPHTN will produce data that will improve health agencies' abilities to inform communities of environmental hazards, conduct inexpensive research, link hazards to health status, conduct surveillance and to consider multiple health outcomes of an exposure. The information provided by the network will also be used to create better public health policies, practices and interventions.



The Environment and Our Health

Preventing and monitoring exposures are key actions in reducing the burden of diseases related to environment.

Determinants of health contribute to the wellness of an individual or population. Heredity, access to medical care and lifestyle are all determinants of health. Environment is also an important determinant of health. Researchers have linked specific diseases with exposures to some environmental hazards, such as lung cancer and exposure to asbestos. However, other suspected links between environment and disease remain unproven.

The environment includes the places we live, work and play. Lead used in household plumbing, chemicals and other materials at work, and poor air quality are all examples of hazards in our environment.

Preventing and monitoring exposures to environmental hazards are key steps toward reducing the burden of diseases related to environment. The information the EPHTN will provide will be used to advance public environmental health programs. Improved programs will result in increased prevention to harmful environmental exposures and a decrease in environmentally related diseases.

Diseases Related to Environment

Life expectancy in the United States has increased from 47.3 to 77 years over the last century. A majority of this increase is due to traditional environmental health services such as improved drinking water quality, sewage management and food safety. Due to these improvements, infectious disease is no longer the leading cause of death among Americans. However, chronic diseases are now on the rise. Chronic diseases may arise from environmental hazards, such as tobacco smoke and other air pollution. Exposures to these hazards may affect some more severely than others. Several factors alter an individual's risk for an illness related to environment, such as genetic background, nutrition, age and lifestyle.

Environmental hazards are related to a wide variety of common chronic diseases including cancer, learning disabilities, asthma, respiratory illnesses, cardiovascular disease, neurological disease, autoimmune diseases and endocrine problems. Some birth defects have also been linked to environmental exposures. Many of these diseases are increasing worldwide, creating an even greater need for the EPHT Network.

Diseases Related to Environment

In 2000, the UDEQ discovered elevated levels of lead in residential soil in Eureka, Utah. Elevated blood lead levels in children is linked to lower IQ testing and attention and behavior disorders.

After the discovery of elevated lead in residential soils in Eureka, an exposure investigation was conducted. The UDOH and the Central Utah Public Health Department (CUPHD) conducted free blood lead testing for children aged six months to 18 years living in Eureka. The UDEQ used the results from the blood lead testing along with soil contamination data to prioritize the residential soil clean up.

The investigation concluded that children living in Eureka were ten times more likely than other Utah children to have elevated blood lead levels. Prevalence of elevated blood lead levels were high for both young children and teenagers. Exposure dose estimates for children living in Eureka exceeded health guidelines for arsenic and thallium as well.

The UDOH and CUPHD continue to provide quarterly free blood lead testing for children aged six months to 18 years living in Eureka. The UDOH continues to monitor the Utah Blood Lead Registry for children with elevated blood lead levels in areas near the site to ensure adequate case management and environmental follow-up.

This example shows how the EPHTN will benefit the residents in Utah. The EPHTN would allow agencies such as the UDEQ and UDOH to access environmental data quickly and use the information to respond to similar hazards in a timely manner.

The Cost of Diseases Related to Environment

Illnesses due to hazardous environmental exposures come with a heavy burden. In addition to the suffering and loss of life or abilities commonly associated with diseases, there also are economic costs. Treatment, time lost from work and decreased productivity are costs everyone bears.

Philip Landrigan, of the Mount Sinai Medical School in New York, and his colleagues studied the economic costs of four types of childhood diseases and disabilities caused by environmental contaminants: lead poisoning, asthma, cancer, and developmental disabilities. The study estimated the total national costs attributable to environment for these four conditions was approximately $55 billion a year in 1997.

Birth defects are the leading cause of infant mortality. The national health care cost of treating and caring for surviving children with birth defects is over $8 billion annually.

Utah in Perspective

Utah is the fourth fastest growing state in the U.S., and is in the middle of the fastest growing region in the country. Utah and four of its neighboring states were ranked as the five fastest growing states during the last decade. Ranked in order, they are: Nevada (66.3%), Arizona (40.0%), Colorado (30.6%) Utah (29.6%) and Idaho (28.5%). Utah has the youngest population in the nation with nearly one-third of the population under 18 years of age in 2000 (2000 Census).

With Utah's high birth rate and young population, assessing children's exposure to environmental hazards is critical. Children are at greater risk than adults for exposure to many environmental hazards. Children are more likely to be exposed to contaminants because they play outdoors, often bring food into contaminated areas and are more likely to come into contact with dust and soil. Also, because their bodies are still developing, children can sustain permanent damage if exposures to some contaminants occur during critical growth stages.

The UDOH recognizes that the unique vulnerabilities of infants and children require special emphasis on communities faced with contamination of water, soil, air, or food.

There are 195 Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) Sites located in the state of Utah. Of these, 14 are on the final National Priorities List (NPL) and seven additional sites have been proposed for listing (USEPA 2001). All but one of the NPL sites (Monticello Uranium Mill Tailings) and most of the CERCLIS sites are located along the Wasatch Front in northern Utah. Three in every four Utahns live along the Wasatch Front in the northern metropolitan areas of Weber, Davis, Salt Lake and Utah counties (1,702,450 residents). Currently there are limited systems for tracking information about chronic disease and potential environmental factors in Utah.

Public Perceptions of Environmental Health Risks

Concerns are frequently expressed by Utah communities about a variety of potential environmental health issues including cancer clusters, birth defects, multiple sclerosis, lupus, Parkinson's disease, Alzheimer's disease, asthma, childhood cancers and autism (UDOH 1995, 1998, 1999). Information from the EPHTN will help address these concerns.

The Utah EPHT Project gathered information from stakeholders concerning their environmental health and exposure concerns for Utah. The lists to the right identify their highest priority concerns.

Utah Health Concerns

- Asthma
- Birth defects
- Cancer
- Diabetes
- Neurological disease

Utah Environmental Exposure Concerns

- Air pollution
- Heavy metals
- Hazardous waste sites
- Drinking water contamination

The Utah EPHT Project has partnered with organizations such as the Utah Asthma Task Force, the Utah Birth Defects Network, and the Utah Cancer Registry to track and address these high-priority health concerns for Utah citizens.

Benefits and Uses of the EPHTN

The Network will be able to collect information on a number of diseases and exposures, such as:

Diseases
- Neurological diseases
- Cancer
- Asthma
- Developmental disabilities
- Birth defects

Exposures
- Water contaminants
- Persistent organic pollutants
- Pesticides
- Air contaminants
- Heavy metals

In addition to helping establish important links between diseases and environmental exposures, the EPHTN can be a useful tool for other public health efforts.

The completed network can serve as a national early warning network for chemical and environmental catastrophes such as a terrorist event. Information that is transmitted quickly on the network will allow officials to quickly recognize and assess critical situations.

The network can also aid investigative public health responses. Public health agencies will be able to respond to environmental disease clusters, along with outbreaks and emerging threats, just as they now respond to infectious disease outbreaks.

The EPHTN in Utah will also be able to adapt to track issues of special importance to the state. Hazardous waste sites, for example, will be tracked using the network.

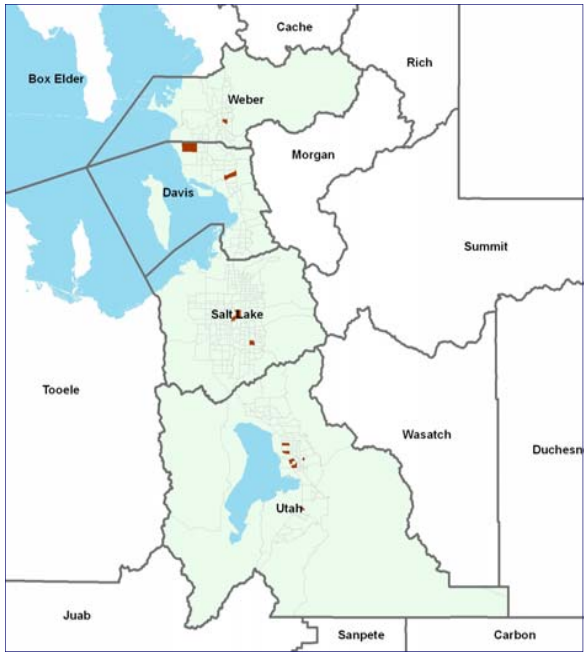
Benefits to Data Stewards

To build the network, stewards of environmental and health data have to first share their data. Data sharing will benefit stewards by:
- Making the most of their data to protect public health
- Giving stewards access to the data of others
- Creating a system linking environmental and health data
- Allowing data stewards to take advantage of the EPHTP data services such as standardizing and geocoding

Pilot Projects: Introduction

Several pilot projects were conducted by the UDOH for the EPHT Project to test methods and the network. With the help of our partners, we have collected important environmental health data and analyzed them as part of these pilot projects. Thanks to these efforts, we now have a greater understanding of diseases related to environment in Utah such as birth defects and childhood leukemia. However, much more remains to be done.

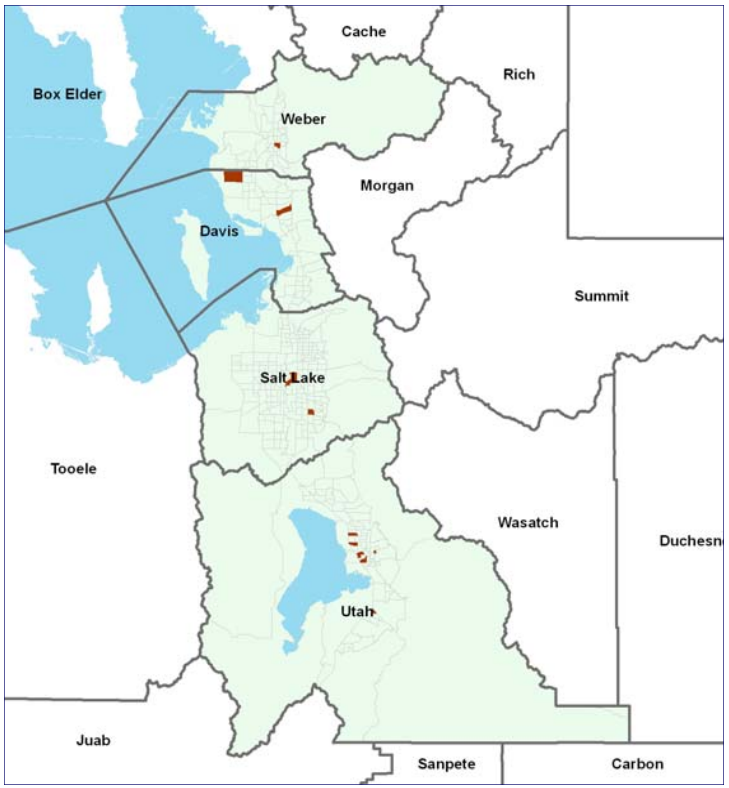
Pilot Project: Geospatial Analysis of Birth Defects in Utah 1999-2002



The Utah EPHT Project collaborated with the Utah Birth Defects Network (UBDN), the Office of Vital Records and Statistics, and the UDEQ to complete a study of geospatial analysis of birth defects in Utah. In this study, researchers determined the distribution of birth defects by mapping all births and birth defects in Utah. The study will assist the UBDN to better understand the causes of birth defects in Utah and provide information that can be used to prevent them.

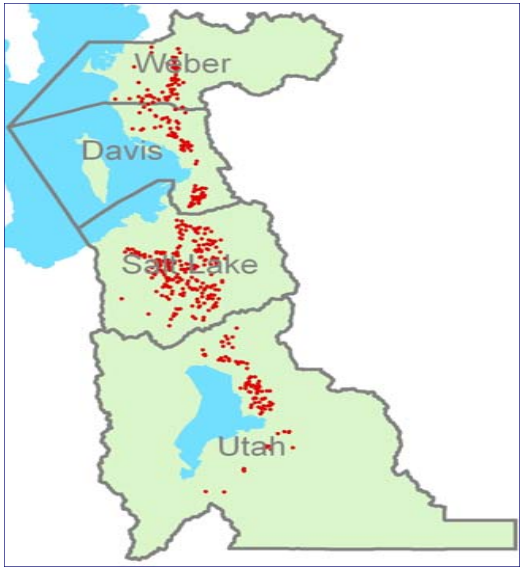
Pilot Project: Geospatial Analysis of Orofacial Clefts in Utah 1994-2002

The EPHT Project conducted a geospatial analysis of orofacial clefts in Utah from 1994-2002. A geospatial analysis compares disease cases with their locations. An understanding of disease distribution helps identify possible environmental exposures responsible for the disease. Together with the Utah Birth Defects Network, the EPHT Project looked at both cleft lip and cleft palate birth defects. All cleft lip and cleft palate cases were mapped and analyzed. The EPHT Project staff also looked at possible environmental pollution sources.



Pilot Project: An Exploratory Study of the Spatial Association Between Childhood Leukemia and Exposure to Benzene Air Pollution from Vehicles in Utah

The Utah EPHT Project conducted a study to determine the relationship between childhood leukemia and exposure to benzene air pollution. The project analyzed all childhood leukemia cases from the Utah Cancer Registry from 1973-2001. The project staff then looked at freeways, highways, or other multi-lane road networks. The leukemia and traffic data were compared. The results indicate that children living in close proximity to a high traffic area have a greater relative risk of developing leukemia.

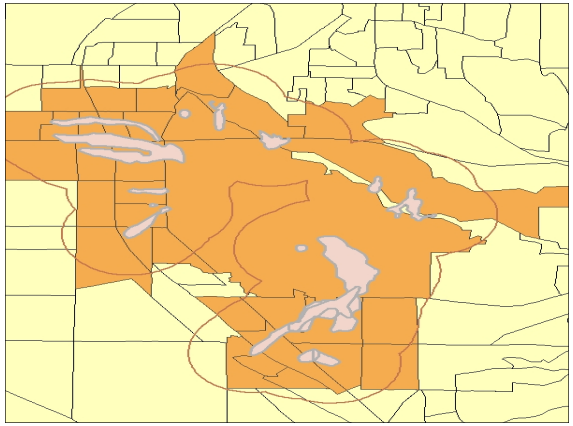


Pilot Project: Utah Rapid Inquiry Facility (RIF)

The Utah EPHT Project is collaborating with CDC and the Imperial College London to develop the Utah Rapid Inquiry Facility (RIF). The RIF is a tool to help epidemiologists conduct statistical analyses of diseases using geographic information system (GIS) technology. The RIF will be used as a tool to map and analyze health and environmental hazards data. The RIF includes health outcome data, population data, environmental hazard data, and data on socio-economic and geographic factors. The RIF will be one of several analytical tools implemented as part of the EPHT network.

Some features of the Utah RIF:

- Maps environmental hazards and diseases to establish the impact of environmental hazards on the population
- Integrates health, population and supporting data into a single database
- Able to use advanced statistical methods



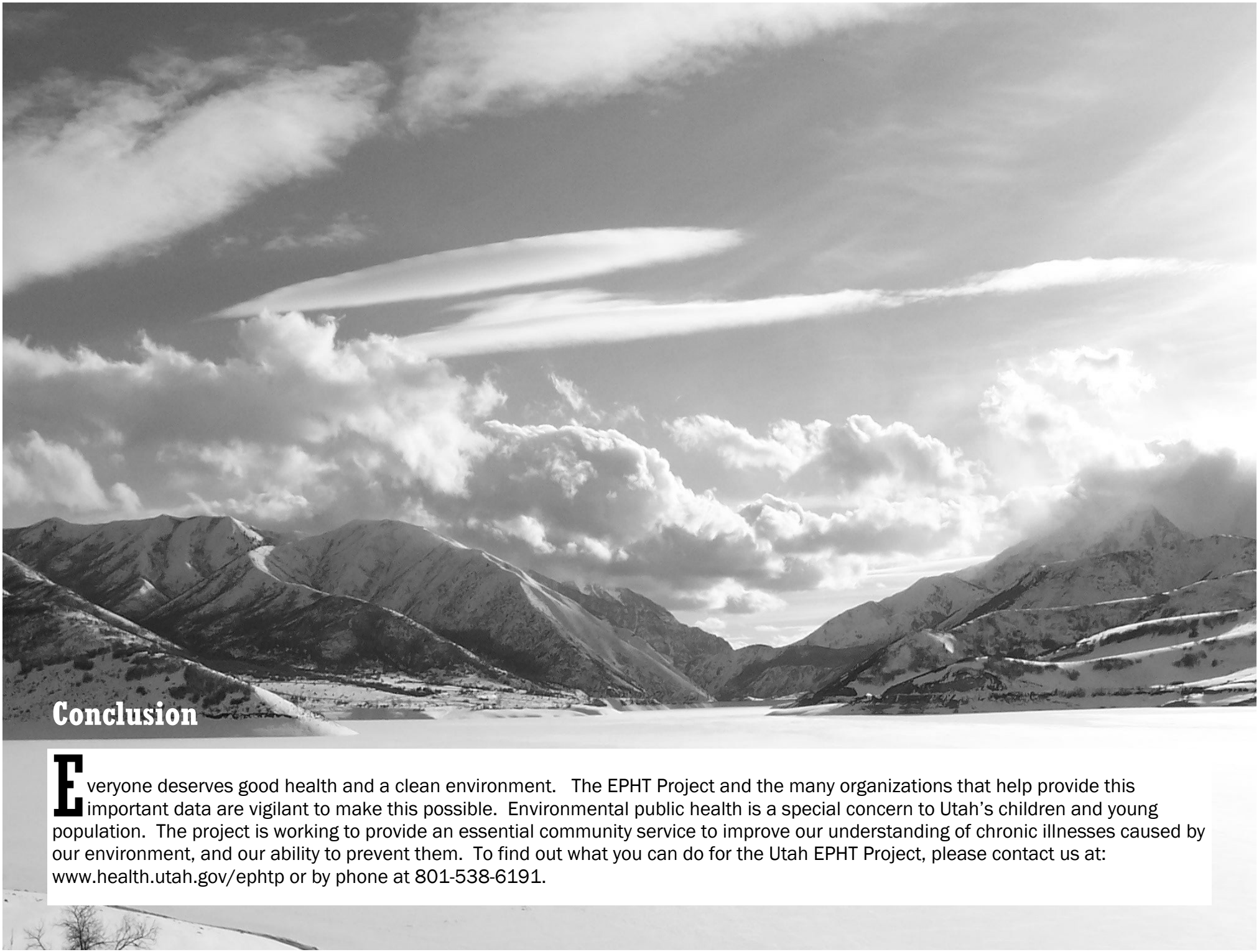
Environmental Justice and Vulnerable Populations

Disparities, or inequities in communities exposed to environmental hazards are well known. Evidence of health disparities between people of different race, socio-economic status, or geographic area is well documented and includes inequalities in environmental health conditions such as asthma, cancer, and birth defects. Hazardous facilities and other environmental threats are often found among neighborhoods of racial and ethnic minorities and low-income populations. Residents of these neighborhoods are more likely to have increased exposures to hazardous substances and related health risks.

Hazardous facilities and other environmental threats are often found among neighborhoods of racial and ethnic minorities and low-income populations.

The EPHTN has the potential to address these problems. In the EPHT strategic plan, CDC states that the EPHTN will monitor and distribute information on trends among environmental hazards, exposures, and health effects. One of the reasons to track data is to identify populations and geographic areas most affected. This data will support regulatory and public health actions to prevent or control exposure to environmental hazards in these areas. The analysis of these trends is important in the identification and resolution of questions of health disparities and environmental justice.

However, prior perceptions of populations that may be at risk are not always verified. Therefore, in order to avoid excluding any groups, the focus of the surveillance must be broad enough to be representative of many populations.



Conclusion

Everyone deserves good health and a clean environment. The EPHT Project and the many organizations that help provide this important data are vigilant to make this possible. Environmental public health is a special concern to Utah's children and young population. The project is working to provide an essential community service to improve our understanding of chronic illnesses caused by our environment, and our ability to prevent them. To find out what you can do for the Utah EPHT Project, please contact us at: www.health.utah.gov/ephtp or by phone at 801-538-6191.

Partner Agencies

The Utah EPHTN has partnered with a variety of agencies in the health and environmental fields. The EPHTN would like to recognize these partnering agencies who support the network by sharing data or other resources.

United States Geological Survey
http://www.usgs.gov

Federal Environmental Protection Agency
http://epa.gov

Utah Department of Health, Center for Health Data
http://health.utah.gov/chd

Utah Department of Health, Office of Vital Records and Statistics
http://health.utah.gov/vitalrecords

Utah Department of Health, Environmental Epidemiology Program
http://health.utah.gov/epi/enviroepi

Utah Resource for Genetic and Epidemiologic Research
http://huntsmancancer.org/groups/ppr
http://www.research.utah.edu/rge

Utah Birth Defects Network
http://health.utah.gov/birthdefect

Utah Cancer Registry
http://uuhsc.utah.edu/ucr

Utah Department of Environmental Quality, Division of Air Quality
http://airquality.utah.gov

Utah Department of Environmental Quality, Division of Drinking Water
http://drinkingwater.utah.gov

Centers for Disease Control and Prevention (CDC)
http://www.cdc.gov/nceh/tracking/

Utah Health Information Network
www.uhin.com

Utah Health Data Committee, Office of Health Care Statistics
http://health.utah.gov/hda

Indicator Based Information Systems for Public Health (IBIS-PH)
http://ibis.health.utah.gov

Utah Public Health Laboratory
http://www.health.utah.gov/lab

Utah Automated Geographic Reference Center
http://agrc.its.state.ut.us

Utah Local Health Departments
http://health.utah.gov/lhd

Definition of Terms

Adverse Health Outcome
Any disease, illness, or injury as a result of an exposure to an infectious agent or environmental hazard.

Determinants of Health
Factors that contribute to a state of health. There are four major categories of factors: heredity, medical care, lifestyle, and environment.

Diseases Related to the Environment
Chronic diseases, birth defects and developmental delays that are related to exposure to environmental hazards.

Environment
The world around us. It impacts our health through the food we eat, the water we drink, the air we breathe, and anything our bodies are exposed to.

Environmental Hazards
Something in the environment, such as chemicals, physical agents, or biological toxins, that can cause human illness or injury.

Environmental Justice
No group of people including racial, ethnic, or socioeconomic minorities, should bear a disproportionate share of the negative environmental consequences resulting from industrial, municipal, and commercial operations or the execution of federal, state, local and tribal programs and policies.

Environmental Public Health
Environmental public health focuses on the interrelations between the health of people and their environment, promotes human health and well-being, and fosters a safe and healthful environment.

Environmental Public Health Tracking (EPHT)
The ongoing collection, integration, analysis, and interpretation of data about environmental hazards, exposure to environmental hazards, and human health effects potentially related to exposure to environmental hazards.

Indicator Based Information System (IBIS)
IBIS is a Web-enabled publicly accessible way to access public health indicator data organized geographically to provide information about community health status.

Rapid Inquiry Facility (RIF)
RIF is a Geographic Information System based spatial query and analytical tool that links health outcome data, population data, socio-economic factors, and environmental hazards data to conduct disease mapping and risk analysis.

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Utah Environmental Public Health Tracking Program, *Application Grant.* www.health.utah.gov/ephtp.

Utah Environmental Public Health Tracking Program (January 2006). *Utah Implementation Plan.* Report: www.health.utah.gov/ephtp.

Additional Resources

Centers for Disease Control and Prevention: **www.cdc.gov**

National Center for Environmental Health: **www.cdc.gov/nceh**

Utah Environmental Public Health Tracking: **http://health.utah.gov/epi/enviroepi/activities/EPHTP/ephtp.htm**

Utah Department of Health: **www.health.utah.gov**

Utah Department of Environmental Quality: **www.deq.utah.gov**

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