8

Environmental Health

Co-Lead Agencies: Agency for Toxic Substances and Disease Registry
Centers for Disease Control and Prevention
National Institutes of Health

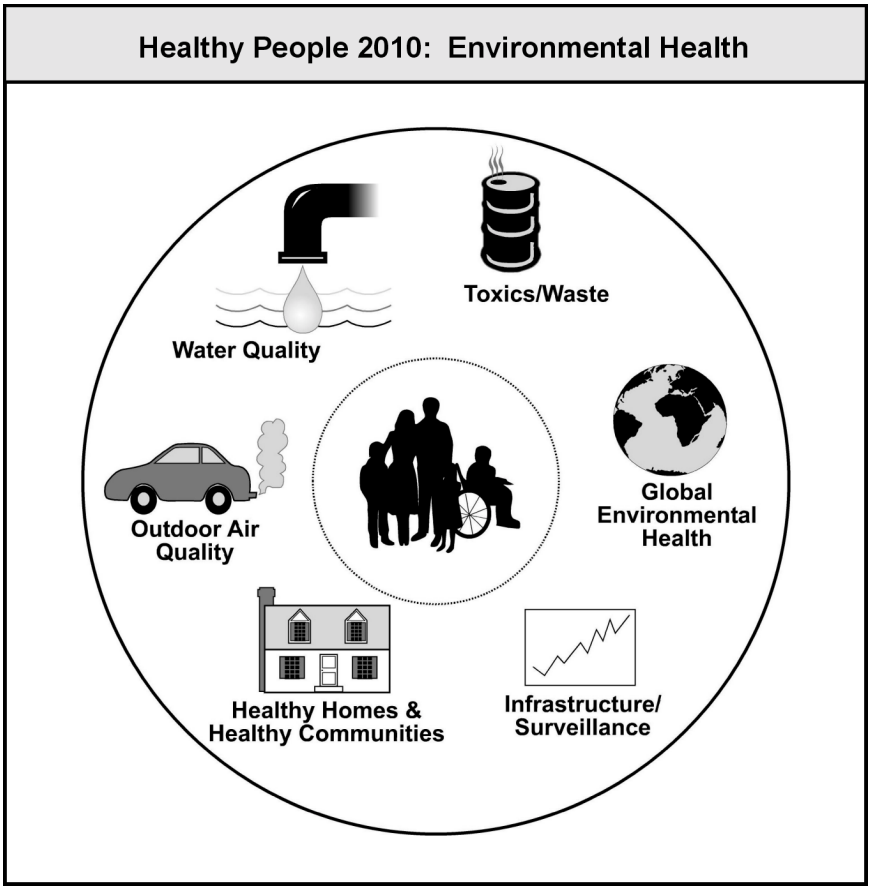
Contents

Goal

Promote health for all through a healthy environment.

Overview

According to the World Health Organization, "In its broadest sense, environmental health comprises those aspects of human health, disease, and injury that are determined or influenced by factors in the environment. This includes the study of both the direct pathological effects of various chemical, physical, and biological agents, as well as the effects on health of the broad physical and social environment, which includes housing, urban development, land-use and transportation, industry, and agriculture."[1] The term "environment" also may be used to refer to air, water, and soil. This more narrow definition ignores the manmade environment created by a society. Where and how a society chooses to grow and develop affects the quality of life by determining how long people spend traveling to work, shopping, or going to school. Where and how a society builds its houses, schools, parks, and roadways can also limit the ability of some people to move about and lead a normal life.



Because the impact of the environment on human health is so great, protecting the environment has long been a mainstay of public health practice. National, State, and local efforts to ensure clean air and safe supplies of food and water, to manage sewage and municipal wastes, and to control or eliminate vector-borne illnesses have contributed a great deal to improvements in public health in the United States. Unfortunately, in spite of the billions of dollars spent to manage and clean up hazardous waste sites in the Nation each year, little money has been spent evaluating the health risks associated with chronic, low-level exposures to hazardous substances. This imbalance results in an inadequate amount of useful information to evaluate and manage these sites effectively and to evaluate the health status of people who live near the sites.[2] In the past, research in environmental epidemiology and toxicology has often been based on limited information. New knowledge about the interactions between specific genetic variations among individuals and specific environmental factors provides enormous opportunity for further developing modifications in environmental exposures that contribute to disease. Further research is needed to address these and other problems and to improve the science and management of health effects on people exposed to environmental hazards.[3]

Issues

Environmental factors play a central role in human development, health, and disease. Broadly defined, the environment, including infectious agents, is one of three primary factors that affect human health. The other two are genetic factors and personal behavior.

Human exposures to hazardous agents in the air, water, soil, and food and to physical hazards in the environment are major contributors to illness, disability, and death worldwide. Furthermore, deterioration of environmental conditions in many parts of the world slows sustainable development. Poor environmental quality is estimated to be directly responsible for approximately 25 percent of all preventable ill health in the world, with diarrheal diseases and respiratory infections heading the list.[4] Ill health resulting from poor environmental quality varies considerably among countries. Poor environmental quality has its greatest impact on people whose health status already may be at risk.

Because the effect of the environment on human health is so great, protecting the environment has been a mainstay of public health practice since 1878.[5] National, Tribal, State, and local efforts to ensure clean air and safe supplies of food and water, to manage sewage and municipal wastes, and to control or eliminate vector-borne illnesses have contributed significantly to improvements in public health in the United States. However, the public's awareness of the environment's role in health is more recent. Publication of Rachel Carson's *Silent Spring* in the early 1960s, followed by the well-publicized poor health of residents of Love Canal in western New York, a significant toxic waste site, awakened public consciousness to environmental issues. The result of these and other similar events is the so-called environmental movement that has led to the introduction into everyday life

of such terms as Superfund sites, water quality, clean air, ozone, urban sprawl, and agricultural runoff.

In 1993 alone, over $109 billion was spent on pollution abatement and control in the United States.[6] However, many hazardous sites still remain. Minimal research has been done to evaluate the health risks associated with chronic low-level exposures to hazardous substances, resulting in an inability to evaluate and manage such sites effectively and to evaluate the health status of residents living near such sites. Further environmental epidemiology and toxicology research is needed to address such problems and to improve the science and public health management of the health effects on people exposed to environmental hazards.

To address the broad range of human health issues affected by the environment, this chapter discusses six topics: outdoor air quality, water quality, toxics and waste, healthy homes and healthy communities, infrastructure and surveillance, and global environmental health issues.

Outdoor air quality. Air pollution continues to be a widespread public health and environmental problem in the United States, causing premature death, cancer, and long-term damage to respiratory and cardiovascular systems. Air pollution also reduces visibility, damages crops and buildings, and deposits pollutants on the soil and in bodies of water where they affect the chemistry of the water and the organisms living there. Approximately 113 million people live in U.S. areas designated as nonattainment areas by the U.S. Environmental Protection Agency (EPA) for one or more of the six commonly found air pollutants for which the Federal Government has established health-based standards.[7] The problem of air pollution is national—even international—in scope. Most of the U.S. population lives in expanding urban areas where air pollution crosses local and State lines and, in some cases, crosses U.S. borders with Canada and Mexico.[8, 9]

Although some progress toward reducing unhealthy air emissions has been made, a substantial air pollution problem remains, with millions of tons of toxic air pollutants released into the air each year.[10] The presence of unacceptable levels of ground-level ozone is the largest problem, as determined by the number of people affected and the number of areas not meeting Federal standards.

Motor vehicles account for approximately one-fourth of emissions that produce ozone and one-third of nitrogen oxide emissions. Particulate and sulfur dioxide emissions from motor vehicles represent approximately 20 percent and 4 percent, respectively. Some 76.6 percent of carbon monoxide emissions are produced each year by transportation sources (for example, motor vehicles).[7]

Unhealthy air is expensive. The estimated annual health costs of human exposure to all outdoor air pollutants from all sources range from $40 billion to $50 billion, with an associated 50,000 premature deaths.[11]

Water quality. Providing drinking water free of disease-causing agents, whether biological or chemical, is the primary goal of all water supply systems. During the first half of the 20th century the causes for most waterborne disease outbreaks were bacteria; beginning in the 1970s protozoa and chemicals became the dominant causes.[12] Most outbreaks involve only a few individuals.[13, 14, 15] In 1993, however, more than 403,000 people became sick during a single episode of waterborne cryptosporidiosis.[15]

One problem in evaluating the relationship between drinking water and infectious diseases is the lack of adequate technology to detect parasitic contamination and to determine whether the organisms detected are alive and infectious. The development of new molecular technologies to detect and monitor water contamination will enhance water quality monitoring and surveillance.

Contamination of water can come from both point (for example, industrial sites) and nonpoint (for example, agricultural runoff) sources. Biological and chemical contamination significantly reduces the value of surface waters (streams, lakes, and estuaries) for fishing, swimming, and other recreational activities. For example, during the summer of 1997, blooms of *Pfiesteria piscicida* were implicated as the likely cause of fish kills in North Carolina and Maryland. The development of intensive animal feeding operations has worsened the discharge of improperly or inadequately treated wastes,[16] which presents an increased health threat in waters used either for recreation or for producing fish and shellfish.

Toxics and waste. Critical information on the levels of exposure to hazardous substances in the environment and their associated health effects often is lacking. As a result, efficient health-outcome measures of progress in eliminating health hazards in the environment are unavailable. The identification of toxic substances and waste, whether hazardous, industrial, or municipal, that pose an environmental health risk represents a significant achievement in itself. Public health strategies are aimed at tracking the Nation's success in eliminating these substances or minimizing their effects.

Toxic and hazardous substances, including low-level radioactive wastes, deposited on land often are carried far from their sources by air, groundwater, and surface water runoff into streams, lakes, and rivers where they can accumulate in the sediments beneath the waters. Ultimate decisions about the cleanup and management of these sites must be made keeping public health concerns in mind.

The introduction and widespread use of pesticides in the American landscape continues in agricultural, commercial, recreational, and home settings. As a result, these often very toxic substances pose a potential threat to people using them, especially if they are handled, mixed, or applied inappropriately or excessively. Furthermore, children are at increased risk for pesticide poisoning because of their smaller size and because pesticides may be stored improperly or applied to surfaces that are more readily accessible by children.

Healthy homes and communities. The public's health, particularly its environmental health, depends on the interaction of many factors. To provide a healthy environment within the Nation's communities, the places people spend the most time—their homes, schools, and offices—must be considered. Potential risks include indoor air pollution; inadequate heating, cooling, and sanitation; structural problems; electrical and fire hazards; and lead-based paint hazards. More than 6 million housing units across the country meet the Federal Government's definition of substandard housing.[17]

Many factors—including air quality; lead-based paint on walls, trim, floors, ceilings, etc.; and hazardous household substances such as cleaning products and pesticides—can affect health and safety. In 1996, the American Association of Poison Control Centers reported more than 2 million poison exposures from 67 participating poison control centers. The site of exposure was a residence in 91 percent of cases.[18]

Infrastructure and surveillance. Preventing health problems caused by environmental hazards requires: (1) having enough personnel and resources to investigate and respond to diseases and injuries potentially caused by environmental hazards; (2) monitoring the population and its environment to detect hazards, exposure of the public and individuals to hazards, and diseases potentially caused by these hazards; (3) monitoring the population and its environment to assess the effectiveness of prevention programs; (4) educating the public and select populations on the relationship between health and the environment; (5) ensuring that laws, regulations, and practices protect the public and the environment from hazardous agents; (6) providing public access to understandable and useful information on hazards and their sources, distribution, and health effects; (7) coordinating the efforts of government agencies and nongovernmental groups responsible for environmental health; and (8) providing adequate resources to accomplish these tasks. Development of additional methods to measure environmental hazards in people will permit more careful assessments of exposures and health effects.

Global environmental health. Increased international travel and improvements in telecommunications and computer technology are making the world a smaller place. The term "global community" has real significance, as shared resources—air, water, and soil—draw people together. Actions in every country affect the environment and influence events around the world. Undoubtedly, the environment affects everyone's health. Sometimes benefits in one area inadvertently create worse conditions for people in different areas of the world. For example, in 1996, the United States exported more than $2.5 billion worth of pesticides.[19] Exported pesticides that are not registered, or pesticides that are restricted for use in the United States, are often used by developing countries. Their use not only endangers populations in those countries but also can contaminate food being exported from those countries to the United States. Sensitive populations, such as children and pregnant women, may be at risk from these environmental exposures. The United States can contribute to improving the health of people internationally,

not only as part of a shared goal for humanity, but also because a healthy global population has positive social and economic benefits throughout the world.

Additionally, a number of countries have resources available to protect their populations from adverse health impacts, but because of inadequate information they are unable to do so. Lead abatement technology, for example, is one area where the United States can provide information to other countries. Likewise, consultation and assistance on numerous environmental health issues from lead poisoning to disaster preparedness will help reduce illness, disability, and death in countries with these problems, which can lead to a healthier global community.

The Nation should expand its efforts for improving environmental conditions to enhance the health of developing countries. It should also increase collaboration, coordination, and outreach efforts with the rest of the world to help close the gap between existing and attainable health status.

Trends

During the 1990s, progress in improving environmental health was mixed. The decline in childhood lead poisoning in the United States represents a public health success. In 1984, between 2 million and 3 million children aged 6 months to 5 years had blood lead levels (BLLs) greater than 15 μg/dL, and almost a quarter of a million had BLLs above 25 μg/dL,[20] a level that can affect vital organs and the brain. (Blood levels are measured in micrograms of lead found in a deciliter of blood.) By the early 1990s, fewer than 900,000 children had BLLs above 10μg/dL, the current standard for identifying children at risk.[21] This dramatic reduction is the result of research to identify persons at risk, professional and public education campaigns to "spread the word," broad-based screening measures to find those at risk, and effective community efforts to clean up problem areas, namely, substandard housing units. However, despite the success achieved, more remains to be done before childhood lead poisoning becomes a disease of the past. Although childhood lead poisoning occurred in all population groups, the risk was higher for persons having low income, living in older housing, and belonging to certain racial and ethnic groups. For example, among non-Hispanic black children living in homes built before 1946, 22 percent had elevated BBLs. Because the risk for lead poisoning is not spread evenly throughout the population, efforts are continuing to identify children at risk and ensure that they receive preventive interventions.[22]

Unfortunately, not all trends for environmental health issues are as encouraging. Since the mid-1980s, asthma rates in the United States have risen to the level of an epidemic.[23] Asthma and other respiratory conditions often are triggered or worsened by substances found in the air, such as tobacco smoke, ozone, and other particles or chemicals. Based on existing data, an estimated 14.9 million people in the United States had asthma in 1995,[24] including more than 5 million children aged 17 years and under.[25] Between 1980 and 1993, the overall death rate for asthma increased 57 percent, from 12.8 to 20.1 deaths per million population;[23]

for people aged 17 years and under, the death rate increased 67 percent, from 1.8 to 3.0 deaths per million population.[26] The direct economic and health care costs of asthma and other respiratory conditions can be large. In 1990, the estimated total cost of asthma was $6.2 billion; the total cost was projected to rise to $14.5 billion by the year 2000.[27] The indirect costs of asthma, measured in reduced quality of life and lost productivity, include the estimated 10 million school days each year that children miss. Lost productivity from missed work days of parents caring for children with asthma is estimated to be $1 billion—not including the cost of lost productivity from adults with asthma who miss work.[27] (See Focus Area 24. Respiratory Diseases.)

Although successes in environmental public health are possible, they are difficult to achieve. Infectious and chemical agents still contaminate food and water. Animals continue to carry diseases to human populations, and outbreaks of once-common intestinal diseases (for example, typhoid fever), although less frequent, still occur. (See Focus Area 10. Food Safety.) These outbreaks underscore the need to maintain and improve programs developed in the first half of the 20th century to ensure the safety of food and water. The challenge is to retain these basic capacities in the 21st century, with the added responsibilities for dealing with emerging hazards. The control of well-known hazards must coexist with ongoing research and the development of strategies and methods to understand and control new hazards. Another challenge is the need to help the public understand the link between human activity and the destruction of the environment.

Within the United States, significant strides toward a reduction in harmful air emissions can be achieved by individuals choosing not to drive their cars. People need to use public transit, walk, or bicycle more often. Laws can help improve street and highway design to facilitate pedestrians and bicyclists, and employers can embrace telecommuting, but the choice remains with the individual. Encouraging individuals to walk or bike also may play a role in reducing the problems of obesity and overweight individuals, which have risen to alarming levels in the U.S. population.

Urban sprawl has become an increasingly important concern in the United States for several reasons: increased outdoor air pollution in major urban areas, reduced quality of life due to the loss of free time and the stress of increased commuting time, and less green space in major metropolitan areas. Between 1983 and 1995, the average annual vehicle miles traveled increased 80 percent.[28] These conditions lead to negative health conditions, such as asthma and injuries from road rage due to traffic-related stress.[29] In addition, sprawl diminishes the amount of land available for prime recreational and agricultural uses and can bring two land uses together that do not coexist well. For example, a residential development in an area that was previously agricultural may expose residents to environmental hazards, such as pesticides, which may pose a threat to their health.

On a global scale, the U.S.-Mexico border area illustrates how human activity can contribute to damaging the environment, affecting generations to come. Over the

past 30 years, this region has experienced a dramatic surge in population and industrialization. The region has had great difficulty in supporting this growth and suffers from a lack of resources and expertise to manage solid waste properly, handle and store pesticides and other hazardous materials, supply sufficient drinking water, and support other sustainable development efforts.[8] Nations need to make choices about how to deal with such regions; offering technical assistance is an option to speed knowledge transfer and reduce environmental harm.

Disparities

Studies have linked race and socioeconomic status to increased exposure to environmental hazards, and information about gene-environment interactions improves the ability to determine who has increased risk of disease from these exposures. Table 8-A and Table 8-B summarize some inequities in the United States regarding exposure to selected potential environmental hazards.

Table 8-A. Proportions of African American, Hispanic, and white populations living in air-quality nonattainment areas, 1992.[30]

Pollutant	Demographic Breakdowns		
	African Americans	Hispanics	Whites
	Percent Living in Air-Quality Nonattainment Areas		
Particulates	16.5	34.0	14.7
Carbon monoxide	46.0	57.1	33.6
Ozone	62.2	71.2	52.5
Sulfur dioxide	12.1	5.7	7.0
Lead	9.2	18.5	6.0

Table 8-B. Proportions of certain racial and ethnic and lower socioeconomic populations in census tracts surrounding waste treatment, storage, and disposal facilities (TSDF) compared with the proportions of these groups in other census tracts, 1994.[30]

Location of TSDFs	Demographic Breakdowns		
	African Americans	Hispanics	Persons Living Below the Poverty Line
	Percent		
Census tracts with either TSDFs or at least 50 percent of their area within 2.5 miles of a tract with TSDF	24.7	10.7	19.0
Census tracts without TSDFs	13.6	7.3	13.1

Disparities exist in the environmental exposures certain populations face and in the health status of these populations. For example, in New York City, African American, Hispanic, and low-income populations have been found to have hospitalization and death rates from asthma three to five times higher than those for all New York City residents. African American children have been found to be three times more likely than white children to be hospitalized for asthma and asthma-related conditions and four to six times more likely to die from asthma.[30] (See Focus Area 24. Respiratory Diseases.) With respect to BLL, children from certain racial and ethnic groups are disproportionately affected. While there are no studies to show rural and frontier dwellers are at increased risk to exposure to contaminated drinking water, the preponderance of this population depends on unregulated private wells for their drinking water. The U.S. Geological Survey (USGS) reports that 42.8 million persons in the United States (17 percent of the total population) were served by their own (self-supplied) water systems in 1990.[31]

Opportunities

An increase in public awareness of environmental health issues is key to achieving this chapter's goal and objectives. Education—at all levels—is a cornerstone of broad prevention efforts.

Improving the availability of environmental health data also will help meet the objectives. The Internet has increased dramatically access to environmental information. Databases such as TOXNET (at http://toxnet.nlm.nih.gov/),[32] Internet Grateful Med (at http://igm.nlm.nih.gov),[33] and TRI (the Toxics Release Inventory www.epa.gov/ceisweb1/ceishome/ceisdata/xplor-tri/explorer.htm) may provide useful information about environmental hazards or other environmental problems in communities to health care providers, policymakers, and the public. Moreover, better dissemination of global environmental health information may reduce the occurrence of disease or exposure to harmful environmental agents for U.S. citizens traveling abroad.

To be successful, programs to improve environmental health must be based on scientific evidence. The complex relationship between human health and the acute and long-term effects of environmental exposures must be studied so prevention measures can be developed. Surveillance systems to track exposures to toxic substances such as commonly used pesticides and heavy metals must be developed and maintained. To the extent possible, these systems should use biomonitoring data, which provide measurements of toxic substances in the human body. A mechanism is needed for tracking the export of pesticides restricted or not registered for use in the United States.

Environmental hazards are not limited by political boundaries. The scope of public and environmental health must be global if the Nation is to achieve good health for all persons in the United States. A global scope will help develop and achieve effective ways to prevent disease worldwide as well. The United States must work

with other governments, nongovernmental organizations, and international organizations to help improve human health on a global scale.

Interim Progress Toward Year 2000 Objectives

Healthy People 2000 targets have been met for objectives dealing with outbreaks of waterborne diseases, with solid wastes, and with toxic substances released through industrial processes. Substantial progress has been made in objectives involving the proportion of people who live in counties that meet EPA air standards for air pollution, the number of States that require radon disclosures with real estate transactions, and the recycling of household hazardous waste. More moderate progress has taken place for the objectives involving radon and lead-based paint testing in homes, asthma hospitalizations, and States with laws to track environmental diseases. Mixed progress or movement away from the targets is being seen in objectives dealing with mental retardation and impaired surface waters (rivers, lakes, and estuaries). Data have been mixed or difficult to assess for the cleanup of hazardous waste sites. The target for blood lead levels in children has not been met, though some progress has been made.

Note: Unless otherwise noted, data are from the Centers for Disease Control and Prevention, National Center for Health Statistics, *Healthy People 2000 Review, 1998–99.*

Environmental Health

Goal: Promote health for all through a healthy environment.

Number	Objective Short Title
Outdoor Air Quality	
8-1	Harmful air pollutants
8-2	Alternative modes of transportation
8-3	Cleaner alternative fuels
8-4	Airborne toxins
Water Quality	
8-5	Safe drinking water
8-6	Waterborne disease outbreaks
8-7	Water conservation
8-8	Surface water health risks
8-9	Beach closings
8-10	Fish contamination
Toxics and Waste	
8-11	Elevated blood lead levels in children
8-12	Risks posed by hazardous sites
8-13	Pesticide exposures
8-14	Toxic pollutants
8-15	Recycled municipal solid waste
Healthy Homes and Healthy Communities	
8-16	Indoor allergens
8-17	Office building air quality
8-18	Homes tested for radon
8-19	Radon-resistant new home construction
8-20	School policies to protect against environmental hazards
8-21	Disaster preparedness plans and protocols
8-22	Lead-based paint testing
8-23	Substandard housing

Number	Objective Short Title
Infrastructure and Surveillance	
8-24	Exposure to pesticides
8-25	Exposure to heavy metals and other toxic chemicals
8-26	Information systems used for environmental health
8-27	Monitoring environmentally related diseases
8-28	Local agencies using surveillance data for vector control
Global Environmental Health	
8-29	Global burden of disease
8-30	Water quality in the U.S.–Mexico border region

Outdoor Air Quality

8-1. Reduce the proportion of persons exposed to air that does not meet the U.S. Environmental Protection Agency's health-based standards for harmful air pollutants.

Target and baseline:

Objective	Reduction in Air Pollutants	1997 Baseline	2010 Target
		Percent	
8-1a.	Ozone*	43	0
8-1b.	Particulate matter*	12	0
8-1c.	Carbon monoxide	19	0
8-1d.	Nitrogen dioxide	5	0
8-1e.	Sulfur dioxide	2	0
8-1f.	Lead	<1	0
		Number	
8-1g.	Total number of people	119,803,000	0

*The targets of zero percent for ozone and particulate matter are set for 2012 and 2018, respectively.

Target setting method: Consistent with the Clean Air Act (Public Law 101-549).

Data source: Aerometric Information Retrieval System (AIRS), EPA, OAR.

Note: For the purpose of this objective, EPA is counting persons living in nonattainment areas only.

Data for population groups currently are not analyzed.

Historically, EPA's air quality monitoring and National Ambient Air Quality Standards data collection have taken place in large urban centers and other areas generally considered to have the Nation's poorest air quality. As nonattainment areas become attainment areas, EPA will continue its monitoring efforts. (See Focus Area 24. Respiratory Diseases.)

8-2. Increase use of alternative modes of transportation to reduce motor vehicle emissions and improve the Nation's air quality.

Target and baseline:

Objective	Increase in Use of Alternative Modes of Transportation	1995 Baseline	2010 Target
		Percent	
8-2a.	Trips made by bicycling	0.9	1.8
8-2b.	Trips made by walking	5.4	10.8
8-2c.	Trips made by transit	1.8	3.6
8-2d.	Persons who telecommute	Developmental	

Target setting method: Consistent with the goal of the National Bicycling and Walking Study, U.S. Department of Transportation (DOT).

Data source: Nationwide Personal Transportation Survey (NPTS), U.S. Department of Transportation.

For many communities in the United States, motor vehicle emissions are the primary cause of air pollution. Increasing use of alternative modes of transportation is a comprehensive approach that each citizen can take to affect local levels of air pollution. An increase in neighborhood streets with ways to slow traffic and with more sidewalks and bike lanes, offroad pedestrian or bike routes, and bicycle and pedestrian plans and programs will aid in reaching the targets for biking, walking, and transit objectives. (See Focus Area 22. Physical Activity and Fitness.) As technology improves, telecommuting will play an increasing role in U.S. business. Many people will be able to do some or all of their work from home, thus reducing peak-period demand for transportation.

8-3. Improve the Nation's air quality by increasing the use of cleaner alternative fuels.

Target: 30 percent.

Baseline: Cleaner alternative fuels represented 2.7 percent of U.S. motor fuel consumption in 1997.

Target setting method: 10-fold improvement.

Data source: Alternatives to Traditional Transportation Fuels, U.S. Department of Energy, Energy Information Administration.

Privately owned cars, vans, and trucks; commercial fleets, trucks, and buses; and power plants are the major users of alternative fuels. Ethanol-blended fuels have been used in small engines and other nonautomotive gasoline engines since the fuels first came into the marketplace over 25 years ago. Today, all mainstream

manufacturers of power equipment, motorcycles, snowmobiles, and outboard motors permit the use of ethanol blends in their products.

The primary force behind development of an alternative fuels infrastructure is the U.S. Department of Energy Clean Cities Program—a voluntary program and locally based government and industry partnership designed to promote the use of alternative fuels and alternative fuel vehicles, cleaner air in major U.S. cities, reduced dependence on imported oil, and stimulate local economic activity.[34]

Infrastructure building also is aided by development of alternative fuel vehicles by the major automobile manufacturers. Also, ethanol blends of up to 10 percent are approved under the warranties of all major auto manufacturers, domestic and foreign, marketing vehicles in the United States. In fact, some recommend the use of cleaner-burning fuels such as ethanol in their vehicle owner manuals because of ethanol's clean air benefits. Ethanol actually can enhance engine performance by increasing octane and raising oxygen, cleaning and preventing engine deposits, and acting as a gas-line antifreeze.[35]

More than a trillion miles have been driven on ethanol-blended gasolines, and ethanol-blended fuels represent more than 12 percent of U.S. motor gasoline sales. Congress established the Federal ethanol program in 1979 to stimulate rural economies and reduce the Nation's alarming dependence on imported oil through the production of a domestic, renewable energy source. The program has helped build a strong domestic energy industry. From just over 10 million gallons of production in 1979, the U.S. fuel ethanol industry has grown to more than 1.8 billion gallons of annual production capacity. Ethanol is marketed widely across the country as a high-quality octane enhancer and as an oxygenate capable of reducing air pollution and improving automobile performance.

8-4. Reduce air toxic emissions to decrease the risk of adverse health effects caused by airborne toxics.

Target: 2.0 million tons.

Baseline: 8.1 million tons of air toxics were released into the air in 1993.

Target setting method: 75 percent improvement.

Data source: U.S National Toxics Inventory, EPA.

Toxic air pollutants are those pollutants known or suspected to cause cancer or other serious health effects, such as reproductive effects or birth defects, or to cause adverse environmental effects. The degree to which a toxic air pollutant affects a person's health depends on many factors, including the quantity of pollutant the person is exposed to, the duration and frequency of exposures, the toxicity of the chemical, and the person's state of health and susceptibility. Examples of toxic air pollutants include benzene, which is found in gasoline; perchloroethylene, which is emitted from some dry cleaning facilities; and methylene chloride, which is used as a solvent and paint stripper by a number of industries.

Examples of other listed air toxics include dioxin, asbestos, toluene, and metals such as cadmium, mercury, chromium, and lead compounds.

Scientists estimate that millions of tons of toxic pollutants are released into the air each year. Some air toxics are released from natural sources such as volcanic eruptions and forest fires. Most, however, originate from manmade sources, including both mobile sources (for example, cars, buses, trucks) and stationary sources (for example, factories, refineries, power plants). Emissions from stationary sources constitute almost two-thirds of all manmade air toxics emissions. (See Focus Area 24. Respiratory Diseases.)

Water Quality

8-5. Increase the proportion of persons served by community water systems who receive a supply of drinking water that meets the regulations of the Safe Drinking Water Act.

Target: 95 percent.

Baseline: 85 percent of persons served by community water systems received drinking water that met SDWA (Public Law 93-523) regulations in 1995.

Target setting method: Consistent with EPA's strategic plan.

Data sources: Potable Water Surveillance System (PWSS) and Safe Drinking Water Information System (SDWIS), EPA.

Most people in the United States obtain their drinking water from public water supply systems. EPA has established regulations intended to ensure that community water systems supply safe drinking water to their customers. Compliance with the established regulations is one measure of the public's receipt of a safe water supply, free from disease-causing agents. In 1997, small systems (serving 25 to 3,300 people) accounted for more than 85 percent of the community water systems in the United States but served only about 10 percent of the population. These systems accounted for 91 percent of the violations of the EPA drinking water regulations.[36] According to USGS, 17 percent of the Nation's total population were served by their own water supply systems in 1990, compared with 18 percent in 1985.[31]

8-6. Reduce waterborne disease outbreaks arising from water intended for drinking among persons served by community water systems.

Target: 2 outbreaks.

Baseline: 6 outbreaks per year originated from community water systems (1987–96 average).

Target setting method: 67 percent improvement.

Data source: State Reporting Systems, CDC, NCID.

The Centers for Disease Control and Prevention (CDC) compiles the results of State investigations into waterborne disease outbreaks arising from water intended for drinking. Between 1987 and 1996, the States reported an average of 15.5 outbreaks per year, of which 6 outbreaks were identified as originating from community water supplies.[13, 14, 15] Limited existing data suggest that State and CDC surveillance systems for detecting waterborne disease outbreaks are able to detect most waterborne disease outbreaks.

8-7. Reduce per capita domestic water withdrawals.

Target: 90.9 gallons.

Baseline: 101 gallons of domestic water per capita per day were withdrawn in 1995.

Target setting method: 10 percent improvement.

Data source: U.S. Department of Interior, U.S. Geological Survey (USGS).

Historically, water management in the United States has focused on directing the country's abundant supplies of fresh water to meet the needs of users. This approach has resulted in the building of large storage reservoirs and conveyance systems, especially in the West. Increasing development costs, capital shortages, government fiscal restraint, diminishing sources of water supply, polluted water, and a growing concern for the environment have forced water managers and planners to begin to rethink traditional approaches to management and to experiment with new ones. Experts on the subject of water supply and demand agree that the West is in transition from the era of water-supply development to an era of water-demand management and conservation. As the population increases in the Eastern United States, the water quantity problems already facing the West will become apparent there as well. Estimates place the amount of water withdrawn for public supply during 1990 at about 5 percent more than during 1985.[31] Public-supply domestic deliveries averaged 105 gallons per day for each person served, the same as during 1985.[31] The per capita use remained about the same for the past decade as the result of active conservation programs that include the installation of additional meters and water-conserving plumbing fixtures.[31] Information about water use is available from USGS at http://water.usgs.gov/watuse/wudo.html.[37]

8-8. (Developmental) Increase the proportion of assessed rivers, lakes, and estuaries that are safe for fishing and recreational purposes.

Potential data source: Clean Water Act (Public Law 92-500), Section 305-b Report, EPA.

EPA reported that about 40 percent of the Nation's surface waters (streams, lakes, and estuaries) are too polluted for fishing, swimming, or other uses designated for them by States and Tribes.[38] Water quality in lakes, streams, and estuaries of the United States affects both the recreational and food production use of these waters. States and Tribes have water-quality management programs that address recreational use and fish and shellfish harvesting. EPA establishes water-quality objectives for these waters and monitors progress toward these goals. Discharging inadequately treated or inappropriate quantities of human, industrial, or agriculture wastes reduces the ability of water to provide conditions that support the growth and harvesting of fish and shellfish for human consumption. Such discharging also prevents water's use as a recreational resource.

8-9. (Developmental) Reduce the number of beach closings that result from the presence of harmful bacteria.

Potential data source: EPA Beach Program.

During the first half of the decade, EPA plans to focus on conserving and enhancing the Nation's waters and aquatic ecosystems so that 75 percent of waters will support healthy aquatic communities.[39] Part of this effort will include developing a national beach-closing survey to monitor efforts to improve the quality of water used for recreational purposes. Although small streams, private lakes, and ponds will not be addressed by the EPA beach-closing survey (available at http://www.epa.gov/ost/beaches), this program will provide a method to evaluate progress toward improving water quality on U.S. swimming beaches. Information from the 1997 and 1998 EPA surveys has been expanded on by the Natural Resources Defense Council (NRDC) and published in its annual beach-closing report. The latest version is available from NRDC and on its Web site (http://www.nrdc.org).

8-10. (Developmental) Reduce the potential human exposure to persistent chemicals by decreasing fish contaminant levels.

Potential data sources: U.S. Department of the Interior, U.S. Fish and Wildlife Service and USGS.

The Biomonitoring of Environmental Status and Trends (BEST) program (http://www.best.usgs.gov) is a cooperative activity of the USGS and the U.S. Fish and Wildlife Service. Designed to assess and monitor the effects of environmental contaminants on biological resources, the program measures 51 organochlorine persistent chemicals, organophosphate and carbamate insecticides, and 21 metals.

8-11. Eliminate elevated blood lead levels in children.

Target: Zero percent.

Baseline: 4.4 percent of children aged 1 to 6 years had blood lead levels exceeding 10 µg/dL during 1991–94.

Target setting method: Total elimination.

Data source: National Health and Nutrition Examination Survey (NHANES), CDC, NCHS.

NOTE: THE TABLE BELOW MAY CONTINUE TO THE FOLLOWING PAGE.

Children Aged 1 to 6 Years, 1991–94	Children With Blood Lead Levels Greater Than or Equal to 10 µg/dL			
	8-11. Resid-ing in All Housing	Residing in Housing Built:		
		Before 1946*	1946 to 1973*	After 1973*
	Percent			
TOTAL	4.4	8.6	4.6	1.6
Race and ethnicity				
American Indian or Alaska Native	DSU	DSU	DSU	DSU
Asian or Pacific Islander	DSU	DSU	DSU	DSU
Asian	DNC	DNC	DNC	DNC
Native Hawaiian and other Pacific Islander	DNC	DNC	DNC	DNC
Black or African American	11.5	22.7	13.2	3.3
White	2.6	6.6	1.9	1.4
Hispanic or Latino	DSU	DSU	DSU	DSU
Mexican American	4.0	13.0	2.3	1.6
Not Hispanic or Latino	4.2	DNA	DNA	DNA
Black or African American	11.2	21.9	13.7	3.4
White	2.3	5.6	1.4	1.5
Gender				
Female	3.3	7.1	2.8	1.5
Male	5.5	9.6	6.6	1.7
Family income level†				
Low	1.9	4.1	2.0	0.4
High	1.0	0.9	2.7	0

Children Aged 1 to 6 Years, 1991–94	Children With Blood Lead Levels Greater Than or Equal to 10 µg/dL			
	8-11. Residing in All Housing	Residing in Housing Built:		
		Before 1946*	1946 to 1973*	After 1973*
	Percent			
Geographic location				
Population ≥ 1 million	5.4	11.5	5.8	0.8
Population < 1 million	3.3	5.8	3.1	2.5

DNA = Data have not been analyzed. DNC = Data are not collected. DSU = Data are statistically unreliable.

*Data for ''all houses'' are from a separate analysis of NHANES data; data for specific periods of time provided for information purposes.

†Income categories defined using poverty-income ratio (PIR) (the ratio of total family income to the poverty threshold for the year). Low equals PIR ≤1.300; middle equals PIR 1.301 – 3.500; high equals PIR ≥3.501.

NOTE: THE TABLE ABOVE MAY HAVE CONTINUED FROM THE PREVIOUS PAGE.

Although considerable progress has been made in reducing BLLs in the Nation's children, lead poisoning remains a preventable environmental health problem in the United States. Culturally and linguistically appropriate information is needed alerting persons to the dangers of lead poisonings.

8-12. Minimize the risks to human health and the environment posed by hazardous sites.

Target: 98 percent of sites on the following lists:

8-12a. National Priority List sites

8-12b. Resource Conservation and Recovery Act facilities

8-12c. Leaking underground storage facilities

8-12d. Brownfield properties

Baseline: 1,200 National Priority List sites; 2,475 Resource Conservation and Recovery Act facilities; 370,000 leaking underground storage facilities; 1,500 brownfield properties in 1998.

Target setting method: Consistent with EPA's 1997 Strategic Plan.

Data source: Comprehensive Environmental Response and Cleanup Liability Information System (CERCLIS), EPA, OSWER.

The National Priorities List (NPL) is a published list of the most hazardous waste sites in the country eligible for extensive, long-term cleanup under the Superfund program. Sites listed on the NPL often are initially discovered by local or State agencies, businesses, EPA, the Coast Guard, or the public. If a site poses a signifi-

cant risk to human health, as determined by the number and toxicity of substances discovered at the site and its capacity to affect surrounding populations, then the site is placed on the NPL. The Agency for Toxic Substances and Disease Registry (ATSDR) is the Federal health agency that issues recommendations to EPA, State health and environmental agencies, and the public concerning the elimination of public health threats at these sites. This advice often also includes recommendations to the public and the health care community concerning practices to identify and prevent exposures and adverse health effects.

The Resource Conservation and Recovery Act (RCRA) was enacted by Congress in 1976 to find a safe way to manage and dispose of the huge volumes of municipal and industrial waste generated nationwide. RCRA facilities are authorized and regulated by this act. With several amendments, the act and its subsequent regulations govern the management of nonhazardous (solid) waste, hazardous waste, and underground storage tanks (USTs). The Leaking Underground Storage Tanks Program attempts to identify and eliminate the threat to human health posed by groundwater or soil contamination from petroleum released from these tanks. The term "brownfields" denotes abandoned, idle, or underused industrial or commercial sites where expansion or redevelopment is complicated by real or perceived environmental contamination.

8-13. Reduce pesticide exposures that result in visits to a health care facility.

Target: 13,500 visits per year.

Baseline: 27,156 visits to health care facilities were due to pesticides in 1997. (A total of 129,592 pesticide exposures were documented in 1997.)

Target setting method: 50 percent improvement.

Data source: Toxic Exposure Surveillance System (TESS), American Association of Poison Control Centers.

Pesticide exposures include those involving disinfectants, fungicides, herbicides, insecticides, moth repellants, and rodenticides, as defined by EPA. The American Association of Poison Control Centers surveillance covers approximately 93 percent of the U.S. population.

8-14. (Developmental) Reduce the amount of toxic pollutants released, disposed of, treated, or used for energy recovery.

Potential data source: Toxics Release Inventory (TRI), EPA.

Reductions in toxic pollutants released, disposed of, treated, or used for energy recovery can be measured by industry's success in reducing pollution at the source—that is, not producing pollutants at all, through manufacturing process changes, shifting to less polluting ingredients, packaging changes, and other

source reduction methods. For that reason, all pollutants, those released and those treated or disposed of in some manner, should be measured.

8-15. Increase recycling of municipal solid waste.

Target: 38 percent.

Baseline: 27 percent of total municipal solid waste generated was recycled in 1996 (includes composting).

Target setting method: Consistent with the EPA's 1997 Strategic Plan.

Data source: Characterization of Municipal Solid Waste, EPA.

Healthy Homes and Healthy Communities

8-16. Reduce indoor allergen levels.

Target and baseline:

Objective	Allergen	1998–99 Baseline	2010 Target
		Number of Homes (in millions)	
8-16a.	Group I dust mite allergens that exceed 2 micrograms per gram of dust in the bed	36.3	29.0
8-16b.	Group I dust mite allergens that exceed 10 micrograms per gram of dust in the bed	18.6	14.9
8-16c.	German cockroach allergens that exceed 0.1 microgram per gram of dust in the bed	4.7	3.8

Target setting method: 20 percent improvement.

Data source: National Survey of Lead and Allergens in Housing, NIEHS, and U.S. Department of Housing and Urban Development.

Indoor allergens—such as from house dust mites, cockroaches, mold, rodents, and pets—can worsen symptoms of respiratory conditions, such as asthma and allergies. These allergens are an important public health issue because most people spend the majority of their time indoors, both at home and at work. In addition, effective methods to reduce exposure to some of these allergens exist (for example, placement of impermeable covers on mattresses and pillows reduces dust mite allergen exposures in beds). (See Focus Area 24. Respiratory Diseases.)

8-17. (Developmental) Increase the number of office buildings that are managed using good indoor air quality practices.

Potential data source: Indoor Environment Division, EPA.

The air quality inside a building impacts both the comfort and health of its occupants. Pollutants are found at higher levels in indoor air as compared to outdoor air. In addition, most people spend over 90 percent of their time indoors.[40]

8-18. Increase the proportion of persons who live in homes tested for radon concentrations.

Target: 20 percent.

Baseline: 17 percent of the population lived in homes in 1998 that had been tested for radon (age adjusted to the year 2000 standard population).

Target setting method: Better than the best.

Data source: National Health Interview Survey (NHIS), CDC, NCHS.

Total Population, 1998	Persons Living in Homes Tested for Radon
	Percent
TOTAL	17
Race and ethnicity	
American Indian or Alaska Native	19
Asian or Pacific Islander	17
Asian	17
Native Hawaiian and other Pacific Islander	17
Black or African American	18
White	17
Hispanic or Latino	14
Not Hispanic or Latino	17
Black or African American	18
White	17
Gender	
Female	17
Male	17
Family income level	
Poor	15
Near poor	12
Middle/high income	18

DNA = Data have not been analyzed. DNC = Data are not collected. DSU = Data are statistically unreliable.
Note: Age adjusted to the year 2000 standard population.

8-19. Increase the number of new homes constructed to be radon resistant.

Target: 2.1 million additional new homes.

Baseline: 1.4 million new homes as of 1997.

Target setting method: 50 percent improvement.

Data source: National Association of Home Builders Research Center Survey, National Association of Home Builders.

8-20. (Developmental) Increase the proportion of the Nation's primary and secondary schools that have official school policies ensuring the safety of students and staff from environmental hazards, such as chemicals in special classrooms, poor indoor air quality, asbestos, and exposure to pesticides.

Potential data source: School Health Policies and Programs Study (SHPPS), CDC, NCCDPHP.

8-21. (Developmental) Ensure that State health departments establish training, plans, and protocols and conduct annual multi-institutional exercises to prepare for response to natural and technological disasters.

Potential data sources: Association of State and Territorial Health Officials (ASTHO); Public Health Foundation.

8-22. Increase the proportion of persons living in pre-1950s housing that has been tested for the presence of lead-based paint.

Target: 50 percent.

Baseline: 16 percent of persons living in homes built before 1950 in 1998 reported that their homes had been tested for the presence of lead-based paint (age adjusted to the year 2000 standard population).

Target setting method: Better than the best.

Data source: National Health Interview Survey (NHIS), CDC, NCHS.

Persons Living in Pre-1950s Housing, 1998	Persons Living in Homes Tested for Lead-Based Paint
	Percent
TOTAL	16
Race and ethnicity	
American Indian or Alaska Native	DSU
Asian or Pacific Islander	13
Asian	11
Native Hawaiian and other Pacific Islander	24
Black or African American	22
White	14
Hispanic or Latino	14
Not Hispanic or Latino	16
Black or African American	23
White	15
Gender	
Female	17
Male	15
Family income level	
Poor	19
Near poor	16
Middle/high income	15

DNA = Data have not been analyzed. DNC = Data are not collected. DSU = Data are statistically unreliable.
Note: Age adjusted to the year 2000 standard population.

8-23. Reduce the proportion of occupied housing units that are substandard.

Target: 3 percent.

Baseline: 6.2 percent of occupied U.S. housing units had moderate or severe physical problems in 1995.

Target setting method: 52 percent improvement.

Data source: American Housing Survey, U.S. Department of Commerce, Bureau of the Census.

Residents of substandard housing are at increased risk for fire, electrical injuries, lead poisoning, falls, rat bites, and other illnesses and injuries.

8-24. Reduce exposure to pesticides as measured by urine concentrations of metabolites.

Target and baseline:

Objective	Reduction in Pesticide Exposure as Measured by Metabolites (Pesticide)	1988–94 Baseline*	2010 Target
		Urine Concentration	
8-24a.	1-naphthol (carbaryl)	36.0 µg/g creatinine	25.2 µg/g creatinine
8-24b.	Paranitrophenol (methyl parathion and parathions)	3.8 µg/g creatinine	2.7 µg/g creatinine
8-24c.	3, 5, 6-trichloro-2-pyridinol (chlorpyrifos)	8.3 µg/g creatinine	5.8 µg/g creatinine
8-24d.	Isopropoxyphenol (propoxur)	1.6 µg/g creatinine	1.1 µg/g creatinine

*95 percent of the population had concentrations below this level.

Target setting method: 30 percent improvement.

Data source: National Health and Nutrition Examination Survey (NHANES), CDC, NCHS.

Note: Data are from a subset of NHANES data and are not nationally representative. Therefore, a population data template is not available.

Pesticides included in the table inhibit cholinesterase, an enzyme found in the human body. These pesticides are among those commonly used in the home and garden, agriculture, and industry.[41] Metabolites (or breakdown products) of pesticides are measured in urine samples obtained from persons aged 6 years and older. Urinary measurements of pesticide metabolites are an accurate way to measure recent exposure to pesticides that inhibit cholinesterase. Concentrations of pesticide metabolites in urine are corrected for kidney function and expressed in µg/g creatinine, a measure of kidney function.

8-25. (Developmental) Reduce exposure of the population to pesticides, heavy metals, and other toxic chemicals, as measured by blood and urine concentrations of the substances or their metabolites.

Objective	Exposure Item
	Heavy metals
8-25a.	Arsenic
8-25b.	Cadmium

8-25c. Lead

8-25d. Manganese

8-25e. Mercury

Pesticides

8-25f. 2, 4-D

8-25g. o-phenylphenol

8-25h. Permethrins

8-25i. Diazinon

Persistent chemicals

8-25j. Polychlorinated biphenyls

8-25k. Dioxins

8-25l. Furans

Organochlorine compounds

8-25m. Chlordane

8-25n. Dieldrin

8-25o. DDT

8-25p. Lindane

Potential data source: National Health and Nutrition Examination Survey (NHANES), CDC, NCHS.

Heavy metals, polychlorinated biphenyls (PCBs), dioxins, furans, and organochlorines are in use or have been used in the past. These compounds are known or suspected causes of cancer, birth defects, or other diseases in people.

8-26. (Developmental) Improve the quality, utility, awareness, and use of existing information systems for environmental health.

Potential data sources: Toxics Release Inventory, EPA; Environmental Defense Fund.

Other environmental health information systems include TOXLINE, Integrated Risk Information System (IRIS), Registry of Toxic Effects of Chemical Substances (RTECS®), HazDat, and Aerometric Information Retrieval System (AIRS). They can be accessed via the Internet.

8-27. Increase or maintain the number of Territories, Tribes, and States, and the District of Columbia that monitor diseases or conditions that can be caused by exposure to environmental hazards.

Target and baseline:

Objective	Disease	1997 Baseline	2010 Target
		Number of Jurisdictions	
8-27a.	Lead poisoning	51	51
8-27b.	Pesticide poisoning	20	25
8-27c.	Mercury poisoning	14	20
8-27d.	Arsenic poisoning	10	15
8-27e.	Cadmium poisoning	10	15
8-27f.	Methemoglobinemia	9	15
8-27g.	Acute chemical poisoning*	8	15
8-27h.	Carbon monoxide poisoning	7	51
8-27i.	Asthma	6	25
8-27j.	Hyperthermia	4	10
8-27k.	Hypothermia	Developmental	
8-27l.	Skin cancer	Developmental	
8-27m.	Malignant melanoma	Developmental	
8-27n.	Other skin cancer	Developmental	
8-27o.	Birth defects	Developmental	

*Includes chemicals not covered elsewhere in the table.

Note: Target and baseline data are for States and the District of Columbia. The targets will be adjusted as data for Tribes and Territories become available.

Target setting method: Total coverage or expert opinion.

Data sources: Periodic surveys, Public Health Foundation and Council of State and Territorial Epidemiologists.

8-28. (Developmental) Increase the number of local health departments or agencies that use data from surveillance of environmental risk factors as part of their vector control programs.

Potential data source: Profile of local health departments, National Association of County and City Health Officials (NACCHO).

8-29. Reduce the global burden of disease due to poor water quality, sanitation, and personal and domestic hygiene.

Target: 2,135,000 deaths.

Baseline: 2,668,200 deaths worldwide were attributable to these factors in 1990.

Target setting method: 20 percent improvement.

Data source: Global Burden of Disease, World Health Organization.

Improving access to clean water and sanitation has been cited as the single most effective means of alleviating human distress. Better water supply and sanitation may increase the average life expectancy in developing countries by 15 years. Furthermore, poor sanitation ranks as one of the highest contributing factors to the global burden of disease and injury. Diarrheal diseases, which kill nearly 3 million persons a year in developing countries, typically result from poor sanitation practices and the consumption of substandard drinking water. These diseases are mostly preventable by improving environmental services.[42, 43]

8-30. Increase the proportion of the population in the U.S.-Mexico border region that have adequate drinking water and sanitation facilities.

Target and baseline:

Objective	Type of Drinking Water and Sanitation Service	1997 Baseline	2010 Target
		Percent of Population Receiving Water Service or Treatment	
	Wastewater sewer service provided		
8-30a.	Ciudad Acuna	39	49
8-30b.	Matamoros	47	57
8-30c.	Mexicali	80	90
8-30d.	Nogales, Sonora	81	91
8-30e.	Piedras Negras	80	90
8-30f.	Reynosa	57	67
	Wastewater receiving treatment		
8-30g.	Ciudad Acuna	0	10
8-30h.	Matamoros	0	10
8-30i.	Mexicali	72	82
8-30j.	Nogales, Sonora	100	100

8-30k.	Piedras Negras	0	10
8-30l.	Reynosa	100	100

Target setting method: 10 percentage point improvement.

Data sources: EPA; Mexico's Comisión Nacional de Agua; State and local health departments; American Water Works Association; Rural Water Association; U.S.-Mexican Border Health Association.

Water pollution is one of the principal environmental and public health problems facing the U.S.-Mexico border area. Deficiencies in the treatment of wastewater, the disposal of untreated sewage, and inadequate operation and maintenance of treatment plants result in health risks.[8, 44] Better environmental services such as sewer service, wastewater treatment service, and safe drinking water may help achieve a balance among social and economic factors and protecting the environment in border communities and natural areas.

Related Objectives From Other Focus Areas

1. Access to Quality Health Services
- 1-7. Core competencies in health provider training
- 1-12. Single toll-free number for poison control centers

3. Cancer
- 3-1. Overall cancer deaths
- 3-2. Lung cancer deaths
- 3-8. Melanoma deaths
- 3.9. Sun exposure and skin cancer
- 3-10. Provider counseling about cancer prevention
- 3-14. Statewide cancer registries

4. Chronic Kidney Disease
- 4-1. End-stage renal disease

6. Disability and Secondary Conditions
- 6-12. Environmental barriers affecting participation in activities

7. Educational and Community-Based Programs
- 7-2. School health education
- 7-10. Community health promotion programs

10. Food Safety
- 10-1. Foodborne Infections
- 10-2. Outbreaks of foodborne infections
- 10-5. Consumer food safety practices

11. Health Communication
- 11-1. Households with Internet access
- 11-2. Health literacy
- 11-4. Quality of Internet health information sources

12. Heart Disease and Stroke
- 12-1. Coronary heart disease (CHD) deaths

14. Immunization and Infectious Diseases

14-31. Active surveillance for vaccine safety

15. Injury and Violence Prevention

15-7. Nonfatal poisonings
15-8. Deaths from poisoning
15-10. Emergency department surveillance systems
15-11. Hospital discharge surveillance systems
15-12. Emergency department visits
15-13. Deaths from unintentional injuries
15-14. Nonfatal unintentional injuries

16. Maternal, Infant, and Child Health

16-10. Low birth weight and very low birth weight
16-11. Preterm births
16-14. Developmental disabilities

20. Occupational Safety and Health

20-1. Work-related injury deaths
20-2. Work-related injuries
20-7. Elevated blood lead levels from work exposure
20-8. Occupational skin diseases or disorders

22. Physical Activity and Fitness

22-14. Community walking
22-15. Community bicycling

23. Public Health Infrastructure

23-1. Public health employee access to the Internet
23-2. Public access to information and surveillance data
23-3. Use of geocoding in health data systems
23-4. Data for all population groups
23-5. Data for Leading Health Indicators, Health Status Indicators, and Priority Data Needs at State, Tribal, and local levels
23-6. National tracking of Healthy People 2010 objectives
23-7. Timely release of data on objectives
23-8. Competencies for public health workers
23-9. Training in essential public health services
23-10. Continuing education and training by public health agencies
23-11. Performance standards for essential public health services
23-12. Health improvement plans
23-13. Access to public health laboratory services
23-14. Access to epidemiology services
23-15. Model statutes related to essential public health services
23-16. Data on public health expenditures
23-17. Population-based prevention research

24. Respiratory Diseases

24-1. Deaths from asthma
24-2. Hospitalizations for asthma
24-3. Hospital emergency department visits for asthma
24-4. Activity limitations
24-5. School or work days lost
24-6. Patient education

24-7. Appropriate asthma care
24-8. Surveillance systems

27. Tobacco Use

27-9. Exposure to tobacco smoke at home among children
27-10. Exposure to environmental tobacco smoke
27-11. Smoke-free and tobacco-free schools
27-12. Worksite smoking policies
27-13. Smoke-free indoor air laws

28. Vision and Hearing

28-16. Hearing protection
28-17. Noise-induced hearing loss in children
28-21. Noise-induced hearing loss in adults

Terminology

(A listing of abbreviations and acronyms used in this publication appears in Appendix H.)

Acute chemical poisoning: Unintentional poisoning caused by chemicals that are not medicines.

Aerometric Information Retrieval System (AIRS): This system, administered by EPA, contains information about air pollution in the United States and other countries.

Algae: Small one- or many-celled plants that live in the water and do not have roots, stems, or leaves but usually contain chlorophyll.

Annual vehicle miles: The distance traveled by a passenger vehicle over a given interval of time.

Bloom: Populations of algae that have grown so large that they can be seen in water with the naked eye.

Brownfields: Abandoned, idle, or underused industrial or commercial sites that raise concern in nearby communities that any expansion or redevelopment could contaminate the environment.

Chlorophyll: The green photosynthetic pigment found chiefly in plants.

Community water system: A public water system that provides water to at least 15 service connections used by year-round residents or that regularly serves at least 25 year-round residents.

Disaster: Any event, either natural (such as hurricanes, wind storms, earthquakes, volcanic eruptions, or floods) or technological (such as the release of radiation or chemical or biologic substances), that, because of its scope or severity, overwhelms a population's ability to respond.

Domestic water use: Using water for household purposes, such as drinking, preparing food, bathing, washing clothes and dishes, flushing toilets, or watering lawns and gardens. Also called residential water use. The water may be obtained from a public supply or may be self-supplied by a homeowner (such as by a well).

Environmental epidemiology: The study of the effect on human health of physical, biological, and chemical factors in the external environment. Can include examining specific populations or communities exposed to different ambient environments to clarify the relationship between physical, biological, or chemical factors and human health.

Environmental hazards: Situations or conditions in which something in the environment, such as radiation, a chemical, or other pollutant, can cause human illness or injury.

Environmental tobacco smoke: Smoke given off by cigarettes, pipes, or cigars to which nonsmokers can be exposed.

Environmental toxicology: Scientific analysis of the relationship between exposure to hazardous substances found in the environment and adverse health effects in people.

Epidemic: The occurrence in a community or region of cases of an illness, specific health-related behavior, or other health-related events clearly in excess of normal expectancy.

Evidence based: Empirical proof that accurately validates professional guidance or recommendations or illustrates how an approach has been used successfully in the past.

Good indoor air quality practices: Operation and maintenance procedures designed to provide air quality inside a building to increase comfort and productivity and to reduce health risks for people in the building.

Greenhouse gas (GHG): A gas that absorbs radiation of specific wave lengths within the infrared spectrum of radiation released by the earth's surface and clouds so that part of the absorbed energy is trapped and the earth's surface warms up. Water vapor, carbon dioxide, nitrous oxide, methane, and ozone are the primary greenhouse gases in the earth's atmosphere.

Hazard Ranking System (HRS): The principal screening tool used by EPA to evaluate risks to public health and the environment associated with abandoned or uncontrolled hazardous waste sites. HRS calculates a score based on the potential of hazardous substances spreading from the site through the air, surface water, or ground water and on other factors, such as density and proximity of human population. This score is the primary factor in deciding whether the site should be on the National Priorities List and, if so, what ranking it should have compared to other sites on the list.

Hazardous substances: Any substance that possesses properties that can cause harm to human health and ecologic systems. A subset of these substances, toxics, or toxicants are substances not produced by a living organism that can cause harm to human health and ecologic systems.

HazDat: A scientific database maintained by the Agency for Toxic Substances and Disease Registry. Provides access to information on the release of hazardous substances from Superfund sites or from emergency events and on the effects of hazardous substances on health.

Household lead dust: Very fine particles containing lead that are usually caused by the deterioration of lead paint.

Humanitarian emergencies: Emergencies that occur as a result of disasters that destroy or have a negative effect on basic human needs, such as food, shelter, and water.

Indoor air quality (IAQ): The overall state of the air inside a building as reflected by the presence of pollutants, such as dust, fungi, animal dander, volatile organic compounds, carbon monoxide, and lead.

Indoor allergens: Fine particles in indoor air that can cause allergic reactions and respiratory problems, including dust mites and animal dander.

Infectious agents: Any organism, such as a virus, parasite, or bacterium, that is capable of invading the body, multiplying, and causing disease.

Integrated Risk Information System (IRIS): This database, maintained by EPA, contains information on health hazards from over 5,000 substances.

Metabolites: Any substance produced by biological processes in the human body. In some cases, it is not possible to measure certain substances (for example, pesticides) in the human body to determine exposure to those substances, but instead it is possible to

measure the secondary substance or metabolite that is created when the human body breaks down the primary substance.

Municipal solid waste: Common garbage or trash generated by industries, businesses, institutions, and homes.

National Ambient Air Quality Standards (NAAQS): Standards set by EPA for the level of common air pollutants allowed by the Clean Air Act.

National Priorities List (NPL): EPA's list of the most serious uncontrolled or abandoned hazardous waste sites identified for possible long-term cleanup under Superfund. The list is based primarily on the score a site receives from the Hazard Ranking System. EPA updates the NPL at least yearly. A site must be on the NPL to receive funds from the Superfund Trust Fund for remedial action.

Nonattainment area: A locality where air pollution levels persistently exceed EPA's National Ambient Air Quality Standards.

Nonpoint source: The source of runoff water coming from an area such as a yard, parking lot, pasture, or other urban or agricultural area.

Ozone: Ozone occurs naturally in the stratosphere and provides a protective layer high above the earth. At ground-level, however, ambient ozone is the prime ingredient of smog. Ambient ozone refers to ozone in the troposphere—the air that people breathe—which is different from ozone in the stratosphere, the hole in the ozone layer. Ozone is not emitted directly into the air but is formed readily in the atmosphere, usually during hot summer weather, from volatile organic compounds emitted by motor vehicles, chemical plants, refineries, factories, consumer and commercial products, other industrial sources, and trees and from nitrogen oxides emitted by motor vehicles, power plants, and other sources of combustion. Changing weather patterns contribute to yearly differences in ozone concentrations from city to city.

Particulate matter: General term used for a mixture of solid particles and liquid droplets found in the air. These particles, which come in a wide range of sizes, originate from "built" and natural sources. Fine particles (PM2.5) result from fuel combustion from motor vehicles, power generation, and industrial facilities, as well as from residential fireplaces and wood stoves. Coarse particles (PM10) generally are emitted from other sources, such as vehicles traveling on unpaved roads, materials handling, and crushing and grinding operations, as well as windblown dust.

Per capita water use: The average amount of water used per person during a standard period, generally per day. In the United States, this measure usually is reported in gallons per day.

Persistent chemicals: Chemicals, such as organochlorine compounds, that remain in the environment for a long time and can accumulate in the fat of people and animals exposed to them.

Photosynthesis: Formation of carbohydrates from carbon dioxide and a source of hydrogen (as water) in the chlorophyll-containing tissues of plants exposed to light.

Point source: The source of water coming from a specific location, such as a drain pipe from a wastewater treatment plant or an industrial plant.

Poisoning: An exposure to a toxic substance that produces negative signs or symptoms.

Premature death: A death that occurs earlier than the life expectancy for most members of the population.

Protozoa: A subkingdom of the animal kingdom, including all of the so-called acellular or unicellular forms (for example, Amoeba, Giardia, and Cryptosporidium).

Radon: A colorless, naturally occurring radioactive gas found in some soils or rocks.

Radon-resistant construction: Affordable and simple techniques that, when incorporated during construction of a new home, reduce indoor radon levels by preventing radon entry and providing a means for venting radon to the outdoors.

Registry of Toxic Effects of Chemical Substances (RTECS®): Maintained by the National Institute for Occupational Safety and Health, this database contains information on the toxic effects of chemical substances. The list of substances includes drugs, food additives, preservatives, ores, pesticides, dyes, detergents, lubricants, soaps, plastics, extracts from plant and animal sources, plants or animals that are toxic by contact or consumption, and industrial intermediates and waste products from production processes.

Service connection: The point at which a customer's water supply attaches to a water utilities distribution system.

Special classrooms: Classrooms with special characteristics, such as laboratories and art rooms, in which particular environmental hazards may be found.

Substandard housing: Housing with moderate or severe physical problems in plumbing, heating, or electrical systems, upkeep and sanitation, hallways, or kitchens.

Superfund: The program operated under the legislative authority of Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and Superfund Amendments and Reauthorization Act (SARA) that funds and carries out EPA solid waste emergency and long-term removal or remedial activities. These activities include establishing the National Priorities List, investigating sites for inclusion on the list, determining their priority, and conducting or supervising cleanup and other remedial actions or both.

Sustainable development: Growth and development within a society that is intended to meet the needs of the present without compromising the ability of future generations to meet their own needs.

Toxic Release Inventory (TRI): EPA's list of more that 600 designated chemicals that threaten health and the environment. Authorized under the Emergency Planning and Community Right-To-Know Act (EPCRA) of 1986, this system requires manufacturers to report releases of these chemicals to EPA and State governments. EPA compiles the data in an online, publicly accessible national computerized database.

TOXLINE: A collection of online information on drugs and other chemicals maintained by the National Library of Medicine.

Transit: Represents what used to be called "mass transit." The 1990 Nationwide Personal Transportation Survey (NPTS/U.S. Department of Transportation) included the following modes in its transit count: bus, subway or elevated rail, commuter rail, streetcar, and trolley. The 1995 NPTS characterizes a "trip" as travel to a destination (for example, worksite). Travel to work, for instance, that includes two stops along the way (trip chains) would constitute three "trips."

µg/dL: Micrograms per deciliter.

Urban sprawl: Unplanned and inefficient development of open land.

Vector-borne diseases: Illnesses that are transmitted to people by organisms, such as insects.

Vector control: Control of any object, organism, or thing that transmits disease from one host to another.

Waterborne disease outbreaks: Includes only outbreaks from infectious agents and chemical poisoning incidents in which two or more people experience a similar illness after consumption or use of water intended for drinking and epidemiologic evidence implicates water as the source of illness. The stipulation that at least two people be ill is waived for single cases of laboratory-confirmed, primary amebic meningoencephalitis and

for single cases of chemical poisoning if water-quality data indicate contamination by the chemical.

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