FY 2000 Profile and Annual Report

The Agency for Toxic Substances and Disease Registry

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Contents

FOREWORD

The Agency for Toxic Substances and Disease Registry (ATSDR) is pleased to present this report of the agency's principal works and findings from fiscal year (FY) 2000. Collectively, ATSDR annual reports provide a historical record of significant accomplishments under the Comprehensive Environmental Response, Compensation, and Liability Act (also known as the Superfund statute), as amended, and other federal statutes.

This annual report highlights the accomplishments of FY 2000 in sufficient detail for the reader to appreciate the wide breadth of ATSDR's programs and the advances in public health that occurred during the year.

The employees of the agency take great pride in its accomplishments and the contributions made in FY 2000 toward improving public health and environmental protection. Comments from interested readers are always welcome.

Jeffrey P. Koplan, MD, MPH

Administrator

Executive Summary

The Agency for Toxic Substances and Disease Registry (ATSDR) is the lead public health agency responsible for implementing the health-related provisions of the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA, also known as Superfund). ATSDR's primary goals are

- to identify people at health risk because of their exposure to uncontrolled hazardous substances in the environment
- to evaluate relationships between hazardous substances in the environment and adverse human health outcomes
- to intervene to eliminate exposure of health concern and reduce or prevent harmful health effects related to releases of hazardous substances in the environment.

Report Highlights

This report highlights ATSDR's accomplishments and the activities that were conducted in fiscal year 2000. There is a chapter devoted to each of the agency's goals. Those programs the agency uses to meet its goals, some key findings, and examples of activities from fiscal year 2000 are summarized in the following paragraphs.

Identifying People Who Are Exposed to Hazardous Substances

ATSDR's health assessment activities help (1) identify people who may have been exposed to hazardous substances in the environment and (2) determine whether these people might be at risk of adverse health effects as a result of that exposure. During fiscal year 2000, ATSDR and the 28 states that have cooperative agreements with ATSDR performed more than 1,200 health assessment activities. These activities included health assessments, health consultations, and exposure investigations that were conducted in 47 states, Puerto Rico, the U.S. Virgin Islands, Guam, and the Navajo Nation.

ATSDR analyzed demographic data for 225 sites where the agency conducted public health assessments or consultations in fiscal year 2000. Approximately 2.7 million people live within a mile of those sites. Of those, about 10% were children aged 6 years or younger, and 22% were 18 years old or younger. About 23% were women of childbearing age. About 11% were elderly, aged 65 or older.

Lead was the contaminant found most often at the sites assessed in fiscal year 2000, with 28% of sites containing lead. Other common contaminants were arsenic, polyaromatic hydrocarbons, and volatile organic compounds.

An example of a site at which ATSDR provided key assistance in fiscal year 2000 was the Chicago area, where state health officials estimated as many as 500,000 homes potentially were contaminated with mercury as a result of the removal of old natural gas meters containing mercury. This widespread problem was addressed by a variety of resources. ATSDR staff members, staff from the Illinois Department of Public Health (Illinois has a cooperative agreement with ATSDR), the ATSDR-funded Pediatric Environmental Health Specialty Unit in Chicago, and the U.S. Environmental Protection Agency were the primary responders. ATSDR developed guidance on action levels and priorities for the residential testing. The action levels EPA used to determine which residences

needed to be cleaned were based on ATSDR recommendations.

The Illinois Department of Public Health evaluated mercury sampling data after cleanup and issued letters to residents to let them know when their homes were safe for occupancy. The state health department also sponsored a hot line and developed pamphlets to provide information to the public. To date, nearly 1,000 residences have been found to be contaminated. The Pediatric Environmental Specialty Unit in Chicago—the Center for Environmental Health—provided medical information to local physicians, laboratories, residents, and the media, among others.

Evaluating Relationships Between Hazardous Substances and Health: Toxicologic Research

One of the ways ATSDR evaluates the relationships between hazardous substances in the environment and human health outcomes is through toxicologic research. ATSDR's toxicologic research program is filling many data gaps about how hazardous substances affect human health. ATSDR oversees two major research programs designed to help fill these data gaps—the ATSDR Great Lakes Human Health Effects Research Program and the ATSDR Minority Health Professions Foundation Research Program.

Data gaps for some hazardous substances have also been filled through the agency's program in which industry voluntarily agrees to conduct needed research and through the industry testing required by the Toxic Substances Control Act. Through fiscal year 2000, ATSDR has identified 201 priority data needs for 50 hazardous substances. Of these, 53 data needs have been filled, and agency programs are currently addressing 117.

ATSDR's toxicologic research provides critical information to public health decision makers about the health effects of hazardous substances. One important project in the past year concerned the effects of aluminum used in vaccines. Aluminum is used in certain vaccines to increase immunologic response to make the vaccine more effective. In fiscal year 2000, ATSDR developed a pharmacokinetic model for aluminum that provided convincing evidence that using aluminum compounds in childhood vaccines is safe. Both CDC and the World Health Organization used the ATSDR assessment to recommend continued use of aluminum in childhood vaccines.

ATSDR provides information about the relationship between hazardous substances and health outcomes by developing toxicological profiles. ATSDR's toxicological profiles summarize information about many of the most hazardous substances found at Superfund sites. As of fiscal year 2000, ATSDR has published 152 toxicological profiles covering nearly 800 substances.

Evaluating Relationships Between Hazardous Substances and Health: Conducting Health Studies

ATSDR conducts and supports health studies to evaluate the relationship between exposure to hazardous substances and adverse health effects. ATSDR also conducts studies to evaluate how people become exposed to hazardous substances. In fiscal year 2000, ATSDR completed five health studies with findings related to exposure to hazardous substances and health. ATSDR also continued

several surveillance activities, including the surveillance of hazardous spills and releases in a number of states.

One large-scale project initiated during the past year was the medical evaluation of residents and former residents of Libby, Montana. Vermiculite mined in the area was found to have been contaminated with asbestos, and people had been potentially exposed for a number of years. More than 6,000 people were tested for signs of asbestos-related disease. The program offered chest x-rays and a test for breathing capacity. About 5% of those tested were immediately referred for a follow-up examination of health conditions that were found. Results of the medical testing are to be analyzed and reported in fiscal year 2001.

ATSDR has collaborated with other agencies of the Department of Health and Human Services to have additional medical services provided in Libby. The Health Resources and Services Administration designated the community as being medically underserved and provided a grant for a nurse to work with residents. The National Cancer Institute is providing information to the community on clinical trials and current therapies for treating asbestos-related illnesses.

Preventing Health Effects Related to Hazardous Substances

ATSDR draws on its resources in health education, risk communication, environmental medicine, and health promotion to prevent or reduce the harmful health effects of exposure to hazardous substances in communities. ATSDR provides such preventive measures as training local physicians about the health concerns associated with contaminants, providing communities with information about the health effects of hazardous substances, and providing clinical evaluations and screenings. ATSDR also conducts health education and promotion activities that have a nationwide focus, such as its case study program on environmental medicine.

These activities are conducted with the assistance of numerous partners with whom the agency has cooperative agreements, including states, American Indian tribal nations or groups, and national organizations. ATSDR also expanded its network of pediatric environmental health specialty units in fiscal year 2000 to eight units across the country. ATSDR and its partners performed health education and promotion activities at approximately 300 sites.

One example of a site where ATSDR and its partners implemented an extensive health promotion activity was in Ottawa County, Oklahoma, where ATSDR worked with Ottawa County public health officials to create a lead poisoning prevention program. The Tar Creek site there is inside Oklahoma's portion of the Pitcher Field mining region, an area that had extensive lead and zinc mining.

The program used a mobile education and blood-testing unit that visited Head Start centers and kindergartens, where about 250 children were screened. In addition, 600 blood level screenings of children and pregnant women were performed through the county's Women, Infants, and Children clinics. Fifty children had blood lead levels that were above the level of health concern and are being rechecked every 3 months. A database was created to track blood lead levels and interventions and to provide information to EPA for pathway analysis and cleanup, when necessary. Additionally, parents of children identified with elevated blood lead levels received referrals and educational materials.

Fiscal Year 2000 Initiatives

ATSDR worked on several initiatives during fiscal year 2000 that explored how the agency can better meet its mission in the years to come. These initiatives consisted of (1) developing a research agenda, (2) beginning work on a strategic plan for the next 5 years, (3) working with the National Center for Environmental Health (NCEH) to develop a shared vision of environmental public health activities, and (4) developing a memorandum of understanding with the U.S. Chemical Safety and Hazard Investigation Board (CSB).

ATSDR's research agenda, Environmental Public Health Research Agenda 2002–2010, will help guide the agency's research programs. The proposed research will directly support the agency's goals. The agency's strategic plan, which is to be developed in fiscal year 2001, will provide a framework for ATSDR's overall vision and will establish critical measures to monitor progress. The vision project with NCEH calls for greater coordination and collaboration between the two agencies. Finally, the agreement with CSB calls for ATSDR to provide technical assistance to CSB investigators on public health aspects of chemical incidents.

Working with communities continued to be a major emphasis of the agency in fiscal year 2000. ATSDR's Office of Urban Affairs, Community Involvement Branch, and Office of Tribal Affairs are promoting innovative ways of involving communities in decisions about their environmental health. ATSDR's work with communities was highlighted in a special issue of the international journal *Environmental Epidemiology and Toxicology* that focused on the evaluation of health hazards in communities exposed to environmental toxins.

ATSDR Headquarters, Atlanta

Agency Profile

History of ATSDR

The Agency for Toxic Substances and Disease Registry (ATSDR) is a federal agency that Congress created through the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), commonly referred to as the Superfund legislation. Congress enacted Superfund as part of its response to two highly publicized and catastrophic events: discovery of the Love Canal hazardous waste site in Niagara Falls, New York, and an industrial fire in Elizabethtown, New Jersey, that released highly toxic fumes into a densely populated area. Congress created ATSDR to implement the health-related sections of laws that protect the public from hazardous wastes and uncontrolled releases of hazardous substances into the environment.

In 1983, an administrative order of the Secretary of the U.S. Department of Health and Human Services (DHHS) established ATSDR as a separate agency of the Public Health Service. In June 1985, ATSDR was formally organized to begin to implement provisions of CERCLA. ATSDR was to work in concert with the Environmental Protection Agency (EPA), the Centers for Disease Control (CDC, now the Centers for Disease Control and Prevention), and the National Institute of Environmental Health Sciences.

When Congress reauthorized Superfund in 1986 in the Superfund Amendments and Reauthorization Act (SARA), ATSDR received major new mandates. By August 1989, the agency had assumed its current structure. Since 1989, ATSDR has received additional non-CERCLA statutory responsibilities. The agency is headquartered in Atlanta, Georgia. The agency is staffed by more than 400 health professionals and other staff members who work in Atlanta, in the agency's Washington office, and in ten regional offices throughout the country.

Mission of the Agency

ATSDR's mission is to prevent exposure and adverse human health effects and diminished quality of life associated with exposure to hazardous substances from waste sites, unplanned releases, and other sources of pollution. ATSDR works closely with state, local, and other federal agencies to reduce or eliminate harmful health effects that are related to exposure to toxic substances at waste disposal and spill sites.

As the lead public health agency responsible for implementing the health-related provisions of CERCLA, ATSDR is charged with assessing health hazards at specific Superfund sites, helping to prevent or reduce exposure and the illnesses that result, and increasing knowledge and understanding of the health effects that may result from exposure to hazardous substances.

CERCLA mandated that ATSDR (1) establish a National Exposure and Disease Registry; (2) create an inventory of health information on hazardous substances; (3) create a list of sites that had been closed or had access restricted because of toxic contamination; (4) provide medical assistance during hazardous substance emergencies; and (5) determine the relationship between hazardous substance exposure and illness.

The Resource Conservation and Recovery Act (RCRA), as amended in 1984, mandated that ATSDR work with EPA to (1) identify new hazardous wastes to be regulated; (2) conduct health assessments at RCRA sites at EPA's request; and (3) consider petitions by states or members of the public to conduct health assessments at sites.

SARA broadened ATSDR's responsibilities, giving ATSDR mandates to conduct public health assessments, establish and maintain toxicologic databases, disseminate information, and provide medical education in the areas of public health assessments, establishment and maintenance of toxicologic databases, information dissemination, and medical education. The Great Lakes Critical Programs Act of 1990 required EPA, in cooperation with ATSDR, to report to Congress on the adverse health effects of water pollutants on people, fish, shellfish, and wildlife.

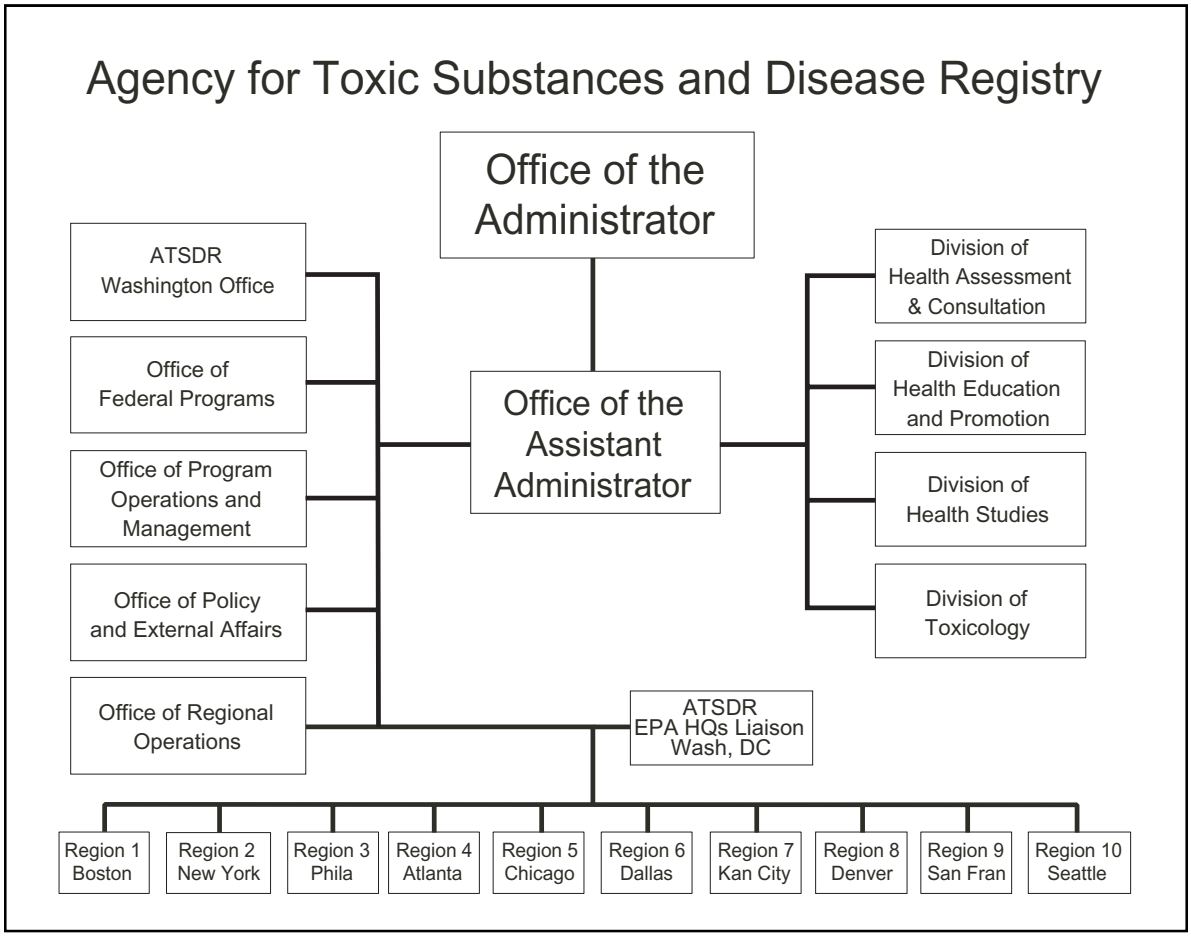
Priorities for the Future

Planning for the future direction of the agency was a key priority for ATSDR in fiscal year 2000. ATSDR embarked on several tasks designed to take a long-range view of the agency's public health activities. Specifically, ATSDR developed a research agenda, began working with the National Center for Environmental Health to develop a vision for environmental public health, and finalized a memorandum of understanding with the Chemical Safety Board.

The research agenda, Environmental Public Health Research Agenda 2002–2010, will help guide ATSDR's research programs through the first decade of the new millennium. The proposed research will directly support the agency's goals of identifying people at health risk, evaluating relationships between hazardous substances and human health, and intervening to eliminate exposure and prevent adverse health outcomes. The agenda has been developed with extensive input from a wide range of agency staff members, governmental partners, professional associations, universities, nongovernmental organizations, affected citizens, community groups, and Native American tribes. The agenda was developed over an 18-month period, and it was endorsed by the ATSDR Board of Scientific Counselors on November 30, 2000.

The research projects proposed in the agenda focus on six areas: exposure assessment, chemical mixtures, susceptible populations, communities and Native American tribes, evaluation and surveillance of health effects, and health promotion and intervention. Results of research in these areas can improve ATSDR public health activities and interventions for communities exposed to hazardous substances through contaminated water, soil, air, or food. Research in each area will improve the tools, methods, and approaches used to evaluate and prevent exposure and adverse health outcomes. The agenda will facilitate planning and communication and foster collaboration on crosscutting areas of research. The research efforts will benefit numerous communities in the United States and around the world as the research findings are incorporated into more effective environmental public health practice. The agenda will be updated over time to monitor priorities and resources.

ATSDR embarked on two initiatives in the past year to examine ways for the agency to better achieve its mission. ATSDR began working with the National Center for Environmental Health (NCEH) to develop a vision statement of a model environmental health program at CDC. A CDC/ATSDR Working Group drafted a report on a shared vision that aims to establish common ground on which to build ATSDR and NCEH programs that would become national and international resources for addressing



environmental public health threats and promoting health by improving the environment. The vision document calls for greater coordination and collaboration between the two environmental health agencies.

ATSDR also began developing a new 5-year strategic plan during fiscal year 2000. The plan will provide a framework for the agency's overall vision and will establish critical measures to monitor progress. The plan is to be completed during fiscal year 2001.

During fiscal year 2000, ATSDR worked on finalizing a memorandum of understanding with the Chemical Safety Board (CSB), the federal board that investigates chemical spills and accidents. CSB is an independent agency that was created by Congress to improve chemical safety by conducting incident investigations, determining all possible causes, and producing reports and special studies. Under the agreement, ATSDR will provide technical assistance to CSB investigators on public health aspects of chemical incidents, such as advising them on how chemicals released from an incident may affect the health of nearby community residents. The agreement also provides for ATSDR to lend staff members to CSB to advise the board on a health and safety program for its investigators.

ATSDR Organizational Structure

ATSDR executes its operations through four program-specific divisions—the Division of Health Assessment and Consultation, the Division of Toxicology, the Division of Health Studies, and the Division of Health Education and Promotion.

Division of Health Assessment and Consultation

The responsibilities of the Division of Health Assessment and Consultation include the following activities.

- Conducting public health assessments or other evaluations of sites listed on the National Priorities List
- Responding to petitions for public health assessments
- Providing consultation on health issues related to exposure to hazardous or toxic substances, including consultations requested by EPA, state, or local officials
- Determining the extent of danger to public health from a release or threatened release of a hazardous substance

Division of Toxicology

The responsibilities of the Division of Toxicology include the following activities.

- Re-examining the CERCLA Priority List of Hazardous Substances annually and updating the list to include any additional hazardous substances found to pose a significant potential threat to human health. Updated lists are published every two years.
- Preparing a toxicological profile for each hazardous substance on the CERCLA Priority List of Hazardous Substances. In a toxicological profile, ATSDR scientists interpret all known information about a specific substance and identify the concentration level of the substance that may cause harm to people who are exposed to it. The toxicological profile also identifies significant gaps in knowledge about the substance, thus serving to initiate additional research when needed.
- Providing emergency response consultations to determine the extent of danger to public health from a release or threatened release of a hazardous substance
- Conducting a research program in cooperation with the National Toxicology Program to determine the health effects of those hazardous substances that ATSDR, EPA, and other agencies have described as lacking sufficient information.

Division of Health Studies

The responsibilities of the Division of Health Studies include the following activities.

- Conducting periodic survey and screening programs to determine relationships between exposure to toxic substances and illness
- Conducting epidemiologic studies that test scientific hypotheses to evaluate the causal nature of associations between exposure to hazardous substances and disease outcome
- Conducting health surveillance programs of populations exposed to hazardous substances, including medical testing and referral for treatment
- In cooperation with the states, establishing and maintaining a National Exposure Registry of persons exposed to hazardous substances

Division of Health Education and Promotion

The responsibilities of the Division of Health Education and Promotion include the following activities.

- Conducting site-specific programs to assist communities and health professionals in understanding, preventing, or reducing adverse health effects of exposure to hazardous substances. These program activities promote awareness, share information, increase knowledge, promote behavioral changes, provide medical consultations, and communicate potential health risks.

- Supporting a wide array of environmental health education and promotion activities for health care providers, public health officials, and communities through cooperative agreement programs with national organizations of health professionals
- Developing, distributing, and evaluating environmental public health information and training programs in various formats, languages, and media

Office of the Assistant Administrator

In addition to the program-specific divisions, ATSDR has several offices that provide administrative, scientific, or management support to the agency and its divisions. These offices are contained within the Office of the Assistant Administrator.

The Office of the Associate Administrator for Science serves as the agency focal point for science issues that have an impact on ATSDR programs and activities. The office provides administrative and technical support to ATSDR's Board of Scientific Counselors and the board's Community/Tribal Subcommittee, the ATSDR peer review process, and a science forum that serves to facilitate sharing of scientific information among staff members.

In 1998, ATSDR established a Children's Health office to (1) coordinate child health programs throughout the agency; (2) identify (in collaboration with other divisions and offices) new projects that benefit children; and (3) solicit input from and disseminate information to partner agencies and organizations. ATSDR's office complements EPA's formation of the Office of Children's Health Protection and the federal Task Force on Children's Environmental Health and Safety Risks (established under Executive Order No. 13045).

The Office of Federal Programs plans, recommends, manages, and coordinates the policies and procedures under which ATSDR works with federal agencies to develop toxicological profiles for unregulated hazardous substances found at federal facilities and to conduct public health assessments and related health activities.

The Office of Policy and External Affairs promotes the mission of ATSDR by coordinating the agency's efforts to build public health capacity in state and local entities, by providing analysis of agency policy, and by communicating information about ATSDR's activities. The office coordinates public affairs activities, provides graphics and editorial services to the agency, and produces various publications, reports, and fact sheets to communicate agency activities.

The Office of Program Operations and Management (OPOM) develops and executes ATSDR's budget, including Superfund and other federal program funds. In addition to managing the budget, OPOM provides management support for the agency in the areas of program planning; recruitment and employee development; information access, exchange, and utilization; training; travel; and procurement and other administrative services.

The Office of Regional Operations (ORO) assists in the implementation of ATSDR activities across the country. ORO has ATSDR regional representatives at each of the 10 EPA regional offices and a liaison at EPA headquarters in Washington, D.C. This distribution of staff in regional locations promotes communication and interaction with ATSDR's main partners: the public, EPA, and state and local environmental and public health agencies.

The Office of Urban Affairs coordinates the agency's efforts on issues related to environmental justice, minority health, and Brownfields sites.

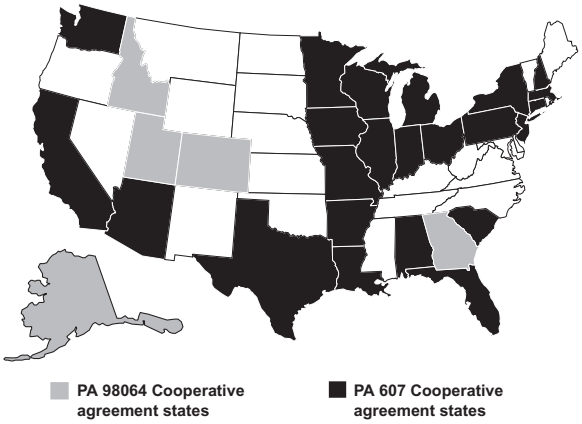
The ATSDR ombudsman provides an independent, neutral resource for all parties concerned with environmental health disputes involving ATSDR. Finding common ground to establish a workable agreement between each faction is the ombudsman's primary objective.

ATSDR's Washington Office links the agency with other executive branch departments and agencies and the legislative branch of government. This office enables ATSDR to respond quickly to issues raised in Congress, other federal agencies, and nongovernmental organizations that are involved with agency programs.

Partnership with States

ATSDR's 607 Cooperative Agreement Program provides funds and technical oversight for participating states to conduct health assessments, consultations, and studies, as well as to provide health education in communities near hazardous waste sites. (See Figure 1.) Staff members in participating state health departments use ATSDR guidance for conducting public health assessments, consultations, and studies. Through the partnership, state staff members receive training and experience in assessing the public health impact of hazardous waste sites and have access to ATSDR's scientific resources. In fiscal year 2000, the program provided about $9.9 million to 23 states. ATSDR provided about $570,000 to five additional states under Program Announcement 98064, another program that allows for ATSDR support of states conducting health assessments and consultations and health education activities.

Figure 1. Map of Cooperative Agreement States



Focusing on Communities

During fiscal year 2000, ATSDR continued its emphasis on working with people in communities to resolve their public health concerns about hazardous substances from waste sites or spills. Three ATSDR units—the Office of Urban Affairs, the Community Involvement Branch, and the Office of Tribal Affairs—have a special focus on working with communities and are promoting innovative ways of involving people in environmental health decisions in their communities. ATSDR's work with communities was highlighted in a special issue of the international journal, *Environmental Epidemiology and Toxicology* (April–September 2000). The issue highlighted the evaluation of health hazards in communities exposed to environmental toxins.

Office of Urban Affairs

ATSDR's Office of Urban Affairs has funded four community-based demonstration projects in Arkansas, Louisiana, Mississippi, and Tennessee through its cooperative agreement with the Minority Health Professions Foundation. They represent Phase II demonstration projects of ATSDR's Mississippi Delta project

on health and the environment. The overall goals of these demonstration projects will be to (1) identify environmental hazards, (2) promote environmental quality, and (3) reduce or prevent negative impacts on public health and the environment, with emphasis on persons of color and underserved communities. The four sites are

- Family Services of Greater New Orleans, Tulane University Medical Center, Cancer Center
- Jackson-Hinds Comprehensive Health Center, Tri-County Health Group Jackson, Mississippi
- Community Health Resources, Incorporated, Memphis, Tennessee
- Lee County Cooperative Clinic, University of Arkansas at Pine Bluff

The Office of Urban Affairs has also been working with a low-income community near the Memphis International Airport and the Defense Depot in Memphis, Tennessee. Airport and Defense Depot activities are at the core of the historic and current public health concerns of residents in the area. The Defense Depot is the only site on EPA's National Priorities List of Uncontrolled Hazardous Waste Sites (NPL) within the Memphis city limits. Currently its 625 acres are being cleaned up. In an effort to help the community obtain appropriate health care in problems involving hazardous substances, ATSDR has a memorandum of understanding with the Health Resources and Services Administration's Bureau of Primary Health Care. The agreement allows for ATSDR to provide environmental medicine training to health care providers in Memphis who work at primary health care facilities supported by the Bureau of Primary Health Care. These health care providers trained in environmental medicine will then be able to provide better health care to persons exposed to hazardous substances in the environment.

Community Involvement Branch

Staff members of ATSDR's Community Involvement Branch have a significant role in ATSDR's activities at sites. Community involvement staff members work to establish and maintain partnerships with communities near sites where ATSDR is conducting health assessments or consultations. Staff members facilitate collaboration and information exchange between ATSDR and communities and other government agencies involved at those sites. They provide an essential link between the community and the ATSDR scientists who are working to address community health concerns and to protect public health.

For example, in fiscal year 2000, community involvement staff members worked extensively in Libby, Montana, to develop communications strategies to inform residents about medical testing that was offered those who may have been exposed to asbestos found in vermiculite mined in the area. The staff members developed a list of state, federal, and local stakeholders and created a communication plan to meet the stakeholders' needs. More than 6,000 people participated in ATSDR's asbestos medical testing program—twice the number of participants originally expected. ATSDR community involvement staff also coordinated communication efforts with EPA's Community Involvement staff to ensure that the messages coming from both federal agencies were consistent and compatible.

Office of Tribal Affairs

The Office of Tribal Affairs is charged with writing policy for the agency on working with American Indian and Alaska Native governments and peoples, coordinating tribal site activities, and providing oversight on various projects. The office represents ATSDR on DHHS and EPA working groups that focus on American Indian and Alaska Native issues. In

fiscal year 2000, the Office of Tribal Affairs' programs and activities increased significantly.

ATSDR was one of two DHHS agencies to meet the department's mandate to have each agency establish policies on consultation and coordination with American Indian and Alaska Native governments, as set forth in Presidential Executive Order 13084. In March 2000, ATSDR and CDC hosted the first annual Tribal Budget Planning and Priorities meeting. The purpose of the meeting was to take direction from the tribes and national tribal organizations in addressing the public health needs of American Indian and Alaska Native peoples.

In fiscal year 2000, the Office of Tribal Affairs initiated a cooperative agreement program with four tribal colleges and universities to build programs for environmental public health. In addition, the Office of Tribal Affairs oversees nine Hanford Tribal cooperative agreements, which were designed to provide assistance to the nine tribes impacted by the Hanford Nuclear Reservation.

Several projects were initiated and continued in fiscal year 2000. An Alaska pilot project addressing formerly used defense sites was initiated in partnership with other Department of Health Assessment and Consultation branches, the Office of Regional Operations, the Alaska Native Health Board, and the Corps of Engineers. Six sites were chosen for inclusion in this pilot; draft health consultations have been prepared thus far for two sites. Additional sites not included in the pilot program are also being investigated.

Work on a tribal subsistence database is progressing and is slated for completion in 2001. This database is expected to provide useful reference documents, Web sites, and information on other federal programs that will assist health assessors assigned to tribal sites. The office also provided agency staff members with training on working effectively with tribal governments. This training provides insights into appropriate protocols for working with tribal governments and addresses special considerations that should be given when assessing the health of American Indian and Alaska Native people with subsistence diets and lifestyles and other unique exposure conditions.

The Office of Tribal Affairs was involved in approximately 30 tribal sites in fiscal year 2000. Involvement ranged from coordinating meetings with tribal councils and making presentations to writing health consultation documents and public health action plans. In general, the tribal sites are politically complex and require a holistic approach to environmental public health.

ATSDR Budget and Appropriations History

ATSDR is funded through EPA and its personnel allocation through CDC. Funding for ATSDR activities at federal facility sites is negotiated with the Department of Defense (DOD) and the Department of Energy (DOE).

Figure 2. ATSDR CERCLA Budget (Nonfederal Obligations), Fiscal Year 1995–Fiscal Year 2000

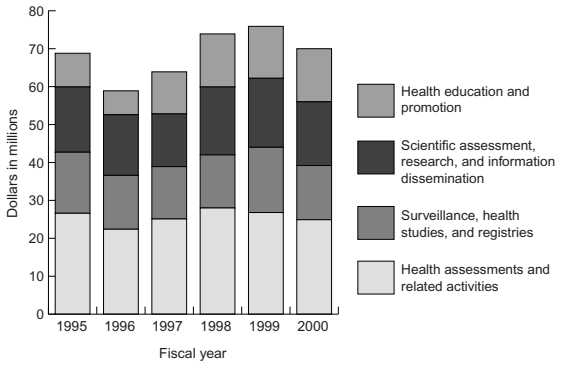


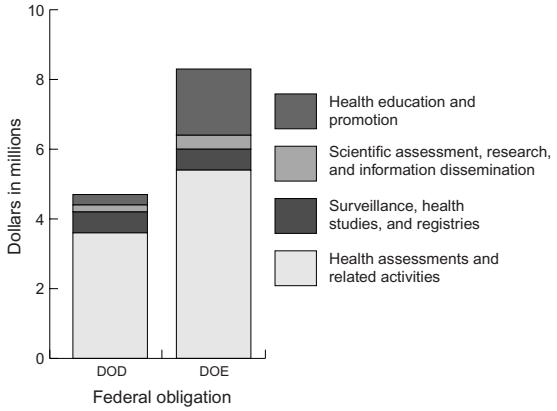
Figure 2 contains a breakdown of ATSDR's Superfund budget obligations, by budget activity, for fiscal year 1995 through fiscal year 2000.

Since fiscal year 1997, ATSDR has received earmarked funds for work on the Toms River, New Jersey, childhood cancer evaluation project. Toms River community members were concerned about the number of childhood cancer cases and feared that exposure to environmental contaminants from the area's hazardous waste sites, including two NPL sites, were related to the elevated incidence of childhood cancer. ATSDR is helping state health officials assess whether there is a relationship between exposure to the contaminants in the drinking water and incidence of childhood cancer. ATSDR's earmark for fiscal year 2000 for Toms River was $1.5 million.

ATSDR is mandated by Congress to conduct public health assessments, health studies, surveillance activities, and health education at federal NPL waste sites, and to develop toxicological profiles of high-priority chemicals found at these sites. These tasks are complicated by the absence of a congressional mandate to federal agencies (with the exception of DOD) to provide ATSDR with the necessary staff and budget to conduct these activities. ATSDR negotiates with DOD and DOE to establish annual work plans and budgets required to conduct its programs at DOD and DOE facilities. Figure 3 illustrates ATSDR's fiscal year 2000 DOD and DOE operating budgets, by budget activity.

In fiscal year 2000 ATSDR had a staff of about 415, who brought a variety of skills and expertise to the agency's work. ATSDR's staff includes epidemiologists, environmental engineers, health educators, hydrologists, physicians, toxicologists, and other public health professionals. ATSDR has a very active

Figure 3. ATSDR's Fiscal Year 2000 Operating Budget From DOD and DOE



Quality of Work Life Committee, which exists to facilitate communication between staff and senior management on the work-related well-being of all ATSDR employees. During fiscal year 2000, ATSDR management and the Quality of Work Life Committee initiated a series of activities to enhance internal communications, such as holding informal discussion sessions with the agency's assistant administrator. ATSDR also strives toward a commitment to diversity by recruiting at minority-led career fairs, seminars, and conferences; targeting minority journals and other advertising to fill vacancies; and sponsoring internships at targeted schools and universities.

Requests for Information from the Public

The ATSDR Information Center provides scientific and technical information to support ATSDR staff, agency constituents, and the public. The Information Center includes a research library, a clearinghouse, and the ATSDR toll-free telephone access system. In fiscal year 2000, the Information Center responded to more than 36,000 requests and distributed more than 750,000 agency products and publications.

ATSDR's Primary Partners in Assessing Sites

Cooperative Agreement States
(activities also include health education and some health studies)

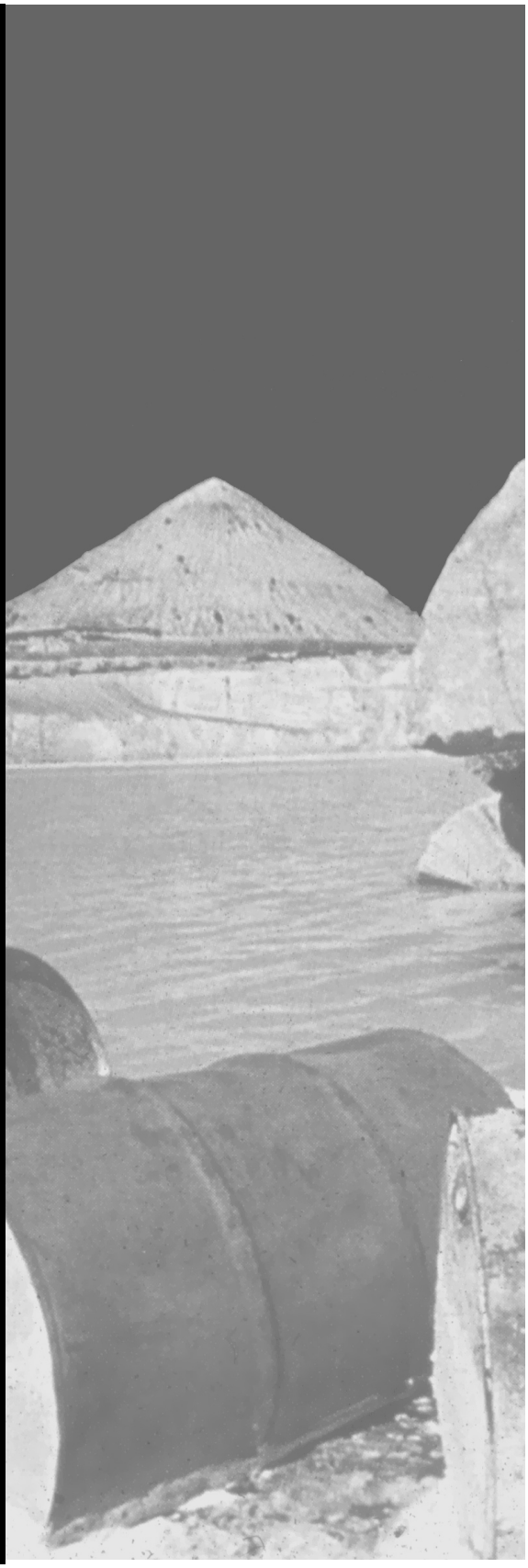
Alabama - Alaska - Arizona - Arkansas
California - Colorado - Connecticut
Florida - Georgia - Idaho- Illinois - Indiana
Iowa - Louisiana - Massachusetts
Michigan - Minnesota - Missouri
New Hampshire - New Jersey - New York
Ohio - Pennsylvania - South Carolina
Texas - Utah - Washington - Wisconsin

Alaska Initiative

Alaska Native Health Board
U.S. Army Corps of Engineers

Hanford Area Tribes

Colville Confederated Tribes
Confederated Tribes of the Umatilla Reservation
Confederated Tribes of the Warm Springs Indian Reservation
Couer d'Alene Tribe
Kalispel Tribe
Kootenai Tribe of Idaho
Nez Perce Tribe
Spokane Tribe
Yakama Indian Nation



Identifying People Who Are Exposed to Hazardous Substances

One of ATSDR's primary goals is to identify people who are at health risk because of their exposure to hazardous substances in the environment. ATSDR's public health assessments, consultations, and related activities play a key role in achieving this goal. ATSDR's health assessment activities help identify people who potentially have been exposed to hazardous substances in the environment and help determine whether they might be at risk of adverse health effects. The activities that are part of the health assessment process also are often the trigger for a variety of other ATSDR activities and public health recommendations. The activities may identify a need for health education in a community, for health studies to be conducted, or for a public health advisory to be issued to recommend immediate actions to prevent exposure.

Helping ATSDR carry out health assessments and related activities are the 28 states that have cooperative agreements with the agency to conduct health assessments and related activities. During fiscal year 2000, ATSDR and its cooperative agreement states performed more than 1,200 health assessment activities in 47 states, Puerto Rico, the U.S. Virgin Islands, Guam, and the Navajo Nation.

ATSDR's community involvement staff members have a significant role in ATSDR's activities at sites. These staff members work to establish and maintain partnerships with communities near sites where ATSDR is conducting health assessments or consultations. Community involvement staff members facilitate collaboration and information exchange between ATSDR and communities and other government agencies involved at those sites. They provide an essential link between the community and the ATSDR scientists who are working to address the communities' health concerns and to protect public health.

"Soil and water were found to be the media of contamination at most of the sites where ATSDR conducted health consultations and public health assessments in fiscal year 2000."

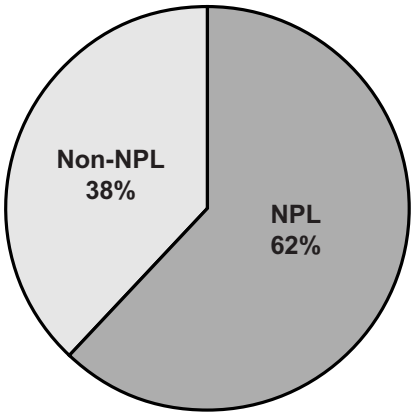
Overview of Public Health Assessment Findings

A public health assessment is a review of information about hazardous substances at a site and an evaluation of whether exposure to those substances at the levels found might harm people. Public health assessments often include recommendations about actions needed to prevent or mitigate potential health effects and identify any follow-up or additional studies that may be needed at the site to protect public health.

In fiscal year 2000, ATSDR and the cooperative agreement states prepared 208 public health

assessment documents for 150 sites. Of these 150 sites, 93 (62%) were NPL Sites, and 57 (38%) were non-NPL sites. (See Figure 1.) In addition, 13 were sites that were covered by the Resource Conservation and Recovery Act (RCRA), and 29 were sites for which the community or others had petitioned ATSDR to conduct a public health assessment. RCRA covers the control of hazardous substances at operating facilities, such as manufacturing plants.

Figure 1. NPL Status of Sites with ATSDR Public Health Assessment Activity in Fiscal Year 2000

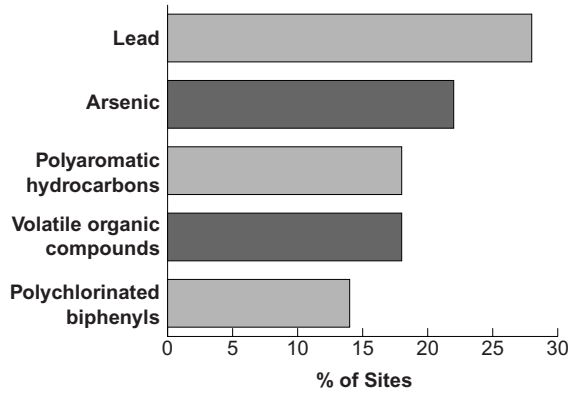


ATSDR estimates that more than 1.6 million people live within 1 mile of the 150 sites that were assessed in the last year. Of the 1.6 million people, about 660,000 live near non-NPL sites, and about 950,000 live near NPL sites. Of the sites assessed in public health assessment documents, 16% were found to pose a public health hazard.

Lead was the contaminant found most often at the sites assessed in fiscal year 2000. Lead was detected at 28% of the sites. Other contaminants commonly found were arsenic, which was found at 22% of the sites; polyaromatic hydrocarbons or PAHs, found at 18%; volatile organic compounds or VOCs, also found at 18% of the sites; and polychlorinated biphenyls or PCBs, found at 14% of the sites. (See Figure 2.)

ATSDR analyzed demographic data for 225 sites where the agency conducted public health assessments or consultations in fiscal year 2000. Approximately 2.7 million people live within a mile of those sites. Of those, about 10% were children aged 6 years or younger; 22% were 18 years old or younger. About 23% were women of childbearing age. About 11% were elderly, aged 65 or older.

Figure 2. Major Contaminants Found at Sites Assessed in Fiscal Year 2000



About one-third of the sites assessed in public health assessments in fiscal year 2000 were manufacturing or industrial sites. Government-owned sites made up 17% of the sites where public health assessments were conducted, and waste storage sites accounted for 15%. Eleven percent were mining industry sites. (See Table 1.)

Table 1. Types of Sites Assessed in Fiscal Year 2000

Type of Site	*Number of Sites*	*Percentage*
Manufacturing	49	32
Government	25	17
Waste Storage or Treatment	23	15
Mining	16	11
Other	19	13
Natural Area	12	8
Waste Recycling	5	3
Residential	1	1
Total	150	100

Following are examples of public health assessments conducted in fiscal year 2000.

Brick Township Autism Public Health Assessment, New Jersey

In February 1998, ATSDR and CDC were contacted by a group of parents of children in Brick Township and by U.S. Senator Robert Torricelli and U.S. Representative Christopher Smith with a request to investigate concerns about the prevalence of autism and other pervasive developmental disorders among children in Brick Township, New Jersey. They also asked that ATSDR assess whether community members may have been exposed to hazardous chemicals in the environment.

In responding to this request, ATSDR and CDC conducted multiple activities and investigations. ATSDR conducted a public health assessment evaluating whether community members may have been exposed to hazardous chemicals in the environment. ATSDR's public health assessment concluded that there was no clear pattern linking the residences of the children who had autism with environmental contaminants. However, there was also no clear pattern for a link between environmental contaminants and the residences during pregnancy of mothers of children who had other pervasive developmental disorders. Total trihalomethane levels in the municipal drinking water supply exceeded 80 parts per billion several times during the study period. There was no clear pattern linking the residences of the mothers (during pregnancy) with location and timing of the high trihalomethane levels. The public health assessment therefore concluded that it appears unlikely that trihalomethane in the municipal drinking water supply was associated with autism incidence in Brick Township. CDC's investigation found that the rates of autism and other pervasive developmental disorders in Brick Township were high compared with prevalence rates reported in previously published studies.

ATSDR and CDC emphasized community involvement and outreach in their Brick Township activities and investigations. The two agencies coordinated their activities and met with the community jointly. Their agencies' reports, informational fliers, and press releases were released to the public at the same time.

This was the first U.S. investigation to fully explore the possible association between autism and environmental contaminants. The results of the Brick Township autism investigation provided valuable information about a disorder which is estimated to be the third most common developmental disability (occurring in as many as one in every 500 children).

Children on Isla de Vieques

U.S. Navy Training Exercises on Vieques, Puerto Rico

Isla de Vieques is a small island south of the main island of Puerto Rico on which the U.S. Navy has a bombing range for conducting training exercises. In May 1999, ATSDR received a petition from a resident of Vieques to evaluate any health effects that might be associated with potential releases of hazardous substances as a result of bombing range activities. Training activities at Vieques had been halted from 1999 until June 2000 in response to a training exercise accident in which a civilian contractor for the Navy was killed.

People who opposed the bombing training conducted on the island established camps on the bombing range to protest the bombings. These camps of protestors included children. In June 2000, an agreement between the Governor of Puerto Rico and the President of the United States resulted in training exercises being resumed with inert bombs. A political referendum is to be held in November 2001 to determine whether the Navy will leave the island in 2003 or resume full-scale training.

ATSDR staff members visited the island several times and met with a variety of community members to determine their specific health concerns. ATSDR has provided environmental health education to resident and non-resident health care providers for the island. During ATSDR's first visit to the island, community activists were camping on the live impact area of the training range. ATSDR expressed concern to various governmental agencies about the potential danger of unexploded ordnance on the site. Eventually, this public health threat was removed with the reinstitution of security at the site. This was accomplished by agreements with local authorities and the federal government.

ATSDR has evaluated sampling information gathered by various environmental agencies. The primary source of drinking water provided by pipeline from the main island of Puerto Rico and the island's backup wells have been determined to be safe. The lay of the land and other geographical aspects of the island limit the possibilities for potential contaminants to reach other parts of the island. A public health assessment on drinking water was released for public comment to the communities of Vieques in February 2001. The assessment was made available in both English and Spanish. The assessment found that the Vieques public water supply is safe to drink.

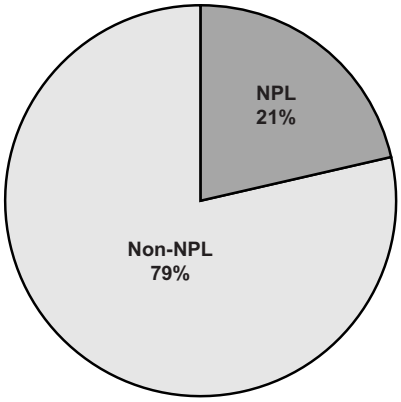
ATSDR is currently evaluating environmental information related to other potential pathways of exposure to the communities. The potential for transport of contaminants through the air and through the food chain is being evaluated.

Health Consultations

Health consultations provide advice and recommendations on specific, health-related questions concerning actual or potential human exposure to hazardous substances or to other related human health hazards. A health consultation is often needed quickly to evaluate situations and recommend immediate actions to mitigate or prevent harm to human health from exposure to hazardous substances in the environment.

Consultations vary in complexity; either an individual health professional or a team may respond to a question about a site or issue. In some cases, ATSDR prepares more than one health consultation in response to a request for help with an exposure or potential exposure. Health consultation reports may be either written or oral, and they are timely; for example, an oral report might be provided on the day a request reaches ATSDR.

Figure 3: NPL Status of Fiscal Year 2000 Health Consultations



In fiscal year 2000, ATSDR staff members and state health assessors issued 383 health consultations (82 NPL; 301 non-NPL) for 342 hazardous waste sites in 43 states, Puerto Rico, and the Virgin Islands. Unlike public health assessments, the majority were non-NPL sites, (see Figure 3). Solid waste disposal sites were the main type of hazardous waste sites addressed by these health consultations. Fifty-seven of the health consultations responded to public health concerns about contaminated drinking water, explosive landfill gases, and contaminated surface soil at solid waste disposal sites such as abandoned dumps and both closed and operating municipal landfills.

During fiscal year 2000, ATSDR organized a team of staff members, called the "Strike Team," to provide quick answers to specific requests from other agencies for health consultations. The Strike Team is a multidisciplinary team composed of an environmental health scientist, an industrial hygienist, a toxicologist, a physician, an editor, and regional staff members. The team was established to provide a quick response to site-specific and focused requests on issues that are time-critical. The team strives to provide a response within 3 working days.

The Strike Team prepared 28 written health consultations in fiscal year 2000. The majority of the requests came from EPA. Implementing the Strike Team's recommendations has allowed EPA to

- continue remediation activities without relocating residents in some cases
- be responsive to residents extremely concerned about the health effects of emissions from a hazardous waste incinerator
- incur decreased remediation costs while still acting in the best interest of the public's health.

Following is an example of a site for which ATSDR provided a health consultation in fiscal year 2000.

Metallic Mercury Exposures, Illinois

In July 2000, a private citizen notified the Illinois Department of Public Health (IDPH) and ATSDR that metallic mercury had been found in the basement of a home after the removal of an indoor natural gas meter that was equipped with a mercury pressure regulator (shown on next page). Approximately 1 week before the call, a gas company had removed mercury regulators from that home and from other homes in the neighborhood.

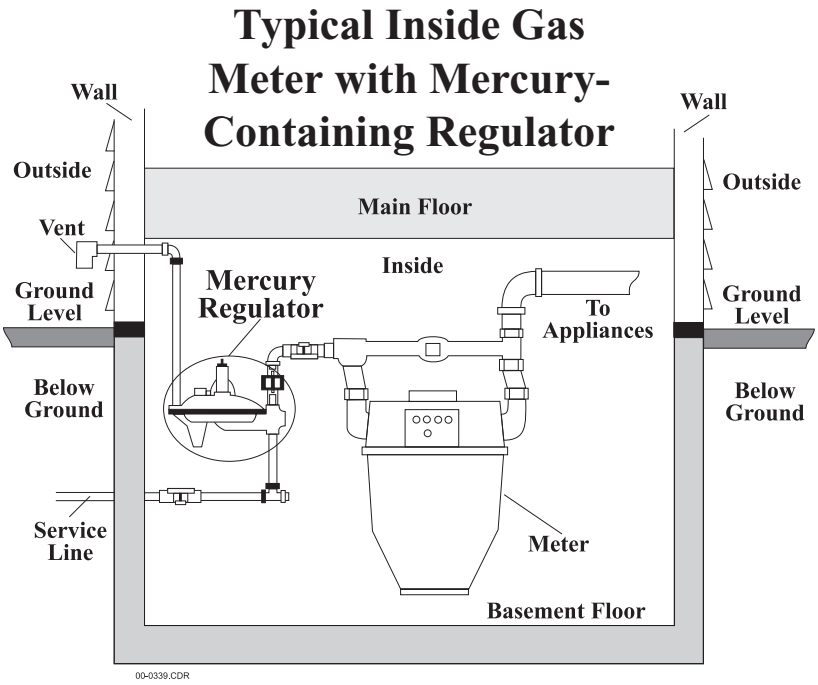
ATSDR and EPA determined that many residences in the Chicago area might be contaminated with mercury at levels that could cause acute or long-term health effects in unborn infants and children. In response to concerns about the potential contamination, the Illinois Attorney General's office formed a mercury task force consisting of federal, state, and local health and environmental agencies, along with other interested agencies. The gas companies developed a protocol for identifying, testing,

Metallic mercury

and cleaning affected residences, providing urine testing, relocating residents, reimbursing affected residents for expenses, and providing the opportunity for stress counseling.

About 500,000 residences were potentially affected, including some homes where mercury regulators had been removed more than 10 years previously. ATSDR developed guidance on action levels and on residences that should be prioritized for testing because of possible adverse effects on children and unborn infants. EPA developed clean-up levels that were based on ATSDR recommendations.

Through a cooperative agreement with ATSDR, IDPH evaluated the mercury sampling data after



cleanup and issued letters to residents specifying when their homes were safe for occupancy. IDPH also sponsored a "hot line" and developed pamphlets for the public. To date, nearly 1,000 residences have been found to be contaminated, and IDPH has issued more than 700 letters to residents. IDPH is collecting the results of the biologic (urine) testing and results of the original mercury air sample for evaluation and comparison. Data will provide additional information that will help compare residents' exposure with levels of mercury in the environment and identify any exposure-induced, adverse health effects. The Center for Environmental Health in Chicago, a Pediatric Environmental Health Specialty Unit funded by ATSDR, has provided medical information to the task force, the gas companies, local physicians, laboratories, affected residents, and the media.

The training and support that ATSDR provides to Illinois and the other states with which it has cooperative agreements made possible this type of rapid, in-depth response to a potentially widespread public health problem. In this case, federal, state, and local environmental and health agencies joined in partnership with the gas companies in Illinois to contact homeowners whose gas meters had been replaced within the past 10 years and make them aware of the free services available to them to protect their health.

Exposure Investigations

Exposure investigations are conducted to gather and analyze site-specific information to determine whether human populations have been exposed to hazardous substances. Information is obtained through biomedical testing, environmental testing, and exposure-dose reconstruction. Biomedical testing (for example, urine or blood samples) can show current, and sometimes past, exposure to a contaminant. Environmental testing (for contamination of soil, water, or air) is focused on where people live, spend leisure time, or might come into contact with contaminants under investigation. Exposure-dose reconstruction analyses use environmental sampling information and computer models to estimate the contaminant levels that people may have been exposed to. The data and information

collected during an exposure investigation help determine whether people have been exposed and, if so, the extent of the exposure. The results of exposure investigations are used to make public health decisions and to recommend appropriate public health actions.

In fiscal year 2000, ATSDR found 423 different substances in completed exposure pathways at sites.

The focus of an exposure investigation is to identify and test residents with the highest potential for exposure. An exposure investigation is not intended to be a study or a complete characterization of a site. Rather, it is a transitional activity designed to provide information that will allow ATSDR to carry out its public health activities more efficiently and effectively. Follow-up activities to exposure investigations may include recommendations for additional sampling, an epidemiologic study, medical evaluations, health education, or more rapid public health action to reduce exposure.

The following criteria are used to determine whether an exposure investigation should be conducted.

- Can an exposed population be identified?
- Are critical data needed to determine whether a public health hazard exists?
- Can the needed information be provided by an exposure investigation?
- How would the exposure investigation's results impact public health decisionmaking?

ATSDR conducted 20 exposure investigations in fiscal year 2000. Following are three examples of these investigations.

Saipan clinic

Village of Tanapag, Saipan

After World War II, about 50 to 60 capacitors that had been used during the war were left in the Village of Tanapag in Saipan, one of the islands in the Commonwealth of the Northern Mariana Islands (CNMI). The abandoned capacitors were scattered throughout the village and were used for a variety of purposes, including boundary markers, headstones, road blocks, and windbreaks.

When the capacitors were removed in the early 1990s, a few were discovered to have leaked fluids containing polycholorinated biphenyls (PCBs). In response to the community's concern about the PCB contamination, the CNMI Department of Public Health (DPH) petitioned ATSDR in 1999 to perform a public health assessment. Community members were concerned for their current safety and wanted to know if their past exposures might cause illness. The Army Corps of Engineers, with oversight from EPA, was responsible for the soil cleanup.

At the request of the CNMI Secretary of Health, ATSDR assisted the DPH with the medical evaluation of the residents of Tanapag Village at a satellite clinic. Working with ATSDR were health care providers from the Immigration Health Services of the Health Resources and Services Administration. Between May 8, 2000, and June 9, 2000, the clinic operated 11 hours per day with a staff of 5 health care providers. More than 1,250 individuals were interviewed to obtain exposure and medical histories. Physical exams, blood tests for PCBs, and a general battery of other screening lab tests were also given.

ATSDR staff presented results of the exposure investigation to community members in November, assisted DPH staff with followup on medical examinations, and provided training on PCB exposure and health effects for local health care providers. Seventeen people having total PCB levels above 10 parts per billion were counseled about the health significance of their blood levels; 30 people having abnormal lab values or other health concerns were seen in the clinic by an ATSDR physician. ATSDR also counseled Tanapag residents who had normal PCB lab results, but who still had concerns about environmental contamination. Additionally, information repositories were established in the local library and Tanapag clinic. ATSDR also worked with DPH medical staff to identify data needed to perform a descriptive analysis of disease incidence and mortality in Tanapag.

Mossville, Louisiana

Residents of the community of Mossville in Calcasieu Parish, Louisiana, expressed concern over potential health effects from exposure to chemical releases from chemical manufacturing plants in their neighborhood. Calcasieu Parish has a large number of chemical manufacturing plants which produce petroleum-based chemicals and chemicals such as chlorinated hydrocarbon solvents and polyvinyl chloride. Chemical wastes from some of these operations are burned in hazardous waste incinerators operated by industries in the area. Mossville is located across the road from a large vinyl chloride monomer plant. Several flares at this facility intermittently burn unidentified waste materials. Residents reported that black soot from these flares was deposited on vegetation on their property.

Mossville, Louisiana

To document their concerns, a community member provided ATSDR with blood dioxin test results that indicated that some residents had elevated blood dioxin levels. In response to these preliminary findings, ATSDR conducted an exposure investigation. Blood samples were collected from 28 residents of the community, and the samples were analyzed for chlorinated dibenzodioxins (CDDs), chlorinated

dibenzofurans (CDFs), and polychlorinated biphenyls (PCBs). A limited investigation of environmental contamination was also conducted: four surface soil samples and two chicken eggs were collected and analyzed for CDDS and CDFs. A breast milk sample from one resident was also analyzed.

The exposure investigation concluded that blood dioxin concentrations measured in the study participants were elevated, but were at levels that were unlikely to be associated with known clinical health effects such as chloracne (an acnelike skin condition) or elevated liver enzyme levels. The average concentration of dioxin in blood samples from the exposure investigation participants was at the upper end of the reference range averages. The reference range was from studies conducted in the 1980s. Thus, the current reference range could be lower. Four of 28 residents had blood dioxin concentrations that exceeded the reference range means by twofold or threefold. Dioxin concentrations in three surface soil samples and two chicken eggs were not at levels of health concern. The concentration of dioxin in a breast milk sample was not elevated.

The source of the increased dioxin exposure in residents of Mossville could not be initially determined. ATSDR plans to work with federal and state agencies and the community to implement further investigations to identify possible sources of dioxin exposure in Mossville. ATSDR facilitated access to an Association of Occupational and Environmental Clinics (AOEC) environmental medical expert in dioxin to review medical information for the 28 exposure investigation participants, determine the next clinical steps for these people, and provide them with education and information about their exposure status.

Anniston, Alabama

The Monsanto Company produced PCBs at a plant in Anniston, Alabama, from 1935 to the 1970s. Hazardous wastes, including PCBs, were disposed of in two unlined landfill areas adjacent to the production facility. Investigations documented the presence of PCB contamination in sediment samples from off-site drainage ditches and in soil samples from private residences east and north of the facility. These findings led to the remediation of off-site contaminated areas and property buyouts for some homeowners.

Subsequent investigations detected elevated blood levels of PCBs in some residents living in the community surrounding the facility or other neighborhoods in Anniston. The source and exposure pathways by which residents had been exposed to PCBs had not been defined. Furthermore, it was uncertain whether significant exposures were still occurring. ATSDR conducted an exposure investigation to address these question.

Before conducting the exposure investigation, staff from ATSDR and the Alabama Department of Public Health (ADPH) met with community representatives to explain the exposure investigation and solicit their input. In March 2000, ATSDR staff members met with families who lived within a half-mile radius of the site and invited them to participate in the exposure investigation. To be eligible for the investigation, at least one family member had to be a child between 1 and 7 years old. ATSDR staff members and representatives of the community group, CAP, went door-to-door in the designated neighborhoods to invite eligible families to participate. A total of 18 families participated in the exposure investigation. Environmental samples were collected from the homes of these

Emergency response

families. The concentration of PCBs was determined in blood serum samples from 37 children (16 years old or less) and 43 adults.

The exposure investigation concluded that 5 of the 43 adults tested had elevated (higher than 20 parts per billion) blood PCB levels. Blood PCB levels were not elevated in the 37 children tested. PCB concentrations in excess of 1 part per billion were detected in surface soil samples from 4 homes and in house dust samples from 2 homes. Blood PCB levels were not correlated with soil or house dust PCB levels.

The exposure investigation showed a strong correlation between blood PCB level and length of residency. This, along with the absence of elevated blood PCB levels in younger residents of the community, suggests that past exposures to environmental PCB contamination exceeded current exposures.

The findings of this study are consistent with studies conducted by the EPA that have documented that elevated levels of PCBs remain in off-site soils and sediments. Because the future use of these areas cannot be predicted, ATSDR recommended that the areas be remediated to prevent the potential for further exposure.

Responding to Spills and Other Emergency Events

ATSDR emergency response staff members provide health-related technical support to federal, state, and local responders during emergencies involving the uncontrolled release of hazardous substances. As resources permit, they also do time-critical consultations. ATSDR emergency response coordinators have immediate access to various experts including chemists, toxicologists, environmental scientists, and medical professionals. Site-specific consultation teams can be convened to provide support 24 hours a day, usually within 30 minutes.

During fiscal year 2000, ATSDR emergency response staff members received a total of 613 requests for assistance or consultation from EPA regional offices, other federal agencies, state and local agencies, and private citizens. Of these, 59 were acute events for which ATSDR provided information. ATSDR also made an on-site response to one of these acute events. During these emergencies, ATSDR assisted first responders in addressing the public health needs of more than 500,000 people who were potentially affected by these accidental spills or releases. In response to these requests, ATSDR provided protocols for treatment of people who were exposed to hazardous substances, evaluated the health implications of spills, and provided action levels to protect workers and the public. About one-third of the requests for assistance in acute events were made by EPA.

For example, ATSDR responded to an EPA request in July 2000 for on-site assistance with a spill of an unidentified substance into the Guaynabo River in San Juan, Puerto Rico. An unknown amount of a substance had been released into the river, which is the drinking water supply source for approximately 250,000

residents of metropolitan San Juan. The contaminant passed through a treatment plant and into the homes of residents. The treatment plant was shut down for decontamination, a 7-day process, and Commonwealth officials provided residents with alternative water supplies. The concentration of the contaminant was below levels of health concern in all of the analytical results reviewed; however, the concentration was sufficient for the average person to detect an objectionable odor. The possibility of additional contaminants could not be eliminated, and further analysis was being conducted by multiple agencies, including the Puerto Rico Department of Health, the U.S. EPA Caribbean Field Office, and the Puerto Rico Department of Environmental Quality.

EPA Region 2 requested that ATSDR provide on-site assistance in coordinating the environmental and public health aspect of the contamination of the city's water supply. ATSDR reviewed environmental data and evaluated the public health significance of the contaminants. ATSDR also met with Commonwealth and EPA officials to coordinate activities and facilitated arrangements through EPA and the Centers for Disease Control and Prevention's National Center for Environmental Health for rapid turnaround in the analysis of water samples.

In addition to assisting federal and other agencies with response to spills, releases, and other acute events involving hazardous substances, ATSDR emergency response personnel routinely participate in regional and local training in which response to such spills is simulated. In fiscal year 2000, ATSDR participated in 26 local drills, usually providing compound-specific information on toxicity, human health effects, fate and transport, and worker health and safety.

One such exercise ATSDR participated in was a Congressionally mandated, full-field exercise called "Top Official" or TOPOFF. TOPOFF consisted of two simulations of terrorist attacks that were timed to occur simultaneously—one involving a biological agent in a major city and the other involving a chemical agent in a smaller city. In addition, a third full-field exercise involving a radiological release took place in Washington, D.C. The objective of the exercises was to test the Federal Response Plan response to such incidents and to evaluate failures of the systems. ATSDR dispatched emergency response coordinators to the biological and chemical incidents and also provided information for the response to the radiological incident.

ATSDR's Primary Partners in Conducting Toxicologic Research

Voluntary Research Program

American Chemistry Council (ACC)

General Electric Company (GE)

Halogenated Solvents Industry Alliance, Inc. (HSIA)

Minority Health Professions Foundation Institutions

Charles R. Drew University of Medicine and Science

Florida A&M University

Meharry Medical College
Morehouse School of Medicine

Texas Southern University

Tuskegee University

Xavier University

Great Lakes Research

Michigan Department of Community Health

Michigan State University

New York State Department of Health

University of Illinois at Chicago

Research Foundation of State University of New York at Buffalo

State University of New York at Oswego

University of Illinois at Urbana-Champaign

University of Wisconsin-Milwaukee

Wisconsin Department of Health and Family Services

Chemical Mixtures Program

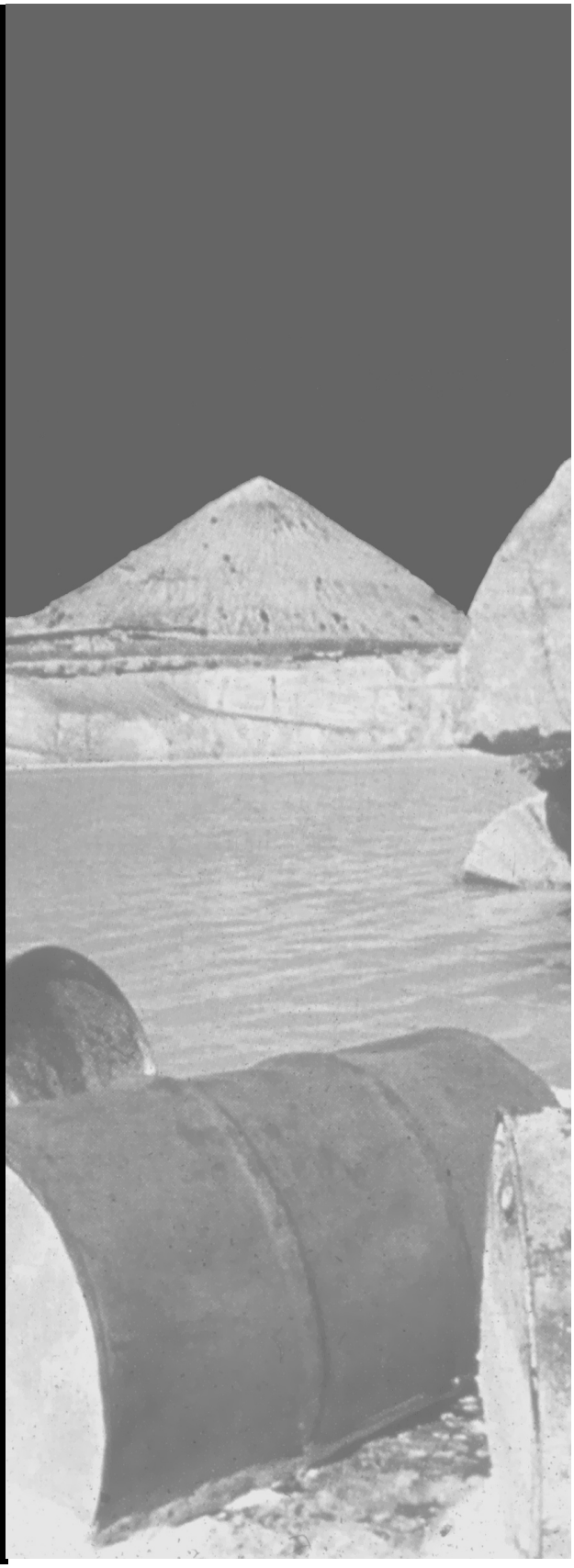
Colorado State University

North Carolina State University

Northeast Louisiana University

Texas A & M University

Wayne State University

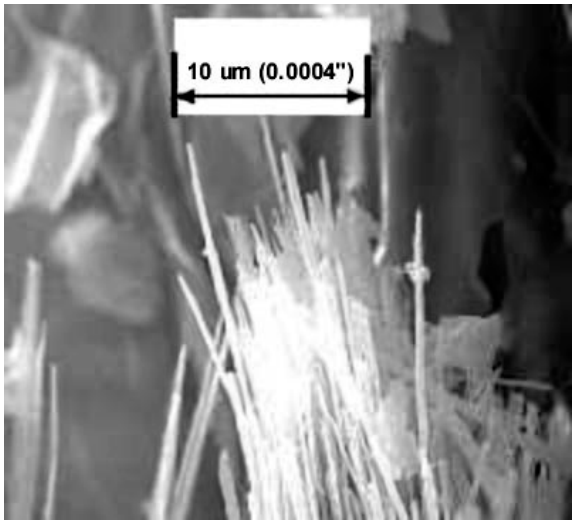


Evaluating Relationships Between Hazardous Substances and Health: Toxicologic Research

A second major goal of ATSDR is to evaluate relationships between hazardous substances in the environment and adverse human health outcomes. To help achieve that goal, ATSDR has a toxicologic research program that is filling many of the data gaps about how hazardous substances affect human health. ATSDR also helps provide information about the relationship between hazardous substances and health outcomes by developing toxicological profiles that summarize information about many of the most hazardous substances found at Superfund sites.

Identification and Ranking of Hazardous Substances

The Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) Priority List of Hazardous Substances contains the names of 275 substances found at NPL sites and believed to pose the most significant potential threat to human health. This list helps form ATSDR priorities on many issues. The Superfund Amendments and Reauthorization Act of 1986 (SARA) requires ATSDR, in cooperation with EPA, to compile this priority list, which is drawn from all hazardous substances known to exist at NPL sites. The ranking of substances on the priority list is based on three criteria: (1) frequency of occurrence at NPL sites, (2) toxicity, and (3) potential for human exposure.



Asbestos fibers

To ensure that the priority list is current, ATSDR periodically reexamines its information database (HazDat) of all hazardous substances known to exist at NPL sites. In early fiscal year 2000, the 1999 CERCLA Priority List of Hazardous Substances was published. Its availability was announced in the *Federal Register* on October 21, 1999 (64 FR 56792). The top substance on the 1999 Priority List of Hazardous Substances was arsenic, followed by lead and mercury (see Table 1).

Along with the publication of the revised priority list in October 1999, ATSDR also published an updated Completed Exposure Pathway Site Count Report. A completed exposure pathway (CEP) is an exposure pathway that links a contaminant source to a receptor population. The CEP ranking is based on a

Table 1. Top 10 Substances on the 1999 Priority List

1999 Priority List	
Rank	*Name*
1	Arsenic
2	Lead
3	Mercury
4	Vinyl chloride
5	Benzene
6	Polychlorinated biphenyls
7	Cadmium
8	Benzo(a)pyrene
9	Polyaromatic hydrocarbons
10	Benzo(b)fluoranthene

site frequency count, and thus lists the number of sites at which a substance has been found in a completed exposure pathway. The substance found in a completed exposure pathway at the most sites was lead, followed by trichloroethylene and arsenic (see Table 2).

Table 2. Substances Found Most Frequently at Sites with a Completed Exposure Pathway (CEP)

Number of sites with substance in a CEP

Substance	*All Sites*	*NPL Sites*
Lead	298	206
Trichloroethylene	277	239
Arsenic	215	147
Tetrachloroethylene	206	167
Benzene	149	116
Cadmium	148	105
Chromium	146	102
PCBs	130	96
1,1,1-trichloroethane	116	97
Zinc	116	75

Preparation of Toxicological Profiles

CERCLA, as amended, requires ATSDR to prepare toxicological profiles for each hazardous substance on the CERCLA Priority List of Hazardous Substances. These profiles summarize the current scientific literature and interpret available toxicological and epidemiologic information to determine levels of significant human exposure regarding the substances.

ATSDR also provides toxicological profiles at the request of the Department of Defense (DOD) and the Department of Energy (DOE). Thirty toxicological profiles were under development as finals or drafts for public comment during fiscal year 2000. These profiles covered

ATSDR has about 150 toxicological profiles covering about 800 substances.

CERCLA substances and non-CERCLA substances identified by DOD and DOE (See Appendix B for a list of toxicological profiles completed in 2000). The toxicological profile for total petroleum hydrocarbons was released as a final profile in fiscal year 2000, thus completing the list of 25 substances submitted by DOD for profile development. The final toxicological profiles for uranium and ionizing radiation were released during fiscal year 2000; they were prepared at the request of DOE. The following toxicological profiles were under development as public comment drafts during fiscal year 2000: americium, cesium, cobalt, iodine, and strontium. These profiles will be released for public comment in fiscal year 2001. Toxicological profiles developed in fiscal year

2000 featured new sections on child health issues, which are being added to all new profiles.

In fiscal year 2000, 137 toxicological profiles were available on CD-ROM. During the year, ATSDR continued a quality control project to update and complete the process of placing all public health statements of final toxicological profiles on the agency's Internet site.

Fact Sheets (called ToxFAQs), containing material drawn from ATSDR public health statements**,** have also been developed. ATSDR now has a total of 150 fact sheets in print and posted on the Internet in HTML and PDF format.

ATSDR's Substance-Specific Applied Research Program

ATSDR is working to determine the relationships between adverse human health outcomes and hazardous substances through its Substance-Specific Applied Research Program. CERCLA requires that for each hazardous substance listed, ATSDR, in consultation with EPA and other public health agencies and programs, assess whether adequate information is available on the health effects of the substance. Furthermore, the law requires that ATSDR, in cooperation with the National Toxicology Program, initiate a research effort designed to determine the health effects of those substances for which adequate information is not available (or under development).

ATSDR used several mechanisms to fill priority data needs in fiscal year 2000. These included industry testing through EPA, private-sector voluntarism, and academic-based research conducted through the Minority Health Professions Foundation. Additional research needs are being addressed through other agency programs including ATSDR's Great Lakes Human Health Effects Research Program and an interagency agreement with the National Toxicology Program. Significant progress has been made in filling the priority data needs. Through fiscal year 2000, ATSDR has identified 201 priority data needs for the top 50 hazardous substances. A total of 117 priority data needs are being addressed via the mechanisms that ATSDR has implemented. In addition, 53 priority data needs have been filled. Data obtained from the research program are used to update ATSDR toxicological profiles and to develop health-guidance values for hazardous substances evaluated in ATSDR's public health assessments conducted at waste sites. Currently, ATSDR is expanding its Substance-Specific Applied Research Program by identifying priority data needs for an additional 10 priority hazardous substances, bringing the total number of substances with a research agenda to 60.

Industry Testing Through EPA

The Toxic Substances Control Act of 1976 (TSCA) authorizes EPA to ensure that chemicals are safe for their intended use. EPA places some of this responsibility on chemical manufacturers and processors by requiring them to conduct toxicologic testing. Costs of conducting this research are borne completely by the industries.

Substances with Some Research Needs to Be Addressed by Industry Testing

Benzene

Chloroethane

Hydrogen cyanide

Methylene chloride

Sodium cyanide

Tetrachloroethylene

Toluene

Trichloroethylene

During fiscal year 2000, ATSDR and EPA finalized information to support development of a TSCA test rule for eight substances that ATSDR previously had identified as having research needs. A test rule is the legally enforceable document that describes (1) EPA's authority to require testing, (2) the specific testing required, (3) why it is required, and (4) who should conduct the testing. The proposed test rule will address substance-specific research needs identified in ATSDR's priority data needs documents. In a recent meeting between officials of EPA and ATSDR, EPA identified the ATSDR test rule as its top priority for fiscal year 2001. Publication of the proposed test rule is expected in the spring of 2001.

Private Sector Voluntarism

ATSDR encourages industry to voluntarily conduct needed research into the toxicity of priority chemicals. During fiscal year 2000, ATSDR had Memoranda of Understanding in place with three private-sector organizations—General Electric Company (GE), Halogenated Solvents Industry Alliance, Incorporated (HSIA), and the American Chemistry Council (ACC), formerly called the Chemical Manufacturers Association,—to address about 10 research needs for 5 substances.

Methylene Chloride

During fiscal year 2000, ATSDR reviewed and accepted the conclusions of an HSIA study covering the immunotoxicity of methylene chloride, a substance found in at least 842 NPL sites. The data from the study indicated that inhalation exposure to methylene chloride at a concentration of 5,187 parts per million did not result in any sign of immunotoxicity. This study addresses an important research need for methylene chloride, that is, to determine whether the immune system is a susceptible target organ for this chemical via inhalation exposure. As a next step, HSIA plans to use physiologically based pharmacokinetic modeling, a state-of-the-art technique, to estimate oral intakes of methylene chloride-contaminated environmental media that would not produce human immunotoxicity. This research is being conducted because ATSDR has identified ingestion of contaminated media as the most common exposure route for methylene chloride at hazardous waste sites.

Substances with Some Research Needs Being Addressed by Private-Sector Voluntarism
Methylene chloride
Polychlorinated biphenyls
Tetrachloroethylene
Trichloroethylene
Vinyl chloride

Trichloroethylene

During fiscal year 2000, ATSDR signed a third agreement with HSIA that covers a developmental toxicity study on trichloroethylene, a substance found in at least 932 NPL sites. This study addresses an important research need for trichloroethylene, that is, to determine whether the development of the young is affected by breathing this chemical. HSIA has completed the study, and it is currently undergoing outside peer review.

Vinyl Chloride

During fiscal year 1996, ATSDR entered into an agreement with the American Chemistry Council covering a study on reproductive and developmental toxicity for vinyl chloride, a substance found in at least 544 NPL sites. Vinyl chloride ranks fourth on the agency's Priority List of Hazardous Substances. This study addresses two important research needs for vinyl chloride, that is, to determine whether the reproductive system and the development of the young are targets of this chemical via inhalation

exposure. During fiscal year 2000, ATSDR reviewed and accepted the conclusions of this study. The study indicated that exposure to vinyl chloride through two consecutive generations did not affect reproductive performance and fertility at any of the concentrations used in the study up to 1,100 parts per million (ppm). However, there were significant effects on the liver, including increased liver weights and hypertrophy in the parental rats.

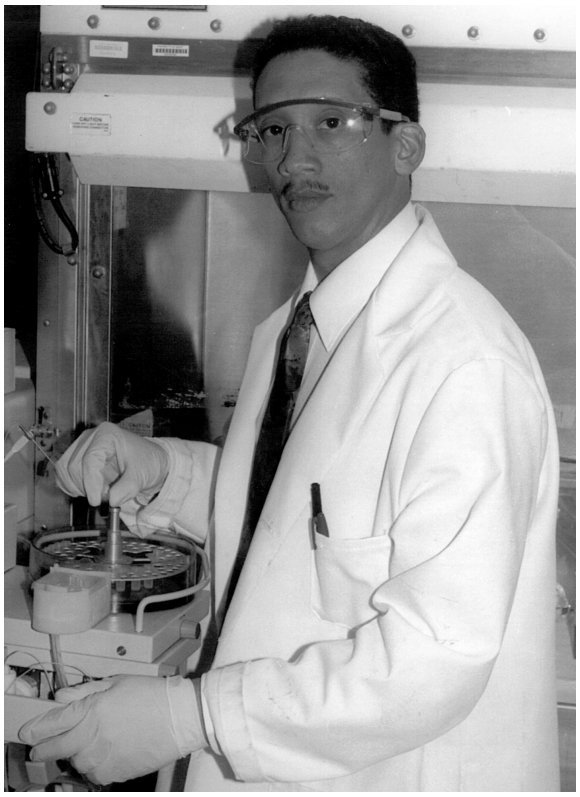
Similarly, no developmental toxicity was reported at any of the concentrations up to 1,100 ppm. Maternal toxicity noted as increased kidney weights relative to the day-20 gestation weights was reported at 100 ppm; and at 1,100 ppm maternal toxicity included increases in both liver and kidney weights relative to the day-20 gestation weights.

Research Program of the Minority Health Professions Foundation

The Minority Health Professions Foundation's Environmental Health and Toxicology Research Program is a partnership that involves minority health-professions schools located throughout the nation. A major component of the Substance-Specific Applied Research Program (SSARP), the program is ATSDR's primary mechanism for filling gaps in knowledge about the effects of hazardous substances.

Some examples of significant new fiscal year 2000 findings from the program include

- Children may be exposed to polyaromatic hydrocarbons (PAHs) *in utero* through their mother's inhalation of PAHs. PAHs are a neurotoxin.
- Long-term exposure to PAHs results in elevated enzyme activity that may contribute to the formation of harmful toxic reactive metabolites and symptoms in target organs.



Laboratory research

- Specific combinations of metals accumulate to a greater extent in inner city soil than in soil in outlying areas. These data will be useful in the development of profiles on the interaction of metals in the environment.

New research findings from this program are incorporated into the updated toxicological profiles and result in filling priority data needs and fulfilling the agency's congressional mandate to assure the initiation of research when available information is inadequate. In addition to being the agency's primary mechanism to address data gaps for hazardous substances, the Environmental Health and Toxicology Research Program is the only university-based research program that supports the agency's efforts to address environmental justice concerns.

As a result of mothers' exposure to methylmercury, the type of mercury that accumulates in fish, as many as 60,000 children are born every year in the United States with neurological problems that could lead to poor school performance.

—Toxicological Effects of Methylmercury, National Research Council, 2000

Mixtures Assessment and Research Program

Superfund sites rarely contain only one hazardous substance. Frequently, multiple chemicals are found at NPL sites. Therefore people who are exposed to contaminants from waste sites are often exposed to mixtures of hazardous substances.

The principal aim of ATSDR's Mixtures Assessment and Research Program is to develop methods for assessing the joint toxicity of exposure to multiple chemicals that are most frequently found at hazardous waste sites. The program seeks to identify pertinent mixtures, assess joint toxicity, and conduct experimental testing to fill research needs.

During fiscal year 2000, identification and ranking of chemical mixtures that are found in completed exposure pathways has progressed. A list of binary mixtures has been identified, and work is being conducted to identify higher order mixtures (such as 3- and 5-component mixtures). On May 30–31, 2000, ATSDR convened an international review panel of outside expert scientists to review three draft documents. The 2-day discussions focused on ATSDR's *Guidance Manual for the Assessment of Joint Toxic Action of Chemical Mixtures*, its *Guidance for Preparation of Interaction Profiles*, and the *Interaction Profile for Chlorinated Dibenzo-p-Dioxins, Hexachlorobenzene, p,p'-DDT, and Methylmercury*. Overall, the panel was very supportive of the mixtures program and commended ATSDR scientists for their work to address and characterize the health effects of chemical mixtures.

Also during fiscal year 2000, ATSDR continued its support of experimental research to enhance the understanding of the underlying mechanisms of toxicity following exposure to chemical mixtures. Many of the key research findings during the year were presented in seven separate presentations at national and international toxicology meetings. One of the papers was recognized as the best paper presented in the Risk Assessment speciality section at the annual meeting of the Society of Toxicology held in Philadelphia, Pennsylvania, March 19–23, 2000.

Computational Toxicology Program

As a part of the development of the SSARP, ATSDR has incorporated the use of state-of-the-art computational toxicology methods such as physiologically based pharmacokinetic (PBPK) modeling, structure-activity-relationship (SAR) techniques, and benchmark dose (BMD) models to aid in interpreting and assessing short, intermediate, and long-term health effects associated with exposure to hazardous substances. PBPK, BMD, and SAR are computer-based mathematical models used to predict the action of chemicals on the body in the absence of little or no experimental data. The alternative

to mathematical models is often costly experimental work that can take months to years to complete.

The computational toxicology laboratory has been used to provide critical toxicological information that supports agencywide programs and activities. Following are highlights of some of the major projects and activities conducted during fiscal year 2000.

- New minimum risk levels (MRLs) for methylene chloride were derived by developing and using a PBPK model.
- A minimum risk level for manganese was derived by applying BMD modeling technology to the data set.
- A pharmacokinetic model for aluminum was developed that provided convincing evidence that using aluminum compounds in childhood vaccines is safe. Both CDC and the World Health Organization used the ATSDR assessment to recommend continued use of aluminum in childhood vaccines. Aluminum is used in certain vaccines to increase immunologic response and thus make the vaccine more effective.
- Development of safe fish consumption levels for women and children who eat fish containing dioxins.
- SAR analyses of a styrene-acrylonitrile trimer were critical in a multiagency decision to pursue reproductive toxicology testing of this compound found in the drinking water in Toms River, New Jersey.
- Development and utilization of a PBPK model for PCBs to determine route-specific sources contributing to high serum PCB levels in Anniston, Alabama. The model simulations indicated that high PCB soil levels were an important exposure route.

Great Lakes Human Health Effects Research Program

The Great Lakes Human Health Effects Research Program is intended to build on, and amplify, the results of past and ongoing fish-consumption research in the Great Lakes basin, using existing structures and institutions already involved in human health research. This ATSDR-supported research program studies known at-risk populations to further define the human health consequences of exposure to persistent toxic substances identified in the Great Lakes basin.

During fiscal year 2000, significant research findings were reported. Those findings include the following.

- The relationship between prenatal exposure to PCBs and performance on the Fagan Test of Infant Intelligence (FTII) was assessed in infants at 6 months and again at 12 months. The results indicated a significant relationship between exposure to PCBs and poor performance on the FTII. No significant relationship was found between exposure to DDE or methyl mercury on any tests of the FTII.
- PCBs and DDE were markedly elevated in a cohort of adults who consumed fish. Exposure to PCBs, but not to DDE, was associated with lower scores on several measures of memory and learning.

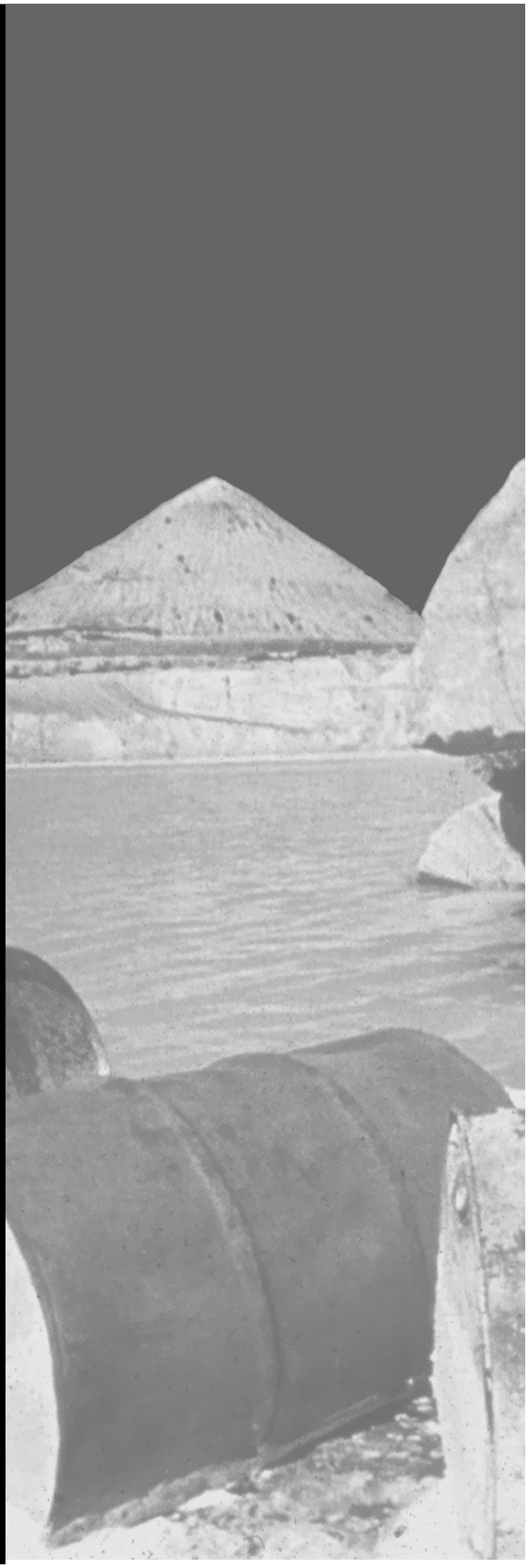
ATSDR's Primary Partners in Conducting Health Studies

Hazardous Substances Emergency Events Surveillance (HSEES) States

Alabama - Colorado - Iowa - Louisiana
Minnesota - Mississippi - Missouri
New Jersey - New York - North Carolina
Oregon - Rhode Island - Texas - Utah
Washington - Wisconsin

States Conducting Health Studies

California - Florida - Illinois - Kansas
Massachusetts - Minnesota - Missouri
New York - New Jersey - Ohio - Texas



Evaluating Relationships Between Hazardous Substances and Health:

Conducting Health Studies

ATSDR conducts and supports health studies to evaluate the relationship between exposure to hazardous substances and adverse health effects. Many of these studies have focused on seven priority health conditions ATSDR identified as the health conditions considered to be most sensitive to exposures to hazardous substances. These are birth defects and reproductive disorders, cancer, immune function disorders, kidney dysfunction, liver dysfunction, lung disease, and neurotoxic disorders. ATSDR also conducts studies to evaluate how people become exposed to hazardous substances.

In 2000, ATSDR completed five health studies. Of these, two had findings related to exposure to hazardous substances, and two had health-related findings. One study had findings related to both exposure and health. ATSDR also continued several surveillance activities in fiscal year 2000, including its surveillance of hazardous spills and releases in a number of states. Following are some of the findings from studies and surveillance activities completed in fiscal year 2000.

- The Kalamazoo River Angler's survey demonstrated that people who ate fish from that river had significantly higher residue levels of total PCBs and DDE than people who did not eat the fish. This finding is consistent with other studies performed under the Great Lakes Research Program.
- In the Coeur d' Alene Basin of Idaho, about 15% of children under 6 years of age were identified with blood lead levels higher than 10 micrograms per deciliter, the level of health concern. The basin area is contaminated with lead from a century of mining activities.
- A study of exposure to toluene diisocyanate from a foam manufacturing facility in North Carolina identified children with clinical evaluations and symptoms consistent with asthma in numbers greater than expected for a community of similar size.

Pediatric neurobehavioral testing

One additional activity of significance initiated during fiscal year 2000 was the medical evaluation of people exposed to asbestos-contaminated vermiculite in Libby, Montana. More than 6,000 people were provided medical testing, including spirometry (which measures the breathing capacity of the lungs) and chest x-rays (which can identify changes in the lungs and the lining of the lungs that may be the result of asbestos exposure).

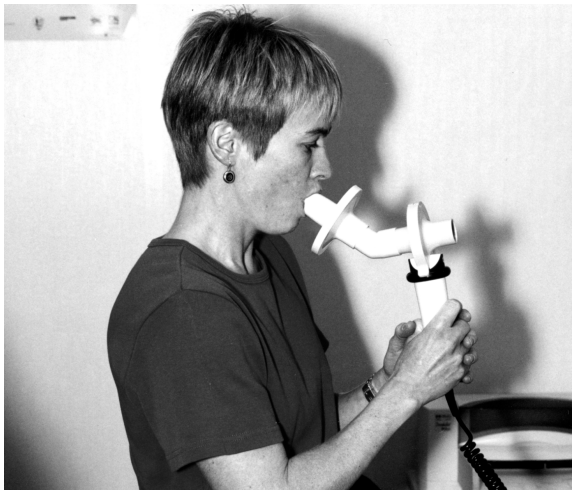
Some examples of ongoing studies in fiscal year 2000 include an evaluation of childhood brain cancer at Toms River, New Jersey; an investigation of childhood leukemia and birth defects among children exposed to contaminated drinking water at Camp Lejeune, North Carolina; and a study examining whether neurotoxic effects and asthma are related to hydrogen sulfide exposure in Dakota City, Nebraska.

The health studies activity continues to be a program that provides services to communities and expands the knowledge base for public health decisions and program development. Following are summaries of two health studies ATSDR completed in fiscal year 2000.

Glenola, North Carolina

A manufacturing facility in Glenola, North Carolina, released diisocyanates and other substances during the production of polyurethane foam. The plant was closed by state order in 1997. ATSDR undertook an investigation to identify children with asthma who lived near the facility during the period of highest emissions of diisocyanates. Parents of children who lived in the area were interviewed by telephone, and the parents confirmed potential exposure for 204 children; 118 of the children had respiratory symptoms and were offered a clinical evaluation by specialists in childhood asthma. A diagnosis of asthma was made for 28 of the 55 children in the study who were evaluated; asthma was considered possible for another 10 children. The two specialists provided recommendations for medical care as appropriate. The information collected was most consistent with a high prevalence of asthma among the community's children. Two children had antibodies to diisocyanates, adding to the evidence for human exposure in the community.

The children with asthma received early diagnosis and referral, along with appropriate recommendations for medical care and followup.



Testing lung capacity

Findings were shared with the community and the state health department. ATSDR is also providing information to local health care providers on current guidelines for diagnosis and management of childhood asthma.

Kidney Biomarker Study

In 1993 and 1994, ATSDR included a panel of kidney biomarkers in three studies of communities living near military bases that had been included on the NPL. These test results served as the baseline values for the follow-up study of 526 participants. For most of the children and adolescents who participated, measured elevations in the kidney biomarkers had reverted to normal at followup. For persons over age 20, about 50% of the elevations in these biomarkers reverted to normal at followup.

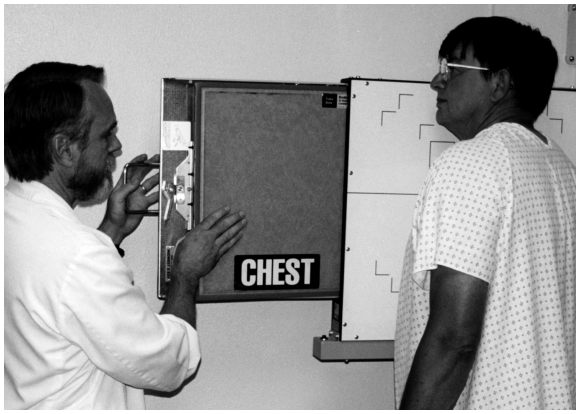
The presence or absence of elevated biomarkers at baseline among generally healthy participants was not associated with the development of early indicators of kidney disease at followup. However, participants who had selected health conditions at baseline (diabetes—and to a lesser extent—heart disease, hypertension, gout, and urinary tract disease) and elevated biomarkers were more likely to show early indicators of

kidney disease (elevated serum creatinine, elevated serum cystatin C, and decreased creatinine clearance) at followup. This longitudinal study confirmed the utility of four urinary kidney biomarker tests as markers of preclinical organ dysfunction among adults with certain pre-existing medical conditions.

Medical Testing Program for People Exposed to Asbestos-Contaminated Vermiculite, Libby, Montana

During fiscal year 2000, ATSDR initiated a program to screen for asbestos-related illness among residents of Libby, Montana, who may have been exposed to asbestos contained in a mineral mined in Libby for many years. Vermiculite, a natural mineral used to make insulation materials and garden soil additives, was mined in Libby, Montana, from the 1920s until 1990. The vermiculite ore mined at Libby has been shown to be contaminated with asbestos. The vermiculite ore was surface mined, milled, heated to expand its volume, and shipped throughout the nation, and used as play and fill material locally. Many people were potentially exposed to the asbestos in the vermiculite.

In response to public health concerns about cases of asbestos-related illnesses in Libby, ATSDR instituted a medical screening program for the residents and former residents of the town. Those who participated in the screening included former miners, household members who may have been exposed to dust on the clothing of mine workers, people who played in the vermiculite during childhood, and former Libby residents exposed to the airborne emissions of dust from vermiculite processing. EPA, the Montana Department of Health and Human Services, the Lincoln County Environmental Health Department, and the Montana Department of Environmental Health assisted ATSDR with the screening program.

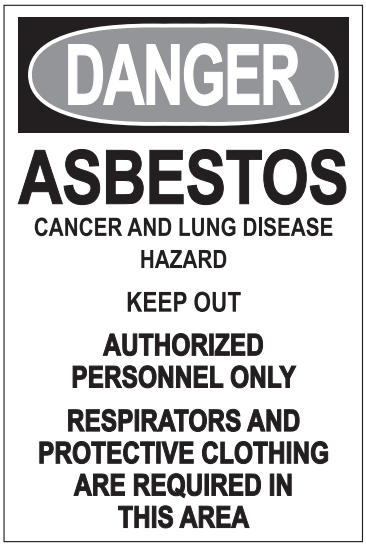


Chest x-ray

ATSDR used multiple communication strategies and methods to reach the general public in Libby. These included mailing flyers, putting up posters, handing out reminder cards, sponsoring open houses and public availability sessions, making presentations at Community Advisory Group meetings, and setting up displays at local health fairs and events, such as the July 4 celebration. ATSDR staff members also conducted face-to-face outreach in the community, gave interviews on local radio stations, and ran announcements on the local cable television station.

Community participation in the medical testing program was very high. More than 6,000 Libby residents—twice as many as ATSDR had projected—participated in the testing program. Testing began in early July 2000 and consisted of spirometry, chest x-rays, and an exposure and health questionnaire. More than 90% of the scheduled interviews were kept. Testing at the clinic was conducted through November 2000. About 5% of those tested were immediately referred for a follow-up examination because of health conditions found as a result of the chest x-ray or spirometry test. ATSDR has worked with the DHHS Region 8 Office to facilitate

needed medical services in the community. The Health Resources and Services Administration (HRSA) provided a grant for a nurse to work with residents and designated the community as being medically underserved. The National Cancer Institute is sharing information with the community on clinical trials and current therapies that are available to treat asbestos-related illnesses.



Participants have been notified of their test results. An interim report is being prepared that will assist the community in applying for grants for support of clinical services for people in need. Once completed, the information will also be used to assist in planning future testing, assisting EPA to identify ways in which people may become exposed, and assisting clinical research about the illnesses for the benefit of people with asbestos-related illnesses and their physicians.

ATSDR is also assisting EPA in evaluating the public health impact of the many sites where vermiculite was shipped for processing across the country. Vermiculite from Libby was transported to plants in 30 states. Altogether, there are about 300 potential sites where some vermiculite operations were located. ATSDR is helping to prioritize sites on the basis of potential public health impact.

What illnesses are associated with asbestos exposure?

Asbestosis

Asbestosis is a serious, progressive, long-term disease of the lungs. It is not cancer. It is caused by inhaling asbestos fibers that irritate lung tissues and cause the tissues to scar. The scarring makes it hard for lungs to do their job getting oxygen into the blood. Symptoms of asbestosis include shortness of breath and a dry crackling sound in the lungs while inhaling. The chance of getting asbestosis is very small for those who do not work with asbestos. There is no effective treatment for asbestosis; however, symptoms of the disease can be managed under the care of a physician. The disease, if severe, can cause disability and death.

Lung Cancer

Lung cancer causes the largest number of deaths related to asbestos exposure. People who work in occupations involving the mining, milling, manufacturing, and use of asbestos and its products are more likely to get lung cancer than the general population. The most common symptoms of lung cancer are coughing and a change in breathing. Other symptoms include shortness of breath, persistent chest pain, hoarseness, and anemia. People who develop these symptoms do not necessarily have lung cancer, but should consult a physician for advice. People who have been exposed to asbestos and are also exposed to some other cancer-causing product, such as cigarette smoke, have a greater risk of developing lung cancer than people who have been exposed only to asbestos.

Mesothelioma

Mesothelioma is a relatively rare form of cancer that is found in the thin lining (membrane) of the lungs, chest, abdomen, and heart. Several hundred cases are diagnosed each year in the United States, and most cases are linked with exposure to asbestos. About 2% of all miners and textile workers who work with asbestos, and 10% of all workers who were involved in

the manufacture of asbestos-containing gas masks, develop mesothelioma. This disease may not show up until many years (generally 20–40+) after asbestos exposure.

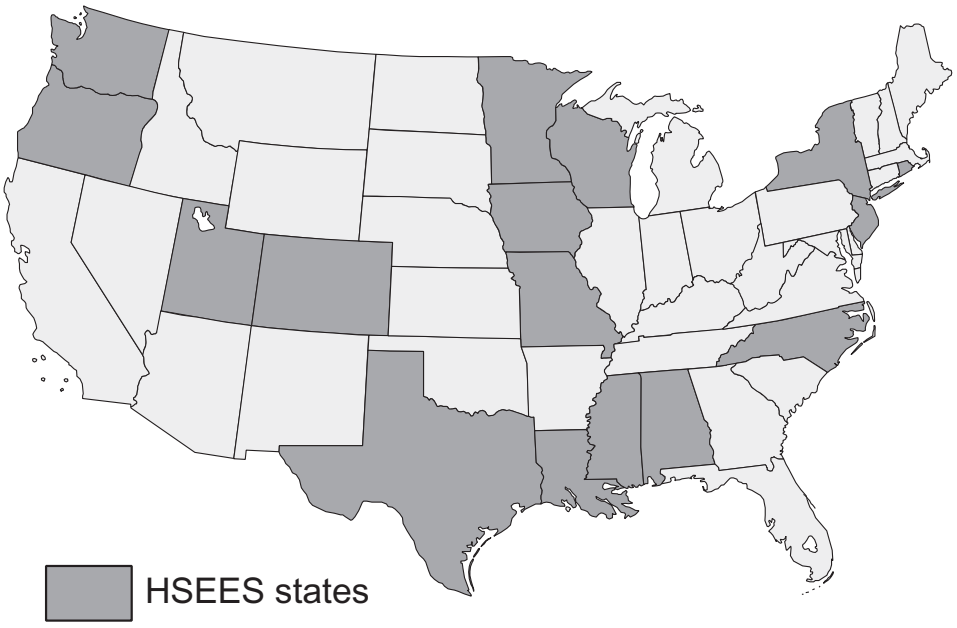
Hazardous Substances Emergency Events Surveillance: Analysis of 5 Years of Data

Since 1990, ATSDR has maintained an active, state-based Hazardous Substances Emergency Events Surveillance (HSEES) system to describe the public health consequences associated with the release of hazardous substances. The HSEES program collects data on the public health impact of hazardous substance releases and promotes the prevention of these impacts in 16 participating states (see Figure 1). In fiscal year 2000, an analysis was conducted looking at 5 years of data from HSEES.

There were 24,359 events reported to the HSEES during 1993–1997. Fixed-facility events represented 80% of all events, and transportation-related events represented 20%. The number of events reported increased every year, partially due to improved reporting. The largest percentage of fixed-facility industry-related events involved releases from aboveground storage areas and from a vessel used for processing, piping, material loading and unloading sites. The most frequent causal factors were equipment failure and operator error.

The frequency of both transportation-related and fixed-facility events was highest from April through August, with a peak occurring in May, coinciding with the high demand for agricultural chemicals. Both fixed-facility and transportation-related events occurred more frequently on week days than on weekends. The majority of fixed-facility events and transportation events occurred between the hours of 6 AM and 6 PM, peaking at 10 AM.

Figure 1. States participating in HSEES in FY 2000



Eighty-one percent of transportation-related events occur during ground transport, 13% during rail transport, and 6%, combined, for other types of transport. Analysis showed that although the railroad events are not as common as other types of events, they have a greater potential for harm because large volumes of chemicals are carried by rail through residential areas at times of the day when people are more likely to be at home. Eleven percent (n=2,676) of events had an official evacuation ordered ranging from 1 to more than 10,000 persons evacuated. Fifty percent of the evacuations involved 20 or fewer persons, and only 2% involved 1,000 or more persons.

A total of 9,869 decontaminations were performed at HSEES events on 2,162 employees on scene (406 at a hospital), 5,637 first responders on scene (259 at a hospital), and 992 members of the general public (413 at a medical facility). There were 8,397 victims resulting from spills or releases at fixed facilities and 1,216 victims from spills or releases that occurred while hazardous substances were being transported. For both transportation and fixed-facility events, the population group most often injured was "employees and students" (55.9%), followed by "the general public" (35%) and "first responders" (9%).

First responders, however, are the group most often injured in methamphetamine production-related events as reported in *Morbidity and Mortality Weekly Report* (November 17, 2000). Of the first-responder group, professional firefighters, police, and volunteer firefighters were the most frequent victims of spills or releases that occurred at fixed facilities, and police officers were the most frequent victims of such events that occurred while hazardous materials were being transported.

Acids, ammonia, chlorine, and pesticides are more frequently represented among events involving victims than among total events, indicating a greater potential for harm. These chemicals have been specifically targeted for prevention activities. Respiratory irritation, eye irritation, gastrointestinal irritation, vomiting, headache, dizziness and other central nervous system effects, skin irritation, physical injury, and chemical burns were the most commonly reported effects. A total of 110 deaths were reported. Motor vehicle collisions were likely responsible for 47 of the 110 deaths. Events where explosions were reported were responsible for 25% (n=16) of the 63 remaining deaths. Almost 21% of the 63 deaths were in a farming-related industry.

States have used their data from the HSEES program to prevent spills and to prevent injuries to first responders or users of chemicals that frequently cause injury. Several instructors have updated training courses on the basis of a recent article published in the *Morbidity and Mortality Weekly Report*. The article reported data on injuries that first responders have suffered from illicit methamphetamine drug labs.

Childhood Cancer Registry Workshop

ATSDR sponsored a 3-day expert panel workshop that discussed what data is needed to better identify any possible links between childhood cancer and children's exposure to hazardous substances in the environment. The workshop, "Workshop on Environmental Exposures Among Children with Cancer: Current Technologies, Methodological Challenges, and Community Concerns," was held January 25–27, 2000. It was convened to identify and prioritize feasible strategies for obtaining data

"Despite numerous limitations, ATSDR has played an important role in rebuilding state-level public health capacity, implementing a national exposure registry, and supporting numerous site-specific tracking projects that track populations exposed to hazardous substances."

—America's Environmental Health Gap: Why the Country Needs a Nationwide Tracking Network, The Pew Environmental Health Commission, 2000

to measure or estimate environmental exposures among children with cancer. Having such data would facilitate research into the possible links of exposure and pediatric cancer. Many experts attended the workshop, including representatives of the National Institutes of Health and the National Cancer Institute, which was developing a childhood cancer registry, the Child Cancer Network.

Examples of the panel's recommendations to the National Cancer Institute included the following.

- Collect data for at least two points of residential history: (1) residence at time of diagnosis and (2) residence at birth, so that potential prenatal exposures and later exposures can be explored.
- Ensure that appropriate diagnostic groupings of cases are used in cancer causation research activities (for example, data collection and data analysis) to reflect current knowledge of the multi-faceted distinctiveness of cancer as a diagnostic category.
- Provide improved, published assessments of existing exposure databases that facilitate more efficient determinations of their applicability and validity.

Soil Pica Workshop

ATSDR invited 10 expert panelists to a workshop to assess the current state of science on soil pica behavior—an issue that is relevant to the agency's ongoing work at many sites where people may be exposed to contaminated soils. The 2-day workshop focused on addressing three key issues: the prevalence of soil pica behavior, soil ingestion rates for people who exhibit this behavior, and means for identifying people with this behavior. Common themes discussed throughout the workshop included the need for clear definitions of key terms, the lack of extensive research on the distribution of soil ingestion rates, and the need for additional research to fill data gaps.

The panelists defined soil pica as the recurrent ingestion of unusually high amounts of soil (that is, on the order of 1,000–5,000 milligrams per day). Groups at risk of soil pica include children aged 6 years and younger and developmentally delayed individuals. The panelists agreed that soil pica clearly exists, but the prevalence at a given soil ingestion rate has not been adequately characterized. Nonetheless, noting that soil ingestion is normal behavior among children, the panelists unanimously agreed that ATSDR should continue to evaluate the public health implications of all types of soil ingestion, including soil pica.

ATSDR's Primary Partners in Health Education

Cooperative Agreements with National Organizations

American Academy of Pediatrics

American Association of Occupational Nurses

American College of Medical Toxicologists

American College of Preventive Medicine

Association of Occupational and Environmental Clinics

Association of State and Territorial Health Officials

Migrant Clinicians Network

National Alliance for Hispanic Health

National Association of County and City Health Officials

National Environmental Health Association

Pediatric Environmental Health Specialty Units

Boston Children's Hospital

Cook County Hospital, Chicago

Emory University

Environmental Protection Agency

George Washington University Medical Center

Harborview Medical Center, Seattle

Mt. Sinai-Irving J. Selikoff Center for Occupational and Environmental Medicine

University of California-Irvine

University of California-San Francisco

University of Texas Health Center

Health Education and Promotion in Tribal Communities

College of Menominee Nation

Dine College

Eight Northern Indian Pueblo Council Inc.

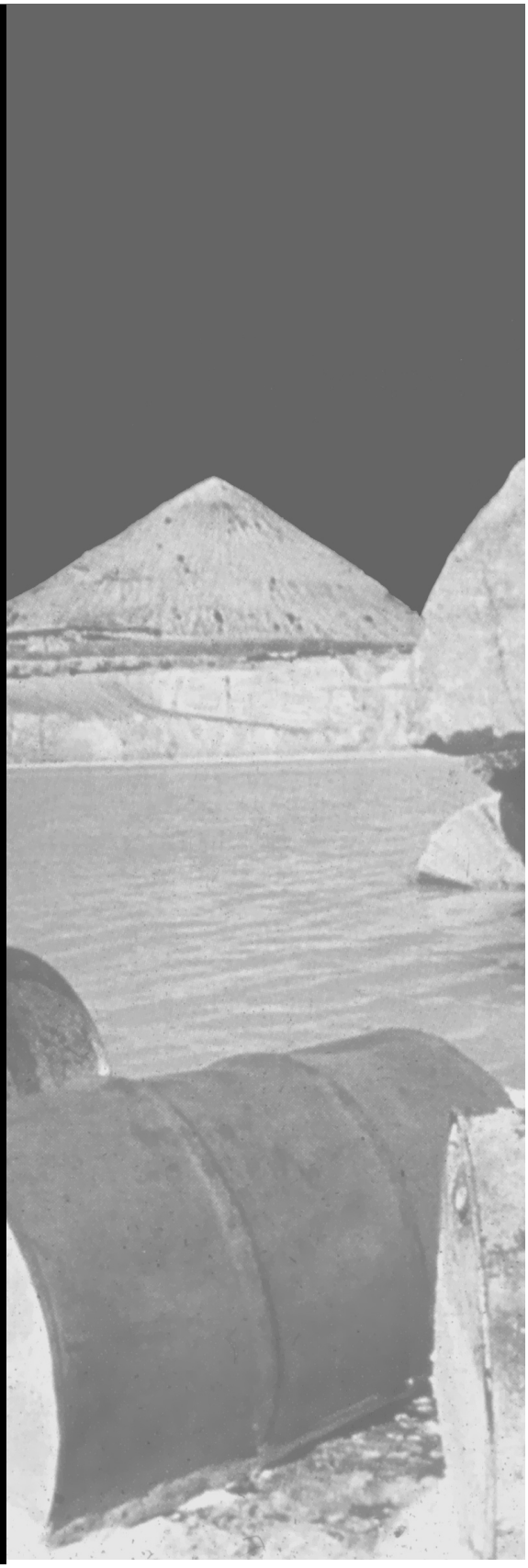
Ely Shoshone Tribe

Indian Health Council, Inc.

Northwest Indian College

St. Regis Mohawk Tribe

Turtle Mountain Community College



Preventing Health Effects Related to Hazardous Substances

ATSDR achieves its goal of preventing or reducing the harmful health effects of exposure to hazardous substances by drawing on its resources in health education, risk communication, environmental medicine, and health promotion to assist communities. The types of services provided include training local physicians about the health concerns associated with contaminants to which their patients may be exposed, providing communities with information and education about the health effects of hazardous substances and providing clinical evaluations and screenings such as testing for lead exposure. ATSDR also conducts health education and promotion activities that have a nationwide focus, such as its case study program for environmental health.

These activities are conducted with the assistance of numerous partners with whom the agency has cooperative agreements—states, American Indian tribal nations or groups, and national organizations. In fiscal year 2000 ATSDR was in the first year of a new 5-year agreement with 10 national organizations (up from 5 under the previous agreement). ATSDR also expanded its network of pediatric environmental health specialty units in fiscal year 2000 (eight are now in operation). In fiscal year 2000, ATSDR, in cooperation with its partners, performed health education and promotion activities at approximately 300 sites.

Pediatric Environmental Health Specialty Units Program

The Pediatric Environmental Health Specialty Unit (PEHSU) Program was designed to promote children's health by encouraging medical specialists with environmental expertise to work collaboratively with pediatricians to develop pediatric environmental medical expertise and to improve the ability of parents and locally practicing health-care providers to access this expertise. Starting in 1998, three pilot units were established in Seattle, Boston, and New York City. These units focused on conducting activities in the areas of medical education and training, telephone clinical consultation and outreach, and clinical evaluation of children who may have been exposed to hazardous substances in the environment.

From this modest beginning, in fiscal year 2000 the PEHSU Program has grown to include

- a national network of eight operating units, including a University of California unit operating in Irvine and San Francisco (see Figure 1.)
- the addition of EPA as a partner in six of the units
- an increasing international interest in establishing similar units
- the continuing and increasing interest and demand for these services from governmental agencies at all levels and from the public
- opportunities to collaborate with additional partners, such as NIEHS/EPA/CDC Centers for Children's Environmental Health and Disease Prevention Research

Figure 1. Location of FY2000 Pediatric Environmental Health Specialty Units

- an impact on the field of pediatric environmental health as a potential medical subspecialty
- the development of a body of published articles, curricula, and educational materials.

The number of PEHSU activities has increased since the units were established. In fiscal year 1998, 123 children were evaluated in PEHSU clinics; by fiscal year 2000, 929 children were evaluated. In fiscal year 1998, the units received a total of 14,534 consultation calls from health-care providers and the public; by fiscal year 2000, the number had grown to 30,643. The number of health professionals reached with education or training was 672 in fiscal year 1998. In fiscal year 2000, the number of health professionals reached was more than 8,580.

The Cook County PEHSU took an active role in ATSDR's response to potentially widespread mercury contamination in Chicago area homes, mentioned previously in Chapter One. On July 20, 2000, a suburban Chicago homeowner discovered elemental mercury in his basement after the removal of an indoor natural gas meter that was equipped with a mercury pressure regulator. The homeowner contacted the local gas company, the EPA, and the Illinois Poison Center for health and clean-up information. The Poison Center referred the family to the Cook County PEHSU. The family, which included an 8-week-old infant, was evaluated. Shortly after that two other families were evaluated: a second family with two small children and a third family with a preteen son. These families had potential exposures and health concerns similar to those of the first family.

The director of the Cook County PEHSU met with city officials and helped develop a plan to address the community health concerns. A local health center was used to coordinate the collection of medical and exposure histories and urine specimens. The PEHSU developed a screening tool to assist local hospitals and clinics in determining individual mercury exposure and the appropriate medical followup.

By September 2000, it was recognized that more than 500,000 homes scattered over northeastern Illinois were potentially affected. Throughout this time, the PEHSU worked closely with the Illinois Department of Public Health, ATSDR, and EPA. Because of already existing working relationships, the PEHSU and these agencies were able to share information

and coordinate efforts to effectively address public health concerns. The PEHSU director participated in seven televison interviews, a radio interview, and two newspaper reports. The Illinois Department of Public Health established a telephone hotline to refer health-related questions to the PEHSU.

Health Education Activities for Communities

ATSDR's health education activities are designed to assist communities in understanding, preventing, or mitigating adverse health effects associated with exposure to hazardous substances. These activities include providing information and training to health-care providers and providing information to enable people in communities to prevent or reduce their exposure to hazardous substances.

For example, ATSDR coordinated a one-day training program in fiscal year 2000 for employees of the Memphis (Tennessee) Shelby County Health Department (MSCHD). The program included information on ATSDR's public health assessment and review of cancer incidence. Approximately 15 health department staff members participated in the training. The purpose of the training was to build capacity within the MSCHD to respond to environmental health concerns related to the Memphis Defense Depot.

ATSDR is also working with a community located next to an old sanitary landfill in Juncos, Puerto Rico. ATSDR has been active in assessing the needs of the residents and providing health education for the community. During fiscal year 2000, ATSDR health educators participated in two public availability sessions, talked to the residents about ATSDR's role, explained the public health assessment process, and explained the process of an exposure investigation.

Exam at a Pediatric Environmental Health Specialty Unit

Culturally sensitive health education materials were developed to better inform the community on the status of the health evaluation process. These materials included a site-specific fact sheet, *Juncos Landfill, Juncos, Puerto Rico*, in English and Spanish and a flier that explained the purpose of ATSDR's visit to the community as part of the process of conducting an exposure investigation. ATSDR translated various materials for the community into Spanish, including consent forms, fact sheets, and letters explaining the purpose of ATSDR's visit in November 1999 to conduct an exposure investigation.

Educating Health Professionals Nationwide

ATSDR works through a variety of mechanisms to provide health education and information to health professionals nationally. Activities may include Grand Rounds presentations, off-site seminars and workshops, newsletters, fact

sheets, satellite broadcasts, and Web-based training. ATSDR often enters into partnerships with other organizations in these efforts, including national organizations, local universities, and professional societies. Currently, ATSDR health education activities have been focused on implementing a national strategy to provide environmental health training for nurses and other frontline health care providers, and expanding partnerships in environmental health expertise.

Distance Learning Program

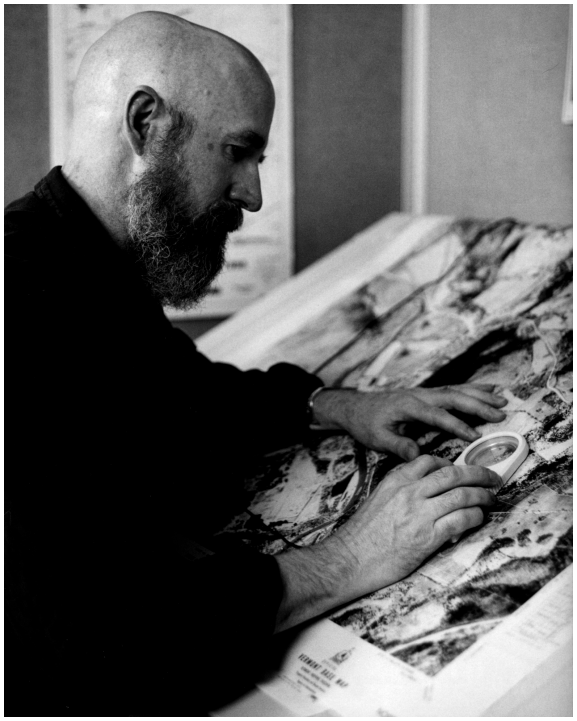
ATSDR, working with CDC's Public Health Practice Program Office, developed two Public Health Training Network courses in fiscal year 2000—*GIS in Public Health: Using Mapping and Spatial Analysis Technologies for Health Protection* and *Environmental Health: A Nursing Opportunity.* Nearly 2,000 public health professionals viewed each course.

Environmental Health: A Nursing Opportunity, a 2½-hour program, was broadcast live on August 10, 2000. The program focused on environmental health and the integration of environmental health into nursing and other health care professional practice. The program provided specific tools (for example, the *Taking an Exposure History* case study in an environmental medicine template) and demonstrated how to implement the tools in actual practice. Nurses, nurse practitioners, physicians, educators, and other health professionals assisted in program presentation.

The live program was broadcast in 48 states in the United States, with a total of 561 registered downlink sites. There were also sites registered in Canada. The highest number of sites registered in a single state was 48 (Florida). Twenty-one states had 10 or more registered downlink sites. A total of 2,163 participants registered to view the live program. California had the most

registrants (248); other states where participation was particularly high included Wisconsin (224) and Florida (170). Continuing education credits (CMEs, CNEs, and CEUs) were awarded to participants who completed the course evaluation and examination. To date, approximately 200 requests have been received for videotapes of the program.

The GIS program, *GIS in Public Health: Using Mapping and Spatial Analysis Technologies for Health Protection,* provided an introduction to the application of GIS technology and the use of health data in the decision-making and resource allocation process. It focused on the opportunities that GIS offers that are useful in public health, such as mapping the locations where cases of a specific disease have been found or in evaluating the adequacy of existing health resources. It was intended to familiarize health professionals with the ways that GIS can be used in public health. The 1,945 registered participants included environmental health professionals, health resource planners, health assessors, and health care providers.



Developing GIS data

Health Promotion Activities at Sites

Health promotion supports three key goals: prevention (proactive actions to prevent the adverse effects of hazardous substances), intervention (actions to diminish or eliminate adverse consequences of exposure to hazardous substances), and capacity building (actions to strengthen existing public health infrastructures to enhance environmental health services for affected communities). Following are two examples of sites where ATSDR conducted health promotion activities in fiscal year 2000.

Health Promotion Activities in Libby, Montana

One of the sites at which ATSDR conducted health promotion activities in fiscal year 2000 was in Libby, Montana. ATSDR, in cooperation with the Association of Occupational and Environmental Clinics through the National Jewish Medical and Research Center in Denver, Colorado, developed a training program for health care providers in Libby and Kalispell, Montana. The training was held on September 18 and 19, 2000. It was developed with the assistance of pulmonologists from the center and a Spokane physician.

Grand rounds were held at the hospital in Kalispell on September 18; 48 physicians, nurses, and physician assistants attended. The objectives of the presentation were to review the epidemiology and pathogenesis of nonmalignant lung disease from exposure to tremolite asbestos, and to discuss the clinical manifestations and diagnosis of nonmalignant asbestos-related lung diseases.

Evening training sessions were held in Libby on September 18 and in Kalispell on September 19. The session in Libby was attended by 14 physicians, nurses, and physician assistants; the Kalispell session was attended by 26 participants. The objectives of the evening presentations were to review the purpose of screening evaluations for asbestos-related lung diseases and discuss appropriate diagnostic followup of screening abnormalities, to identify practical approaches to medical management, and to generate a dialogue about education and risk communication strategies for patients with asbestos-related diseases. The presentations included didactic and interactive case-based discussions.

ATSDR has also been active in trying to assist the community in improving its access to needed medical care.

Health Promotion Activities in Ottawa County, Oklahoma

ATSDR worked with Ottawa County public health officials to create a Lead Poisoning Prevention Program to address concerns of residents living near the Tar Creek Superfund

In FY 2000, about 30 graduate and undergraduate students were being trained in environmental health and toxicology research at universities participating in ATSDR's Environmental Health and Toxicology Research Program with the Minority Health Professions Foundation.

site. The site is inside Oklahoma's portion of the Pitcher Field mining region, an area that has had extensive lead and zinc mining. Tar Creek has been on the National Priorities List since September 1983. Children who live or play near mine tailings piles may ingest or inhale lead-contaminated dust. These piles have also been used by riders of off-road vehicles, and houses have been built on the tailings.

The prevention program has three goals. The first goal is to develop community-relevant health education and outreach strategies that will update and inform Ottawa County residents regarding the lead poisoning problem in the Tar Creek Superfund site and surrounding areas. The second goal is to continually monitor blood lead levels in Ottawa County children through the creation of a multipurpose database that facilitates tracking, information sharing, and the measurement of community impact. The third goal is to determine the incidence of Ottawa County children with learning disabilities from visual and/or cognitive deficits that represent barriers to education.

The program used a mobile education and blood-testing unit that visited Head Start centers and kindergartens in Ottawa County's seven school districts during the 1999–2000 school year. The program screened 127 children enrolled in Head Start and 122 kindergarten children. In addition, 600 blood level screenings of children and pregnant women were performed through the county's Women, Infants, and Children (WIC) clinics. A database was created to track blood lead levels and interventions and to provide information to EPA for pathway analysis and, when necessary, cleanup. Additionally, parents of children identified with elevated blood lead levels received referrals and educational materials. Fifty children had blood lead levels that were above the level of health concern, 10 micrograms per deciliter; these children are being rechecked every 3 months.

Tar Creek

ATSDR's Health Education and Promotion Partnerships with National Organizations

ATSDR has worked with a variety of national organizations since 1989, and conducts many public health education and promotion activities through collaborative projects and partnerships with national organizations of health professionals. These activities build capacity by increasing knowledge of environmental medicine and public health issues for members of the participating organizations and by helping members address the public health concerns of the people and communities they serve. In fiscal year 2000, ATSDR reached more than 80,000 health professionals through its funding of the following 10 national organizations.

- American Academy of Pediatrics (AAP)
- American Association of Occupational Health Nurses (AAOHN)
- American College of Medical Toxicologists (ACMT)
- American College of Preventive Medicine (ACPM)
- Association of Occupational and Environmental Clinics (AOEC)
- Association of State and Territorial Health Officials (ASTHO)
- Migrant Clinicians Network (MCN)
- National Alliance for Hispanic Health
- National Association of County and City Health Officials (NACCHO)
- National Environmental Health Association (NEHA).

For example, ATSDR's collaboration with the Migrant Clinicians Network (MCN) has led to the completion of an extensive mapping project of more than 1,500 members—including nurses, physicians, health educators, outreach workers, and directors of migrant health clinics—to identify and prioritize environmental health issues and health education needs on a regional basis. This needs assessment and mapping effort will enable MCN to effectively target its environmental health educational messages and activities.

ATSDR's work with the National Association of County and City Health Officials (NACCHO) resulted in training for 30 local health officials and community members in June 2000. This training will enable local health departments to be more effective partners with state and federal agencies and more effective advocates for community health concerns. In fiscal year 2000, NACCHO published *Community Revitalization and Public Health*. This document is considered to be a landmark in defining public health issues, roles, and relationships in the Brownfields redevelopment process, and more than 1,250 copies have been distributed to local and state health departments and federal agencies.

ATSDR has also developed health education and promotion partnerships with Tribal Nations. American Indian and Alaskan Native populations exposed to hazardous substances from waste sites, accidental spills, and other sources of environmental pollution are sometimes at greater risk than the general population for adverse health effects. As a federal agency, ATSDR works directly with American Indian and Alaskan Native populations to prevent dangerous environmental exposures that can result in negative health outcomes or diminished quality of life.

In 1999, ATSDR initiated a cooperative agreement program with four tribal colleges and universities to build programs for environmental public health. Under this agreement, ATSDR

provides technical assistance in environmental health science and toxicology. The four participants in the program are the College of Menominee Nation, Dine College, Northwest Indian College, and Turtle Mountain Community College. The program is designed to help tribal colleges and universities develop environmental health curricula. For example, through the program Dine College plans to offer an associate of science in public health degree program to increase the number of Navajo health professionals. The program will have an environmental public health track.

Risk Communication and Research Activities

Health risk communication is an emerging area of emphasis and importance at ATSDR and in parts of the broader public health community. Over the past decade, health risk communication has played an integral part in ATSDR's comprehensive efforts to prevent or mitigate adverse human health outcomes related to hazardous substance exposure. Effective risk communication involves more than merely explaining a health or environmental risk to the public. ATSDR has been working with its health-care partners to develop effective and relevant health communication strategies and messages. Messages are tailored for targeted audience needs (for example, cultural-, age- or sex-specific).

Communications Training Activities

An interactive health risk communications training course was held in Pachuca, Mexico, the capital of the state of Hidalgo, from May 31, 2000, to June 2, 2000. The course objectives included enabling participants to (1) identify the elements that affect health risk perception; (2) describe the stages in health risk communication planning, implementation, and evaluation; and (3) write a plan for a specific target audience. Techniques such as role playing, creation of materials, and values clarification were used. Workshop evaluations revealed that participants thought the program content was useful for their work, the materials were effective, and their expectations were met.

Approximately 2,000 people who live in the communities nearby benefitted from the workshop. Because the participants work with communities in other parts of Mexico, the potential benefit of the workshop was even greater. Benefits included improved interagency coordination and improved ability to deal with environmental health problems. The workshop also opened a door to future collaboration between ATSDR and the state of Hidalgo.

Communication Strategies and Message Development for Targeted Audiences

The purpose of this project was to (1) develop environmental education relationships with schools that are near toxic waste sites; (2) educate and empower children and teachers within the Kids for Saving Earth (KSE) network to better understand the earth's environmental problems and to provide them with action-oriented, noncontroversial, and engaging educational materials and activities; and (3) inform children about the role of government agencies in environmental programs. In fiscal year 2000, KSE designed a poster and worksheets to teach youngsters about how to deal with the consequences of toxic waste sites. Children's artwork was included in the designs. KSE sent packets of environmental information to 4,000 schools nationwide, encouraging students to become members of the organization and to use the KSE Web site.

KSE and ATSDR are currently working together to expand last year's outreach program to educators and children. KSE will adapt the

educational materials so that they are culturally relevant for a Spanish-speaking audience by translating them and inserting appropriate artwork. The materials will be pretested with members of the target audience. Each culturally appropriate set of materials will be mailed to 7,000 schools. Web-site materials will also be created and placed on KSE's Web page, on the Web page of ATSDR's Office of Children's Health, and on CDC's new children's and Spanish language Web pages.

Appendix A:

Sites at Which ATSDR Conducted Activities in FY 2000

The following list shows the sites at which ATSDR conducted public health activities in FY 2000, specifically public health assessments, health consultations, health education and promotion, health studies, and emergency response activities. Consultations that are not site specific are not listed. The listing uses these abbreviations:

HA = public health assessment
HC = health consultation
HE = health education
HS = health study
EI = exposure investigation
ER = emergency response

Alabama

Alabama Methyl Parathion Sites _____ HE
Alabama Plating Company _____ HE
American Brass Inc. _____ HA, HE
Anniston Army Depot _____ HE
Anniston PCB Site (Monsanto Co.) _____ EI, HA, HC, HE
Capitol City Plume _____ HE
Ciba Geigy _____ HE
Hartzog Farm _____ HC
Marshall Space Flight Center _____ HE
Olin Chemical-McIntosh _____ HE
Perdido Groundwater _____ HE
Redwing Carrier _____ HE
Stauffer Chemicals _____ HE
T.H. Agriculture & Nutrition _____ HE
Triana/Tennessee River _____ HE
Redstone Arsenal _____ HE
Wadsworth Brookview _____ HE

Alaska

Alaska Pulp Corp. _____ HA, HE
Arctic Surplus _____ HE
Cape Thompson/Pt. Hope _____ HE
Dutch Harbor _____ HE
Ketchikan Pulp _____ HE
Kodiak _____ HE
Standard Steel and Metals _____ HE
U.S. DOT FAA Umiat Airstrip Staging ___ HE

Arizona

ASARCO Mining _____ HA
Brush Wellman Inc. _____ HC
Franklin Elementary School _____ HA, HE
Klondyke Tailings _____ HA, HE
Litchfield Airport Area _____ HA
Lynx Creek _____ HE
Mountain Pressure Treating _____ HE
Nineteenth Avenue Landfill _____ HC, HE

Phoenix Goodyear Airport _____ HE
Tucson InternationalAirport Area _ HA, HC, HE
Tucson laboratory accident _____ ER
Union Hills Area _____ HC
Vulture Mill Site _____ HA

Arkansas

Ashgrove Cement _____ HE
Great Lakes Chemical Corp. _____ HA
Gurley Pit _____ HE
Helena Chemical Company _____ HC, HE
Koppers Industries _____ HE
Magcobar Mines _____ HE
Mercury Issue—Saline River Basin _____ HE
Methyl Parathion—W. Jacksonville _____ HE
Mountain Pine Pressure Treatment Plt. ___ HE
Red River Aluminum _____ HE
Rixie Iron & Metal _____ HE
Robbins/Sykes _____ HE
South 8th St., W. Memphis _____ HE
Sykes Flooring Products _____ HC
Texarkana Air Quality _____ HC
Texarkana (Pleasant Hills Community) ___ HE
Vertac _____ HE

California

Abex/Remco _____ HE
Alameda Naval Air Station _____ HE
Bernal Property _____ HC
Burbank elementary school _____ HE
Chevron fire _____ ER
Chrome Crankshaft _____ HC, HA
Conoco Service Station
Soil Contamination _____ HC
Del Amo _____ HC, HE
Chrome Crankshaft/Suva School _____ HE
Florence Griffith Joyner School _____ HE
Fort Ord _____ HE
Frank Street Dump _____ HC (2)
J&S Chrome Plating _____ HA, HC
Koppers Co., Inc. (Oroville Plant) _____ HA
Lawrence Livermore Laboratory
(U.S. DOE) _____ HC, HE
Lockheed Propulsion Co. _____ HA
March Air Force Base _____ HA
Mather Air Force Base _____ HA
McFarland Study Area _____ HA
McMinn Avenue _____ HE
Mission Valley _____ EI
Molycorp Inc. _____ HC, HE
Montrose Chemical Corp. _____ HC
New River _____ HE
Pasadena TCE exposure incident _____ ER
Purity Oil Sales, Inc. _____ HC
Santa Susana Field Lab _____ HE
Shasta County mercury spill _____ ER
Sierra Army Depot _____ HE
Sunnyvale residential mercury spill _____ ER
Torrance, chemical reaction _____ ER

Colorado

ASARCO Globe Plant _____ HE
Air Force Plant PJKS _____ HA
Cripple Creek & Victor Gold Mining __ HC,HA
Denver, pesticide exposure incident _____ ER
Pueblo Chemical Depot _____ HE
Rocky Flats Plant (DOE) _____ HE
Vasquez Blvd. and I-70 _____ HE
Victor Mine _____ HE

Connecticut

Barkhamsted–New Hartford Landfill _____ HC
Bristol Radium Sites _____ HE
Coppola Metals _____ HC, HE
Mallory Hat Factory _____ HC
Millbrook Condos _____ HC, HE
New Haven School _____ ER
New Haven Radium Sites _____ HE
Old Southington Landfill _____ HC (2), HE
Raymark Industries, Inc. _____ HC, HE
Remington Park _____ HC
Scovil Industrial Landfill _____ HA, HE
Thomaston Radium Sites _____ HE
University of Connecticut
Landfill/waste pits _____ HC (2), HE
Upjohn Company
Fine Chemicals Division _____ HA, HE
Waterbury Clock Factory _____ HE
Yaworski Landfill _____ HA
Yaworski Waste Lagoon _____ HA

Delaware

Standard Chlorine _____ HE
District of Columbia Glover Bridge Site __ HC
HUD Building fire _____ ER
Transformer fire _____ ER
Washington Naval Shipyard _____ HE

Florida

5th & Cleveland Incinerator Site _____ HC
Alaric Incorporated _____ HA, HE
Anclote Florida Power Plant _____ HA
Brown's Dump _____ HA, HC, HE
Calloway & Son Drum Service _____ HA, HE
Doeboy Dump _____ HC
Gulf Coast Lead Co. _____ EI
Holiday Utilities _____ HC
J & J Signs _____ EI, HC
Landia Chemical Co. _____ HA, EI, HE
Material Exchange Corp. Landfill ____ HC, HE
Orlando residential mercury spill _____ ER
Orland Airport spill _____ ER
Precision Fabricating and Cleaning Co. ___ HC
Queens 41 Auto _____ HE
Sanford Gasification Plant _____ HA, HE
Solitron Devices Inc. _____ HA
Solitron Microwave _____ HE
Southern Solvents, Inc. Site _____ HA, HC, HE
Stauffer Chemical Co. (Tarpon Springs) __ HC
Tower Chemical Co. _____ HC
Trans Circuit Inc. _____ HA, HE
Tuttle Elementary School _____ HC
Tyndall Air Force Base _____ HA
Whiting Field Naval Air Station _____ HA

Georgia

Allied Universal Corp. _____ HE
Arivec Chemicals Inc. _____ HA
Athens Clarke County Landfill _____ HC
Atlanta Steel _____ HE
Brunswick _____ HE
Camilla Wood Preserving Company _____ HA
Coastal Plain Treating Co. _____ HC
Hydrofluoric acid spill _____ ER
Lawrenceville, train derailment _____ ER
Newtown Community _____ HA
Marine Corps Logistics Base _____ HA, HE
Mindis Corporation _____ HE

Montezuma Abandoned Landfill _____ HE

Newtown Community _____ HE

Oakwood Mobile Home Park _____ HE

Richmond County Health Intervention Project _____ HE

Savannah River Site _____ HE

Seminole Road Landfill _____ HC

Terry Creek Dredge Spoil Area/ Hercules Outfall _____ HC

T.H. Agriculture & Nutrition (Albany) ____ HA

Tri-State Steel Drum Co. Inc _____HA, HE

U.S. Army Corps of Engineers Airstrip ___ HA

Young Refining Corporation _____ HA

Woolfolk Chemical Works, Inc. _____HC, HE

Guam

Naval Air Station Agana _____ HE

Idaho

Blackbird Mine _____EI, HE

Bunker Hill Mining & Metallurgical _____ HC (3), HE

Coeur d'Alene River Basin _____ HC (3), HS

Eastern Michaud Flats Contamination _HC, HE

Idaho National Engineering Laboratory ___ HE

Illinois

A & F Material Reclaiming, Inc. _____ HC

Action Wrecking Inc. _____ HC

Amoco Chemicals (Joliet Landfill) _____ HC

Barrie Park Former Manufact. Gas Plant __ HC

Belleville/Metropolitan _____ HC

Bohn Heat _____ HA

Chicago clinic mercury spill _____ ER

Chicago Copper and Chemical Company __ HC

Chicago metro methyl parathion site __HC, HE

Chicago mercury spill _____ ER

Cross Brothers Pail Recycling (Pembroke) _____HC, HE

Depue/New Jersey Zinc/Mobil Chem. Corp. _____ HA

Edwards W.E. _____ HC

Evergreen Manor Contamination Plume __ HA

Flora fire _____ ER

Former Creosote Forest Products _____ HC

Gulf Mobile and Ohio Railyard _____EI, HE

Ilada Waste Company _____ HC

Illinois Beach Park _____ HA

Indian Refinery— Texaco Lawrenceville _____HA, HE

Joliet Army Ammunition Plant (Manufacturing Area) _____ HA

Joliet Army Ammunition Plant (Lap Area) _____ HA

Koppers Inc. Forest Products Group _____ HA

LaSalle Electric Utilities _____ HE

Lindsay Light _____ HC

Matthiessen & Hegler Zinc Co. _____ HE

Metro Disposal System Incorporated _____ HC

Mobil Oil Accidental Release _____ HE

New Jersey Zinc/Mobil Chemical _____ HE

Nicor mercury spill _____ ER

Nike Missile Site _____ HE

Nordic Acres Groundwater _____ HE

Oak Park Manufacturing _____ HE

Ottawa Radiation Areas _____ HE

Pagel's Pit _____ HC

Parsons Casket Hardware Company _____ HA

Peoria State Hospital _____ HC

Peru mercury spill _____ ER

Pfizer Inc. ____ HA
Riverdale Chemical ____ HC
Rust-oleum Corp., Evanston Facility ____ HC
Savanna Army Depot Activity ____ HA
Smith Douglas, Inc. ____ HE
Tesla High School Mercury spill ____ ER
Thomas Garage Service ____ HC
U.S. Army Fort Sheridan ____ HC
U.S. DOE Argonne National Lab (317) ____ HA
U.S. DOE Argonne National Lab (318) ____ HA
Yeoman Creek Landfill ____ HC

Indiana

Bloomington mercury spill ____ ER
Bowman School ____ EI
Conrail Rail Yard (Elkhart) ____ HC, HE
Frank Foundries Corporation ____ HC, HE
Gary school mercury spill ____ ER
Hoosier Wood Treating ____ HC
Keil Chemical ____ HE
Main Street Well Field ____ HC
Vickers Warehouse Site ____ HA

Iowa

3rd Avenue Mercury ____ EI
Bernstein Salvage Site ____ HC
Clinton Coal and Gas ____ HE
Coggon Creamery ____ HC
Cresco mercury spill ____ ER
Dubuque Municipal Landfill ____ HC
Electro-Coatings, Inc. ____ HA
Former Diller Battery ____ HC
Iowa Army Ammunition Plant ____ HA

Kansas

57th and North Broadway ____ HE
Container Recycling, Inc., Kansas City ____ HC
Chemical Commodities, Inc. ____ HA
Fort Riley ____ HA

Kentucky

Bellevue Park ____ HC
LLD Site ____ HC
National Electric Coil ____ HE
Paducah Gaseous Diffusion Plant ____ HE
Rubbertown Plant ____ HE

Louisiana

Agriculture Street Landfill ____ HC (3), HE
Calcasieu Estuary ____ HC, EI, HE
Central Wood Preserving Co. ____ HA, HE
Devil's Swamp Lake ____ HC
D.L. Mud, Inc. ____ HE
Eunice train derailment ____ ER
Grand Bois ____ HE
Highway 71/72 Refinery ____ HA, HE
Lincoln Creosote ____ HA
Maurin Wood Preserving ____ HC
Mossville ____ HE
New Orleans Methyl Parathion Sites ____ HE
Norco Community Industry Panel ____ HE
PAB Oil ____ HE
Renner Creosoting ____ HC
Ruston Foundry ____ HA, HE
Thompson Hayward ____ HE
Texaco Inc. Shreveport Works ____ HC
Union Creosoting (Union Post Co.) ____ HC

Maine

Portland, biohazard spill ER

Waldeborough School Mercury Spill ER

Maryland

68th Street Dump/Industrial Enterprises HA, HE

Andrews Air Force Base HC

Brandywine Defense Reutilization and Marketing Office HC

Central Chemical (Hagerstown) HA

Fort George G. Meade HA

Industrial Enterprises HA

Prince Georges County arsenic removal ER

Spectron, Inc. HE

Massachusetts

Allied Auto Body HE

Alphagary Corporation HC

Atlas Tack Corp. HA

Baird & McGuire HE

Borne strychnine incident ER

Boston Edison HE

Coastal Oil HE

Fort Devens HA, HE

GE — Housatonic River HA (4), HC (2), HE

Glen Street Neighborhood HA

Hatchery Road HA, HE

Jamesbury Corp. HC

Laidlaw (Plainville) Sanitary Landfill HE

Marshall Farms Inc. HC

Materials Technology Laboratory (U.S. Army) HC

MBTA Railyard HE

Merrimack Valley HE

Modern Electroplating HE

Morse Cutting Tools HA

New Bedford Harbor HE

Nuclear Metals HE

Nyanza Chemical Waste HE

Otis Air National Guard HC, HE

Paint Shop Pond HE

Rocco's Disposal (Sutton Brook) HE

Rock Avenue Landfill HA

Salem Power Plant HE

Seaver Street HE

Somerville/Tufts Admin. Bldg. HE

Teledyne Rodney Metals HE

Wells G and H, Woburn HE

Michigan

Bear Archery Disposal Property HC

City of Hillsdale Property HC

Closed Hamlin Road Landfill East HC

Closed Hamlin Road Landfill West HC

Florida Gas HC

Gratiot Avenue Trailer Park HC

Hartford School Athletic Field HC

Johnson Iron Industries HC (2)

Joy Road Dump/Holiday Park HC

Kalamazoo River HS

Kellogg Property HC

Lafarge Corporation, Alpena Plant HA

LFPR, Inc. HC

Melvindale Allen Road HC

Miller Middle School mercury spill ER

Nagel Residence Site HC

Par Don Manufacturing HC

Old Charcoal Iron Property ____ HC
Old Smokestack Property ____ HC
Portage Metal Finishing Co. ____ HC
SER Plating Company ____ HC
Velsicol Chemical Michigan ____ HE
Ward Bakery ____ HC
West Beitz Creek Fill Area ____ HA

Minnesota

2303 Kennedy Street ____ HC
Agate Lake Scrapyard ____ HC
Aitkin Municipal Wellfield ____ HC
American Linen (Ameripride) ____ HA
Ashland Refinery ____ HE
Baytown Township Ground Water Plume ____ HC, HE
Co-operative Plating ____ HE
Faribault Municipal Well Field ____ HE
FMC Corp. (Fridley Plant) ____ HE
Hawkins Chemical Co. ____ HE
Hidden Lakes Development ____ HC, HE
Interplastic Corp. ____ HC, HE
Kennedy Street Building ____ HE
Naval Industrial Reserve Ordinance Plant ____ HE
New Brighton/Arden Hills/TCAAP (U.S. Army) ____ HC
Nutting Truck & Caster Co. ____ HC
Pigs Eye Landfill ____ HC, HE
Rochester freon spill ____ ER
St. Louis River/ U.S. Steel ____ HE
St. Regis Paper ____ HE
Waite Park Wells ____ HC
Western Mineral Products ____ HE

Missouri

Amoco Oil Co. ____ HA, HC (3), HE
Big River Mine Tailings/St. Joe Mine ____ HE
Bonne Terre ____ HE
Cafo Farms ____ HE
Defiance Dump Sites ____ HC
Doe Run Lead Co. Tailings ____ HE
Elvins Mine Tailings ____ HE
Federal Mine Tailings ____ HE
Former Hulett Lagoon ____ HE
Hayden Creek Tailings ____ HE
Hubert Wheeler State School ____ HC
Leadwood Mine Tailings ____ HE
Madison County Mine Tailings ____ HE
Missouri Electric Works ____ HC (2), HE
National Mine Tailings ____ HE
Newton County Wells ____ EI, HC
Newton County Mine Tailings ____ HE
Pools Prairie ____ HA, HE
Quality Plating ____ HC
Quail Run Mobile Manor ____ HC
S & S Landfill ____ HC, HE
St. Louis mercury spill ____ ER

Mississippi

Jackson County Pesticide Sites ____ HE
Picayune Wood Treating Site ____ HC

Montana

Alberton Train Derailment ____ HE
Burlington Northern — Livingston ____ HE
Libby Asbestos Site ____ HC (2), HE
Lockwood Solvents Site ____ HC (2)
Milltown Reservoir Sediments ____ HC (2)

Mouat Industries _____ HE

Nebraska

Omaha Lead _____ HC

Dakota City/ S. Sioux Hydrogen Sulfide __ HE

Nevada

Nye County, hydrogen sulfide exposure ___ ER

Nevada Test Site _____ HE

New Hampshire

Cardinal Landfill _____ HA, HC, HE

Concord, landfill fire _____ ER

Gendron Junkyard _____ HE

Johns Manville/Nashua River _____ HE

J. P. Stevens Textile _____ HC (3)

Messer Street Manufactured Gas Plant _____ HA, HC, HE

Mohawk Tannery _____ HE

Savage Municipal Water Supply _____ HE

Surrette America Battery _____ HC (4), HE

New Jersey

Atlantic State Cast Iron Pipe _____ HA

Borough of Hawthorne _____ HE

Brick Township Investigation _____ HA, HE

Burlington Co. Res Recovery Complex ___ HC

Chemical Insectide Corp. _____ HE

Chemical Leaman Tank Lines _____ HE

Chemsol, Inc. _____ HC

Ciba-Geigy Corp. _____ HA, HE

Cinnaminson Ground Water Contamination _____ HA, HE

Combe Fill North Landfill _____ HC

Cornell Dubilier Electronics Inc. _____ HA,HC (2), HE

Dover Township Municipal Landfill _____ HE

Dover Township Public Water Supply _ HC, HE

Emmell's Septic Landfill _____ HA, HC, HE

Federal Creosote _____ HA, HE

Fort Dix (Landfill Site) _____ HA

Franklin Burn _____ HE

Glen Ridge Radium Site _____ HC (2)

Hawthorne Municipal Wells _____ HA

Horseshoe Road _____ HC, HE

Iceland Coin Laundry and Dry Cleaning _____ HA, HE

Lightman Drum Company _____ HA, HE

Martin Aaron, Inc. _____ HA, HE

McGuire Air Force Base #1 _____ HC

Mercury Trading Inc. _____ HC

Middlesex Sampling _____ HE

Monroe Township Groundwater Contamination Site _____ HC (2)

Reich Farms _____ HE

Rhodia Inc. _____ HE

Rhone-Poulenc Chemical Co. _____ HE

Route 561 Dump _____ HA, HE

United States Avenue Burn _____ HA, HE

Vineland Chemical _____ HE

New Mexico

Fort Wingate Depot Activity _____ HC

Fruit Avenue Plume _____ HA

Los Alamos wildfire _____ ER

Los Alamos Scientific Laboratory _____ HE

North Railroad Avenue Plume _____ HE

Soccorro tire fire _____ ER

New York

102nd Street Landfill _____ HE

3M/ Dynacolor/GE _____ HE

Abby Street Hickory Wood Subdivision HC, HE
Alco Aggregate HE
Anitec Image Corp HA
APCO/Woodstock Brownfield HE
Barker Chemical HC, HE
Brookfield Avenue Landfill HA
Circuitron Corp. HC
Fort Edwards, tank car ammonia spill ER
Fresh Kills Landfill HA
Fulton Avenue HA
Goldisc Recordings, Inc. HC
Griffiss Air Force Base HE
Hamburg Nike HE
Hickory Woods HE
Hillcrest Cancer Cluster, Broome County HE
Hiteman Leather HA, HE
Hooker (102nd Street) HC
Hooker—Ruco HE
Hudson River PCBs EI, HE
Huntington Town Landfill HA
Jones Chemical HE
Lehigh Valley Railroad HA
Little Valley HA
Love Canal HE
Mohonk Road Industrial Plant HE
NYC hospital ER
Old Ithaca Dump HE
Pelham Bay Landfill HA, HE
Peter Cooper Corporation (Markhams) HA
Peter Cooper Corporation (Gowanda) HA
Plattsburgh Air Force Base HA
Prima Asphalt HE
Sealand Restoration HE
Shenandoah Rd. Groundwater HE
Sidney Landfill HA
St. Regis Mohawk Reservation HC
Seneca Army Depot HA, HE
Southside High School HE
Stanton Cleaners Area Groundwater HA, HE
Tri-Cities Barrell HE
Village of Liberty Water Supply—Elm St HA
Waterford HS

North Carolina

Aberdeen Pesticide Dumps HA
Barber Orchard HC (2), EI
Benfield Industries HE
Camp Lejeune HE
Cartrette Field HC
Davis Park Road TCE HE
Geigy Chemical Corp. (Aberdeen Plant) HA
Georgia-Pacific Corp. Hardwood Sawmill HA, HE
Marshallberg mercury spill ER
North Belmont PCE HC, HE
Parmele train derailment ER
Paw Creek Bulk Petroleum Terminal HC
Scottland cottonseed fire ER
Trinity American HE, HS

North Dakota

Bismarck, chemical reaction ER

Ohio

Baker Woods Creosoting HC
Eagle Picher HA
Elano Corp. HE

Fayette Tubing ____ HE
Feed Materials Production Center ____ HA
Geauga Industries ____ HC
Kirby Tire Company ____ HA, HC (2), HE
Maple Heights chemical reaction ____ ER
Marion County ____ HC
Nease Chemical ____ HC
North Sanitary Landfill ____ HA, HC
Old Delaware City Landfill ____ HC
Old Tiffin City Landfill ____ HE
Rickenbacker Air National Guard (USAF) ____ HA
Tiffin Landfill ____ HC (2)
Skinner Landfill ____ HE
Van Wert Mercury Site ____ HC (2)
Windham Alloys ____ HC
Winton Ridge Landfill ____ HC
Wright-Patterson Air Force Base ____ HA, HC
Van Wert Mercury Site ____ HE

Oklahoma

Tar Creek ____ HE
Tulsa Fuel and Manufacturing ____ HA

Oregon

Oregon State Penitentiary ____ HE
Taylor Lumber and Treating, Inc. ____ HC (2)

Pennsylvania

Air Products ____ HE
Altoona Westerly Sewage Treatment Plant ____ HC
Bartonsville trailer incident ____ ER
Bizzarro Junkyard ____ HC
Callery Chemical Company ____ HA
Clements Landfill ____ HC
Fischer & Porter Co. ____ HC
Hamburg Field House ____ HC
Landis Lane Site ____ HC
Lefever Dump ____ HC, HE
Marjol Operation ____ HC, HE
Mercer Spring & Wire ____ HC
Nine Mile Run Slag Area ____ HC (2), HE
Old Wilmington Road Groundwater Contamination ____ HA
Precision National Corp. ____ HC (3), HE
Roxboro Dioxin Site ____ HC
Safety Light Site ____ HC (3)
Skippack Township (North Penn - 8) ____ HE
So. Philadelphia Subsurface Petrol. Plume ____ HE
St. Mary's Borough Landfill ____ HE
Tamaqua fire ____ ER
Tollbrothers ____ HC
Tri-County Landfill ____ HC, HE
U.S. Army Keystone Ordnance ____ HE
Warwick Township Real Estate ____ HC, HE
Wilkes-Barre Steam Heat Building ____ HC

Puerto Rico

Caugas spill ____ ER
Guaynabo River spill ____ ER
Juncos Landfill ____ EI, HE
M/V Sergio Zakariadze ____ ER
Scorpio Recycling ____ HC
Union Carbide Grafito ____ HC
Vieques ____ HE

Rhode Island

Central Landfill ____ HC
Centredale Manor Restoration Project ____ HE

Davisville Naval Construction Battalion Center _____ HE

H & H Rack, Inc. _____ HC

M. Earl Adams Co. _____ HC

R & R Jewelry Inc. _____ HC

South Carolina

Aqua-Tech Environmental Inc. _____ HA, HE

Arkwright Dump _____ HC, HE

Big Creek Landfill _____ HC

Columbia Organic Chemicals Inc. _____ HC

Davisville Naval Construction Battallion Center _____ HA

International Minerals and Chemicals ____ HC

Palmetto Recycling, Inc. _____ HC

Sangamo Weston/Hartwell PCB _____ EI, HE

Sarratt Property _____ HC

Savannah River Site _____ HE

Shuron Textron, Inc. _____ HE

Tennessee

Arnold Engineering Development Center (U.S. Air Force) _____ HA

Chemet Co. _____ HA

Flura Corporation _____ HC (2)

Jersey Miniere Zinc Co. _____ HA

Harpeth River Site _____ HC (2)

H. O. Forgy & Son Inc. _____ HC

Knoxville perc spill _____ ER

Memphis Defense Depot _____ HA

Memphis, glycol spill _____ ER

Memphis/Shelby County Methyl Parathion _____ HE

Nashville, residential mercury spill _____ ER

Oak Ridge National Laboratory _____ HE

Tennessee River _____ HC

Tullahoma, residential mercury spill _____ ER

Texas

Air Force Plant #4 (General Dynamics) ___ HC

Alcoa (Point Comfort)/Lavaca Bay ___ HC, HE

Brownsville Furfural spill _____ ER

Corpus Christi Landfills _____ HE

City of Perryton Well No. 2 _____ HA

Dallas water supply chemical spill _____ ER

Doyle Transformers Site _____ HC

East Texas Lakes _____ HE

Garland Creosoting Co. _____ HA

Galveston chemical exposure _____ ER

Hart Creosoting Company _____ HA

Holly Street Power Plant _____ HA

J & J Plastics _____ HE

Kelly Air Force Base _____ HC (2), HE

La Costex Refinery _____ HC

Many Diversified Interests, Inc. _____ HA, HE

Melton Kelly Property _____ HC

Newell Recycling _____ HC

State Road 114 Groundwater Plume _____ HA

Star Lake Canal Site — Port Neches _____ HA

Tessman Road _____ HE

Texas City Methyl Parathion Sites _____ HE

Tex-Tin Corp. _____ HC

Upper Galveston Bay _____ HC

Utah

Clandestine drug production labs _____ HE

Eureka Mills _____ HE

Former Miller Floral & Green House Site _____ HE

Intermountain Waste Oil Refinery _____ HE
International Smelting and Refining ___ HA, HE
Jacobs Smelter Site _____ HA, HE
Ogden Rail Yard _____ HE
Petrochem Recycling Corp. /Ekotek Plant _____ HC
Staker Paving Asphalt Production _____ HE

Vermont

Downtown Burlington Air Quality _____ HC
Lakeside Community sites _____ HE
Pownal Tannery _____ HA, HE

Virginia

Abex Corp. _____ HC, EI
Bedford mercury exposure _____ ER
Former Nansemond Ordnance Depot _____ HA
Naval Amphibious Base Little Creek _____ HC
Norfolk Naval Shipyard _____ HC
Oldover Corp. _____ HC

Virgin Islands

Anguilla Landfill _____ HC, ER
Bovoni Dump _____ HC

Washington

Able Pest Control _____ HE
Bainbridge Island Landfill _____ HE
Bangor Ordnance Disposal (U.S. Navy) ___ HA
Bangor Naval Submarine Base _____ HA, HE
Basin Oil _____ HE
Bertrand Creek Area Properties _____ HA, HE
B & L Wood Waste _____ HE
Burlington Northern _____ HE
Cascade Pole _____ HE
CENEX — Quincy _____ HE
Chemcentral _____ HC, HE
Cleancare Corporation _____ HC, HE
Everett Landfill _____ HE
Hamilton Road _____ HE
Hanford Site _____ HE
Holman Cement _____ HE
Inland Empire Plating _____ HC, HE
International Airport _____ HE
Interstate Coatings _____ HE
Kah Tai Lagoon _____ HE
Kitsap County, Bainbridge Island Dump _____ HC
Klickitat Valley Sawmill _____ HE
Lewis County Central Maint. Shop _____ HE
Lynnwood Plating Inc. _____ HC
Long Painting Company _____ HC, HE
Malarkey Asphalt _____ HE
Midnite Mine _____ HA, HE
Mt. Pleasant Landfill _____ HE
Northwest Cooperage _____ HE
Oeser Company _____ HE
Palermo Wellfield _____ HE
Paradis Road _____ HE
Port Hadlock Detachment (U.S. Navy) ___ HA
Procoat International _____ HE
Rayonier Inc. Mt. Pleasant Landfill ___ HC (2)
Rayonier Inc. 13th & M St. Landfill _____ HC
Rayonier Mill _____ HA, HE
Sisco Landfill _____ HC
Skyline Public Water System _____ HE
South Park/Georgetown _____ HC, HE
Spokane River Sediments _____ HE
Sylvan Way Land Company— Sand Pit HC (2)

Toxgon Corporation Seattle _____ HC

U.S. Department of Interior, Kabba—Texas Mine _____ HC

Washougal Compressor Station _____ HE

Western Farm Service, Harrington _____ HC

Wilder Landfill _____ HE

Wolph's Second Hand Store _____ HC, HE

Y Road Landfill _____ HE

West Virginia

Fairmont Cullet Pile Site _____ HC

Fike Chemical, Inc. _____ HC

Heizer Creek _____ HC (2)

Manilla Creek _____ HC

Midwest Steel _____ HC

Poca Drum Dump _____ HC

Sharon Steel _____ HE

South Charleston Municipal Landfill _____ HC

Vienna Tetrachloroethene _____ HA

Wisconsin

American Quality Fibers _____ HE

Ashland NSP Lakefront _____ HE

Badger Army Ammunition _____ HE

Boerke Landfill _____ HE

Coliseum Office Park _____ HC

County A Road Sludge Disposal ____ HA, HC

Fox River PCB Releases _____ HE

Freedom MTBE Plume _____ HE

Hartland Chemical Company _____ HC (2)

Hydrite Chemical _____ HE

Lincoln Creek Groundwater Plume _____ EI

Madison Kipp Corp. _____ HE

Miller Compressing Company, Inc. _____ HC

Model Road Illegal Drug Laboratory _____ HC

Modern Sewer Service _____ HC

National Auto Wrecking _____ HC

Newton Creek/Hog Island _____ HE

P&G School Bus Service _____ HC

Weisenberger Tie and Lumber Co. _____ HC

Western Wisconsin Ready Mix _____ HC

Wyoming

F.E. Warren Air Force Base _____ HA

North Casper PCE _____ HE

Appendix B:
Toxicological Profiles Prepared in FY 2000

CERCLA

Public Comment Draft

Asbestos (Update)
Arsenic (Update)
Benzidine (Update)
Chromium (Update)
1,2-Dichloroethane (Update)
Di-n-butyl phthalate (Update)
Endosulfan (Update)
Ethion
Manganese (Update)
Methylene chloride (Update)
Methyl parathion (Update)
Pentachlorophenol (Update)
Polychlorinated biphenyls (Update)
Toluene (Update)

Under Development

Aldrin/Dieldrin (Update)
Beryllium (Update)
Creosote (Update)
DDT/DDE/DDD (Update)
Di(2-ethylhexyl) phthalate
Hexachlorobenzene (Update)
Methoxychlor (Update)
Perchlorates

U.S. Department of Defense

Final Toxicological Profiles

Total petroleum hydrocarbons

U.S. Department of Energy

Final Toxicological Profile

Uranium (Update)
Ionizing radiation

Under Development

Americium
Cesium
Cobalt (Update)
Iodine
Strontium

Appendix C:
ATSDR Resources on the Internet

ATSDR has many documents on its Internet site that provide information about specific sites, substances, agency programs, and activities. These include full public health assessments for a number of sites, easy-to-read fact sheets on toxic substances (ToxFAQs), and case studies for health care professionals. ATSDR's Internet address is

www.atsdr.cdc.gov

Some of the resources available on the Web site are listed below.

1999 CERCLA Priority List of Hazardous Substances

A Primer on Health Risk Communication Principles and Practices

Alaska Native Subsistence and Dietary Contaminants Program

An Evaluation Primer on Health Risk Communication Programs and Outcomes

ATSDR Cancer Policy Framework

ATSDR National Alerts–Toxic Substances

ATSDR Public Health Advisories

ATSDR Public Health Assessments

ATSDR Science Corner

ATSDR Statement of Values

ATSDR's Most Frequently Asked Questions

Case Studies in Environmental Medicine

Community Involvement Pages

Community Matters: About ATSDR

Community Matters: Exposure

Community Matters: Find Out About Sites in Your Community

Community Matters: Information for Communities

Community Matters: Resources and Contacts

Community Matters: Search for a Specific Chemical

Community Matters: The ATSDR Ombudsman

Community Matters: What You Can Expect from ATSDR

Congressional Testimony: Medical Monitoring at Hanford Nuclear Facility

Congressional Testimony: The Scientific Aspects of Mercury

Dioxin and Dioxin-Like Compounds in the Soil, Part 1, ATSDR Interim Policy Guideline

GATHER interactive map server

Great Lakes Human Health Effects Research Program

Hazardous Substances and Public Health Newsletter

Hazardous Substances Emergency Events Surveillance (HSEES) Annual Report 1997

HazDat Site Activity Query Map

Malathion: Chemical Technical Summary for Public Health and Public Safety Professionals

Methyl Parathion Expert Panel Report

Mississippi Delta Project

Organizational Chart of ATSDR

Public Health Concerns at Department of Energy Sites

Public Health Implications of Dioxins

Public Health Implications of Exposure to Polychlorinated Biphenyls (PCBs)

Public Health Statements on various hazardous substances

Report of the Expert Panel Workshop on Psychological Responses to Hazardous Substances

Substances Most Frequently Found in Completed Exposure Pathways -1999

The Toxicologic Hazard of Superfund Hazardous Waste Sites

Top 20 Hazardous Substances–ATSDR/EPA Priority List 1999

ToxFAQs

Appendix D:
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