

Report of the CDC/ATSDR Working Group on a Shared Vision for Environmental Public Health at CDC/ATSDR

Foreword

Reports from *The Future of Public Health*, published by the Institute of Medicine in 1988, to the Pew Environmental Health Commission report, *America's Environmental Health Gap*, published in 2000, point to the need to establish a strengthened national focus on environmental public health.

In August 2000, Dr. Jeffrey P. Koplan, Director, Centers for Disease Control and Prevention (CDC), and Administrator, Agency for Toxic Substances and Disease Registry (ATSDR), charged the National Center for Environmental Health (NCEH), CDC, and ATSDR with developing a plan that would describe the elements of

a comprehensive environmental public health program and the strategies that could advance such a program at CDC and ATSDR. In response to this charge, we formed a Working Group comprised of senior scientists and managers from NCEH and ATSDR to develop a shared vision for environmental public health at NCEH and ATSDR.

The product of the Working Group, *Report of the CDC/ATSDR Working Group on a Shared Vision for Environmental Public Health at CDC/ATSDR*, is designed as a first step to build an enhanced national and international resource at NCEH and ATSDR for jointly addressing environmental public health threats and promoting health by improving the environment in which we live. The environmental public health objectives presented in *Healthy People 2010*, published by the Department of Health and Human Services; the *Pew Report*; and input from our external partners will help guide NCEH's and ATSDR's work.

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Statement of Purpose

The National Center for Environmental Health (NCEH), Centers for Disease Control and Prevention (CDC), and the Agency for Toxic Substances and Disease Registry (ATSDR) have embarked on defining a shared vision for environmental public health. This effort aims to establish common ground on which to build the national and international resource

for addressing environmental public health threats and promoting health by improving the environment in which we live. Although many challenges to this endeavor confront us, we are committed to overcoming these challenges together and providing the leadership required to fulfill this vision.

Current and Future Challenges

Fragmentation of Environmental Public Health Response: From the publication of *The Future of Public Health* in 1988 to the 2000 publication of the Pew Environmental Health Commission's report, *America's Environmental Health Gap*, these and other reports have documented that "environmental health" is the most fragmented and poorly defined area of public health. In 2000, the National Association of County and City Health Officials (NACCHO) conducted focus groups comprised of senior staff of State and local health agencies, Tribal governments, Federal agencies, and volunteer and advocacy organizations. The purpose of these focus groups was to obtain individual advice and recommendations on ways to strengthen the practice of environmental public health in the United States. One overriding theme that emerged from these focus groups was that "fragmentation among agencies at all levels is a barrier to effective protection against environmental health threats." It is clear that today's complex environmental public health problems require coordinated responses of multiple agencies and organizations and various professional disciplines.

Federal agencies other than CDC and ATSDR that have major environmental missions that include public health are the National Institutes of Health (NIH) and the Environmental Protection Agency (EPA) and to a lesser degree, the Department of the Interior, the Department of Transportation, the Department of Housing and Urban Development, the Department of Energy, the Department of Defense, the Department of Agriculture, the Food and Drug Administration (FDA), the Department of Veterans Affairs, the Federal Emergency Management Agency (FEMA), the Indian Health Service, and the Consumer Product Safety Commission (CPSC).

Even within CDC, programs that have major environmental components, such as food borne and water borne disease prevention, injury control, vector control, and occupational safety and health are housed in multiple Centers and Institutes. The wide distribution of related Federal programs results in uncertainty among State and local health agencies and the public we serve as to whom they can turn to at the Federal level if they need assistance in managing environmental public health problems.

At the State and local levels, programs that address environmental quality, largely through regulation and enforcement mechanisms, and classic human health protection programs are almost always housed in different agencies. Likewise, State-and local-level programs such as disaster preparedness and response, zoning/land use planning, pesticide safety and regulation, public safety, and parks and recreation are distributed among various departments. Great disparities exist in the funding "health" of these various agencies and departments, but as a rule environmental public health units in State and local health departments are the most underfunded. In addition, environmental public health concerns such as urban sprawl and its accompanying destruction of "green space," over-population and traffic congestion, and overloading existing infrastructures that provide essential

services such as clean water and waste treatment are often overlooked from a public health perspective.

Need for Focused National and International Leadership: Information from key decision and policy makers (e.g., The Pew Environmental Health Commission and NACCHO focus groups) highlight the need to "...rebuild the nation's public health defenses against environmental threats..." The Pew Environmental Health Commission in its 2000 report indicated that Federal leadership and assistance have lacked disease and environmental exposure tracking, ensuring training for State and local environmental health practitioners, developing strategic partnerships, and providing financial support to State and local health agencies and other entities. These reports underscore the urgent need to establish environmental public health leadership at the Federal level. Areas of greatest concern that need to be addressed include: creating and promoting a unified identity for environmental public health, developing national performance standards and best practices, providing technical assistance, ensuring workforce development at the State and local levels, and securing resources to promote environmental public health at all levels. Leadership is also needed at the international level because environmental public health threats respect no national boundaries.

Emerging Threats: Within the past ten years, dramatic and tragic disease outbreaks involving tens of thousands of people have resulted from breakdowns in the Nation's defenses against environmental threats or are legacies of exposures that occurred decades ago. For example, ATSDR recently began investigating what is believed to be the single most significant source of vermiculite asbestos exposure in the United States as a result of mining and processing operations in Libby, Montana. Additionally, weaknesses in the environmental public health infrastructure in the United States have led to large-scale vector borne, water borne, and food borne infectious disease outbreaks.

Newly recognized threats are emerging such as mercury in vaccines, illegal use of pesticides, abandoned methamphetamine labs in suburban homes, the rapidly increasing incidence of asthma, and the threat of terrorist attacks. Additionally, natural disasters overwhelm and disrupt public and private health systems, often requiring mobilization of substantial internal and external assistance and expertise. Although acute natural events, such as tornadoes, garner the most publicity, slower-onset environmental events such as floods, droughts, heat waves, and extreme cold also present unique public health challenges. The threat of terrorist attacks with biologic or chemical weapons in the United States has become a major public health concern. All these threats have the potential to cause significant morbidity and mortality and overwhelm public health and medical-care systems.

Problems once considered to be solved in the United States have proven to be more intractable than once imagined. Air pollution in urban areas has led to routine public health warnings, including warnings against physical activity for children and other at-risk people. Closure of ocean beaches because of contaminated water are now common—at least in States that have beach water monitoring programs. Unhealthy home and neighborhood environments result in problems ranging from childhood lead poisoning to injuries to the lack of recreation opportunities.

International threats include natural and technologic disasters, complex humanitarian emergencies, lead and heavy metal poisoning, and pesticide exposures. For example, flooding in Venezuela from Hurricane Mitch resulted in significant contamination of the Caracas harbor with industrial waste, and led to a request to CDC to participate in a response team to address this environmental crisis.

"Few would dispute that we should keep track of the hazards of pollutants in the environment, human exposures, and the resulting health outcomes—and that this information should be easily accessible to public health professionals, policy-makers and the public. Yet even today we remain surprisingly in the dark about our nation's environmental health." (From America's Environmental Health Gap.) Although NCEH and ATSDR and their collaborators are working to develop disease and exposure indicators, no comprehensive system is in place in the United States that tracks and links human environmental exposures and the relationship of these exposures to disease causation. It is believed that environmentally related disease outbreaks are relatively common and that many are unreported.

The mapping of the human genome offers an unprecedented but as yet not fully realized opportunity to study gene-environment interactions and their relationship to disease causation.

In recognition of the critical importance of these threats, "Emerging Diseases," many with environmental factors associated with their causation, and "Ecological Issues" are pointed to by CDC as being among the top 10 major health risks in the 21st century.

Overview of CDC/ATSDR Achievements

NCEH and ATSDR have made significant progress over the past 2 decades. NCEH has made outstanding progress in such areas as biomonitoring; reducing the prevalence of childhood lead poisoning; collaborating with State and local health agencies and other partners to track, prevent, and control asthma; and understanding and responding to natural and technologic disasters, both nationally and world wide. NCEH has conducted numerous epidemiologic investigations of acute disease outbreaks related to chemical and other exposures.

Equally, ATSDR has been the national leader in understanding the toxicology of hazardous materials, assessing the health of communities exposed to toxic waste sites, studying the health effects of exposure to toxic substances, and providing community and professional education related to these areas. ATSDR also has established strong ties with EPA by actually assigning staff to EPA regional offices and has a major emphasis on working directly with communities and Tribal nations to ensure their on-going involvement in all site work.

The success of past NCEH and ATSDR collaborations on complex environmental public health problems demonstrates the synergism the two agencies can bring to such problems. For example, as a result of widespread contamination (approximately 20,000 persons—including 10,000 children—in seven States) from illegal indoor use of the highly toxic pesticide, methyl parathion, ATSDR, working with NCEH laboratory and other

personnel, along with State and local partners and EPA, developed an effective national public health response. A protocol was developed that integrated environmental and biologic data in a manner that allowed for targeted public health interventions directed at persons at highest risk. EPA saved more than \$18 million because biologic testing helped determine the relative public health risks associated with these exposures.

Another major success for both organizations is our emergency preparedness and response assistance. ATSDR works closely with EPA and the Coast Guard to provide immediate public health guidance in emergency events such as industrial and other toxic substance releases related to the storage, disposal, and transport of these substances. A recent example of this was the removal of mercury-based gas regulators from 400,000 residences in the Detroit and Chicago metropolitan areas. Mercury had inadvertently been released from these regulators into residences. NCEH's emergency preparedness and response capabilities include natural and technologic disaster assistance, response to bioterrorism threats, bioterrorism preparedness planning and readiness activities, and response to complex international humanitarian emergencies involving refugee populations. The health and financial cost consequences of disasters can be enormous and can be reduced by applying the same epidemiology, surveillance, and public health service delivery techniques that are applied to infectious disease prevention activities. NCEH collaborates with FEMA after natural disasters, including assessing health and medical needs immediately post-disaster and providing surveillance and epidemiologic support in response and recovery phases. NCEH's National Pharmaceutical Stockpile Program is a national pharmaceutical asset, maintaining drugs, medical equipment and supplies, and antidotes for use in terrorist events that may occur in the United States.

In FY 2000, NCEH staff participated in teams responding to hurricanes that affected seven States and Puerto Rico, established the National Pharmaceutical Stockpile Program, were instrumental in ensuring the implementation of mass immunization campaigns in Kosovo, and are developing cross-cultural indicators of refugee health status from data collected at over 40 refugee camps throughout the world.

NCEH has served as the central laboratory for the National Health and Nutrition Examination Survey (NHANES). This survey has provided the data showing the decrease of blood lead levels in the general population which correlated with the decrease in lead in gasoline and lead-soldered seams in domestic food cans. Currently, NCEH in its Report on Human Exposure to Environmental Chemicals, has provided the levels of 27 environmental toxicants in the general population in the United States. These background data will provide trend information by which we can evaluate the effectiveness of regulations and determine populations potentially at high risk because of high exposure levels. NCEH is using ATSDR's toll-free phone system and its ToxFAQs to provide additional information to the public.

NCEH and ATSDR, along with their colleagues at EPA and the Council of State and Territorial Epidemiologists, are leading a collaborative effort to identify environmental public health indicators for use in tracking environmental exposures and adverse health effects at the national and State levels. NCEH and ATSDR scientists also collaborate on radiation exposure and health effects research projects at nuclear weapon production facilities in the United States.

The NCEH/ATSDR Vision

As environmental public health professionals, we seek to identify and prevent health conditions that may be caused by people’s interactions with and exposures to their environment. We also seek to promote health by improving the environments in which people live. Jointly CDC/ATSDR can comprise the national and global resource for environmental public health expertise, information, and training.

The NCEH and ATSDR shared vision is to jointly:

- Form the core of the national and international resource for improving the practice of environmental public health.
- Create a seamless approach, and complement each other’s expertise, to address environmental public health threats.
- Serve as a convener of all relevant parties with the aim of unifying environmental public health.
- Provide the science, service, and leadership needed to further improve the health of the people we serve.

These four Shared Vision elements represent the core principles that will guide our next steps, including the development of a joint NCEH/ATSDR strategic plan.

Scientific Capacity Needed for Future Environmental Public Health Activities

A variety of expertise and tools are needed to address the environmental public health threats facing our nation to:

1. identify the problems,
2. treat or fix the problems, and
3. assess the effectiveness of our programs and interventions and replicate the best ones at the State, local, and international levels.

To identify and manage environmental public health problems, we need to utilize the scientific model of determining exposure to environmental insults, including those associated with disasters; evaluating the health risk for various populations to these insults; and identifying and subsequently preventing adverse health outcomes in these populations.

The following expertise and tools are needed to conduct health and exposure assessments to identify the problems:	
laboratory sciences	
biomonitoring	Together NCEH and ATSDR have a strong base in these areas with

environmental monitoring	the notable exception of surveillance. We have only the beginnings of exposure surveillance and, as the Pew Commission pointed out, little in the way of disease surveillance. We need to develop tracking mechanisms for diseases and conditions such as multiple sclerosis, Parkinson's disease, amyotrophic lateral sclerosis, heavy metal and pesticide poisoning, autism, and asthma to determine their possible link to environmental causes.
epidemiology/biostatistics	
surveillance/tracking	
disease	
exposure	
behavior	
genetics	
toxicology	
medical sciences	
environmental sciences (air, water, soil, food, other physical agents)	
risk assessment	
risk analysis	
community/Tribal involvement	
information systems/informatics (including geographic information systems)	

Addressing an identified problem involves:

- changing or controlling the environmental condition so it no longer causes a problem (e.g., providing a safe, alternative drinking water supply), or
- changing the behavior of individuals so they avoid contact with the environmental condition (e.g., avoiding eating contaminated fish), or
- changing behaviors to reduce the risk for disease development among populations exposed to past environmental insults (e.g., promoting smoking cessation among people with past exposures to radon), or
- providing, or facilitating the provision of, appropriate medical treatment (e.g., training physicians to use the most appropriate tools to more accurately diagnose disease among exposed populations).

The first approach is most often accomplished by enacting regulations, enforcing laws, and managing risk. NCEH/ATSDR are responsible for advising regulatory agencies (e.g., EPA, FDA, CPSC) about how best to eliminate the adverse environmental public health condition. The second and third approaches, both involving changing personal behaviors, are more challenging and require a variety of methods including health education, risk communication, media campaigns, and behavioral research. The fourth approach, providing medical treatment, is outside of NCEH's and ATSDR's purview; however, we do

provide guidance to medical-care providers on how best to diagnose and treat illness in patients who have been exposed to environmental insults. Related to this approach, new ways need to be identified to better manage the transition from the public health infrastructure to the health-care infrastructure once disease and illness have been identified.

The following expertise and tools are needed to treat or "fix" the problems:	
community and Tribal involvement	Although ATSDR has developed some capacity in these disciplines, both NCEH and ATSDR need to greatly strengthen their capacity in these areas if they are to effectively address environmental public health issues.
public health ethics	
health education for communities	
risk communication	
(including media campaigns)	
advice/guidelines for the regulators	
(e.g., safe level of toxicants for human health and land-use policy)	
advice/guidelines for health-care professionals	
genetics	
behavioral change research	
medical screening/treatment facilitation	

NCEH/ATSDR need to continue to assess the effectiveness of our public health interventions and transfer the best of them to our State and local public health partners. We also are obligated to share our knowledge with, and learn from, other countries. For example, assisting a country in conducting an epidemiologic investigation of an environmentally-related disease outbreak can ameliorate suffering and prevent disease; develop new scientific information of benefit to people worldwide, including the United States; and help build lasting public health capacity in the country. Environmental pollution and many disasters respect no boundaries, and can contaminate environments or affect populations thousands of miles from the point source.

The following tools and expertise are needed to determine whether our efforts have prevented or controlled disease, and then to replicate successful programs in other venues:	
program effectiveness evaluation	NCEH and ATSDR have grant and cooperative agreement programs with State and local health departments. Both organizations need to ensure the provision of resources to these departments to
cost-benefit analysis	
(prevention effectiveness)	
capacity building	

technology transfer	cover an array of environmental public health issues and to build State and local laboratory, epidemiology, health promotion, and surveillance capacities as well as to promote community and Tribal involvement
training and education	
funding for grants and cooperative agreement	

NCEH/ATSDR Leadership Role in Environmental Public Health

In infectious disease, CDC plays the traditional public health role of disease detection and tracking, prevention research, and health promotion. CDC's public health role falls between that of NIH (which contributes biomedical research) and FDA (which provides the regulatory muscle). In environmental public health, NCEH and ATSDR play the same disease detection/prevention and health promotion roles, with NIH serving the biomedical research role, and with EPA and FDA filling the regulatory role.

NCEH/ATSDR apply the basic biomedical research findings of NIH (primarily the National Institute of Environmental Health Sciences) in their prevention program activities. Conversely, NCEH/ATSDR feed information back to NIH on the applicability of their basic research findings to disease prevention and identify where critical gaps of information exist so that NIH's basic research programs can address these gaps. Ties between NCEH/ATSDR and NIH do exist, but they need to be strengthened.

The relationship between NCEH/ATSDR and the regulatory agencies is equally important. ATSDR has maintained a particularly strong relationship with EPA, providing environmental public health advice to the EPA Superfund program – primarily because of EPA's and ATSDR's statutory mandates. ATSDR has an excellent record of EPA acceptance of site-specific recommendations. NCEH has also worked extensively with EPA and FDA on a variety of specific environmental public health problems. To have a major impact on environmental public health issues, NCEH/ATSDR must strengthen their ties with all relevant programs at EPA and FDA and provide them with real-time health data that they can use in their regulatory decision-making. Too often regulatory decisions are based upon animal data rather than human data, or on data derived from mathematical modeling. To establish this more effective relationship with EPA, NCEH/ATSDR need expertise in the environmental sciences (e.g., geologists, hydrologists, physicists, and engineers) related to air, water, soil, food, and other physical agents not only so we can talk the same language, but also so we can effectively communicate public health messages to the public and into the regulatory and enforcement programs of these agencies.

Positioning NCEH/ATSDR for the Future of Environmental Health

Although numerous agencies and organizations at all levels are working in various facets of infectious disease prevention, CDC is universally recognized as the "go-to" agency when leadership and assistance are needed. This unquestioned leadership role results from CDC's well-honed and highly effective model that includes staff assignments internationally and to State and local health agencies, training programs, disease tracking, epidemiology

support, linkages with all relevant players, health promotion, risk assessment and communication, laboratory expertise, and applied research. The same model is needed regarding health problems related to the environment. Jointly, NCEH and ATSDR can establish this same model and leadership role for environmental public health within the next 5 years while ensuring that NCEH's and ATSDR's current programs (e.g., childhood lead poisoning prevention and Superfund) are not attenuated.

NCEH and ATSDR and our partners need to be able to respond to all the environmental public health objectives presented in, Healthy People 2010. The critical importance of achieving these objectives is reflected in the "Environmental Health" component of this document where it states, "Poor environmental quality is estimated to be directly responsible for approximately 25 percent of all preventable ill health in the world..." As a reflection of the pervasive impact of the environment on human health, it is notable that the "Environmental Health" focus area crosscuts with 17 other Healthy People 2010 focus areas.

NCEH/ATSDR need to be able to respond to the challenges posed by many of the Nation's most prominent public health leaders at the NACCHO focus group discussions. This diverse group of leaders represented academia, public interest groups (e.g., Physicians for Social Responsibility), nonprofit organizations (e.g., National Safety Council, American Lung Association), Tribal representatives, other Federal agencies with environmental responsibilities, and organizations representing the interests of the public health field (e.g., National Association of Local Boards of Health, Public Health Foundation, and National Environmental Health Association). Participants virtually unanimously indicated that expanded national leadership from NCEH and ATSDR must address critical needs such as ensuring National coordination and reducing fragmentation of activities at all levels, promoting the field of environmental public health, aiding in developing the public health workforce through training support, and providing strategic and flexible financial support to State and local public health agencies.

NCEH/ATSDR also need to be able to answer the questions posed by the Pew Commission such as:

- Are environmental exposures related to clusters of childhood cancer and autism?
- What are the impacts of pesticide exposures on children's health?
- What proportion of birth defects are related to environmental factors?
- Are adult-onset diseases such as Parkinson's disease and Alzheimer's disease related to cumulative environmental exposures?
- Are learning disabilities related to environmental exposures?
- How does particulate air pollution increase the risk of death for the elderly?
- Are endocrine-disrupting pollutants in the environment related to the increasing incidence of breast and prostate cancers?

These questions and issues such as health effects that may result from chronic, low-level exposures to a given toxicant or from mixtures of toxicants need to be addressed both for specific communities, and for the population of the United States in general.

To respond to increasing environmental health concerns by the public NCEH/ATSDR need

to:

- Establish NCEH/ATSDR teams to provide consultation on and, as warranted, investigate environmentally related disease clusters and outbreaks following the public health model.
- Ensure that NCEH and ATSDR programs complement each other and function in concert.
- Provide assistance to State and local health agencies, professional organizations, and others to broaden their capacity in environmental public health through training, assignment of staff, and funding through grants and cooperative agreements.
- Establish the "Nationwide Health Tracking Network" proposed by the Pew Environmental Health Commission.
- Develop effective methods of preventing environmentally related diseases and effectively diagnosing and facilitating treatment when prevention fails.
- Expand emergency preparedness and response capacity to address the many complex issues of natural and technologic disasters and bioterrorism threats.
- Define and implement a joint applied research agenda for environmental public health.
- Pursue linking biomonitoring, environmental data, and disease tracking to further inform environmental and public health decision makers.
- Aggressively pursue the implications of the "new genetics" to better understand environmental exposure and gene interactions.
- Ensure that environmental justice principles are appropriately considered in all NCEH and ATSDR activities.

Additionally, NCEH/ATSDR need to share technical expertise with other countries and learn more about environmental public health impacts from exposure to toxic substances world wide.

Next Steps

In order to move from defining a shared vision to the implementation of the vision, a number of steps need to proceed as soon as possible:

- Beginning January 2001, meetings will be held with staff from across NCEH and ATSDR to present the shared vision and to begin implementing appropriate activities.
- The shared vision document will be circulated widely and posted on the NCEH and ATSDR web sites for comment.
- From January to June 2001, a series of meetings will be held with Federal, State, local, academic, advocacy, volunteer, community, and Tribal partners to discuss and obtain advice and recommendations regarding the shared vision and the path forward.
- NCEH and ATSDR will map the strengths and weakness of each organization and the functional technical and organizational areas that are complementary.
- The Advisory Committee to the Director of NCEH and the Board Of Scientific Counselors of ATSDR will establish an ongoing relationship between the two bodies and will provide advise on implementing the shared vision.

- NCEH and ATSDR will embark on a developing a joint strategic plan that specifically defines strategies for implementing this shared vision.
- NCEH and ATSDR will work closely with the Director of CDC and Administrator of ATSDR to promote the shared vision with the Department of Health and Human Services and relevant Congressional Offices.

In conclusion, the development of the Shared Vision marks an historic beginning of a process that will significantly improve the delivery of environmental public health services nationally and internationally. NCEH and ATSDR leadership are committed to this Shared Vision.

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