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"Artificial Lightning" Could Revolutionize Waste Disposal

Waste disposal is at the heart of our nation's current environmental crisis. Landfills are overflowing, and it's next to impossible to site new ones. And hazardous waste incinerators are even less popular as neighbors.

But what if landfills could be reused many times over and hazardous waste could be reduced in mass and hardened into a rocklike substance that essentially never escapes into the air and never leaches into soil or groundwater?

If you think it would take a magic wand, you'd be right—but the magic exists. Dr. Lou Circeo, director of the Construction Research Center at the Georgia Institute of Technology (Georgia Tech) in Atlanta, has been conducting research into plasma arc technology. Besides expanding the usefulness of landfills and rendering hazardous waste harmless, a torch that uses the technology could be used to turn municipal solid waste into solid rock, stabilize foundation soils, create or destroy building materials, and reduce by tenfold the volume of industrial waste produced by smelters and other industries.

The torch works by producing temperatures of approximately 7,000° Celsius—hotter than the surface of the sun. "It's actually a form of artificial lightning," explains Dr. Circeo. Because the heat is so intense and is generated in the absence of air, the low volume of gases produced are relatively clean and can be collected rather than emitted into the air. The torch, which is electrically powered, uses "a little gas and a lot of electricity" to reach the intense plasma temperatures. The interior of the torch is water-cooled to keep it from melting.

Plasma arc technology was initially used by the National Aeronautics and Space Administration (NASA) to test the ability of materials to withstand heat during reentry into the earth's atmosphere. It has also been used in the steelmaking and metallurgic industries. "Then we got the idea to look at potential environmental applications," says Dr. Circeo.

Will the torch actually be used to solve the world's hazardous waste disposal problems? Various applications are already in use:

- In Japan, where incinerator ash from municipal waste is considered a hazardous material, a plant is being designed using plasma arc technology that will process 400 tons of ash daily. Experimental plants are being used to evaluate processes for nuclear waste and liquid waste.

- In Canada, where electricity is relatively inexpensive, a mobile unit is visiting several industries to evaluate various industrial and environmental applications.

- Toxic substances such as asbestos are easily disposed of along with other building materials, and the more valuable materials, such as metals, can be reclaimed and reused. Under a contract with the Army Corps of Engineers, Dr. Circeo is conducting experiments to destroy asbestos-containing materials removed from buildings. He believes the military will find this application especially useful, as asbestos-contaminated barracks are being replaced.

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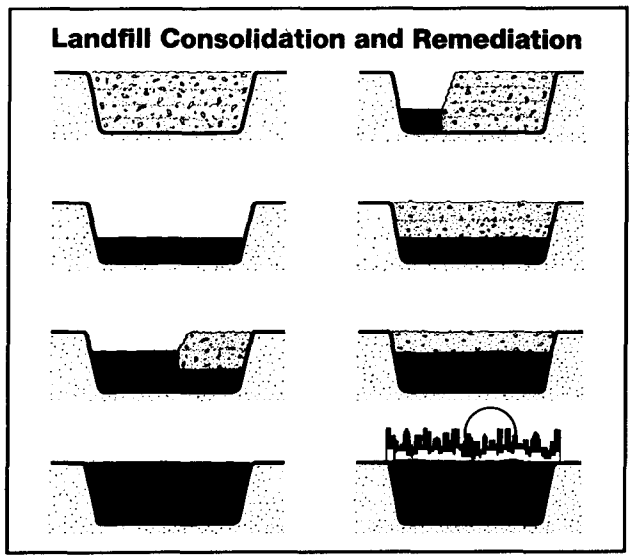
- In the United States, Canada, and Europe, research is being conducted on treating municipal wastes, tires, even medical and nuclear waste. A plant in West Virginia currently recovers usable aluminum metal from an aluminum waste that was previously nonrecoverable.

But ultimately, the future of Dr. Circeo's research rests on finding financial support to continue his work. "We have no funds," he says, although international interest is strong. The former Soviet Union is exploring use of the torch to remediate buried radioactive waste at Chernobyl. Dr. Circeo was invited to visit the former Russian republic to explain the technology; then the Russian minister in charge of the clean-up came to Atlanta for a demonstration.

And officials from Bordeaux, France, where municipal waste incinerator ash has been declared a hazardous substance, are interested, too. They recently sent him several thousand pounds of the ash for experimental disposal.

Lou Circeo is patient. He is seeking investors so that a "showcase" municipal waste plant can be built for the Olympic village that Atlanta is constructing at Georgia Tech for the 1996 games. If this program is successful, all gaseous and solid products from the process would be captured and sold. No gases would be released to the atmosphere and no materials would be sent to landfills. Lou believes his magic wand is an idea whose time has come.



Plasma arc technology could be used to increase the life of a landfill fivefold. Once filled to capacity with municipal solid waste (top left), *a landfill could be reused. The torch would be lowered into a hole bored through the waste, which would then be melted down from the bottom* (top right). *The process is repeated until the bottom of the landfill is covered with the glass-like vitrified waste. More waste is added and melted until the melted waste reaches the top of the landfill* (bottom left). *The area could then be used for development* (bottom right).

For more information about plasma arc technology, write to Lou Circeo, PhD, PE, Construction Research Center, College of Architecture, Georgia Institute of Technology, Atlanta, Georgia 30332-0159; telephone (404) 894-2069.

Neighbors of Incinerator Report Increased Illness, Study Says

Residents of a North Carolina town who lived near a hazardous waste incinerator report higher rates of respiratory and neurologic effects than a comparison group, says a health study released by ATSDR in January.

Residents living within 1.5 miles of the former Caldwell Systems, Inc. (CSI) hazardous waste incinerator were nine times more likely to report respiratory symptoms and one and a half times more likely to report neurologic problems than residents of a nearby comparison community. Reported prevalence of irritant, respiratory, and neurologic symptoms increased for those residents within a mile of the incinerator. However, the rates of reported cancer and adverse reproductive effects were not significantly higher for neighbors of the waste facility.

The CSI incinerator, which operated from 1976 through 1988, burned mostly waste from the regional furniture industry, including varnish, paint, lacquer, toluene, xylene, and other solvents. Waste torpedo fuel from the Navy accounted for 10% of the material burned. [See "Health Effects Found at North Carolina Incinerator Prompt Investigation," *Hazardous Substances and Public Health*, vol. 1, no. 4/September 1991.]

A public health advisory issued by ATSDR in 1990 warned of a significant threat to human health as a result of past work practices at CSI. Neighbors of the facility have testified that the plant burned waste inefficiently, thus releasing toxic materials into the air. CSI's state permit allowed the incinerator to burn twice the rate of waste per hour that it was designed to. Former workers say that the licensed rate was frequently exceeded, and health and safety practices were ignored.

Respiratory and neurologic symptoms have been found among former CSI workers. Workers at the incinerator were the subject of a 1992 study by the National Institute for Occupational Safety and Health (NIOSH) and were excluded from the ATSDR study. Family members and household contacts of former workers are being studied separately.

For more information about the health study, write Michael Straight, MD, Division of Health Studies, ATSDR, Mailstop E31, 1600 Clifton Road, NE, Atlanta, Georgia 30333, or call (404) 639-6201.

Science and Technology in the Clinton Administration

Technological research and development is prominent in the economic plan proposed by President Clinton. Environmental technology would be allotted $271 million for long-term research on pollution prevention and environmental protection measures if the plan is approved; $2.3 billion would be added to university research in science and engineering funded through National Science Foundation grants. And projects to develop technology that could be consigned to the private sector would receive an additional $180 million. Cuts in long-term projects such as the superconducting supercollider would fund the increases. [The Clinton economic plan had not been approved by Congress at press time.]

A $17 billion technology initiative announced by President Clinton in February emphasizes government and industry partnerships in research and development. Environmental protection is one aspect of the plan. According to Vice President Gore, "Technology offers new opportunities for jobs, for a cleaner environment, for better schools, for high-quality health care, and for scores of other advances." One example of "green" technology to promote economic growth is a cooperative effort between government and the auto industry to develop an "environmentally clean" car. Another proposal included in the initiative calls for the network of national laboratories to work with private industry.

Clinton Names Science Adviser

Science magazine recently praised President Clinton for his choice of Jack Gibbons as Science and Technology Adviser [*Science*, vol. 259, January 22, 1993]. Gibbons is former director of the Office of Technology Assessment (OTA), which analyses the future effects of technology for congressional committees. According to the *Science* editorial, "The reputation of OTA owes much to Gibbons's fostering of political nonpartisanship and his refusal to allow the analytical quality of OTA documents to be influenced by political expediency." He is also an expert in energy matters, especially nuclear energy.

The selection of Gibbons highlights the Administration's interest in research and development programs. In a recent press conference, Gibbons noted the Administration's concern for "getting [environmental] research technology into the marketplace." Gibbons has impressive experience to bring to the task; as director of the U.S. Office of Energy Conservation in the Carter Administration, he launched a successful research and development program that contributed to a reduction in the nation's energy consumption.

President Clinton on the role of the science adviser in science policy:

> ***"My science adviser will play a more critical role in overall government policy-making than ever before. I expect that the science adviser will play a role not only in determining policy but also in advising on the selection of top officials who will have science and technology responsibilities. In addition, I have stated on many occasions that I will give Vice President Gore the responsibility and authority to coordinate our overall technology, and by extension, science policy across all government agencies."***

Link Between Environmental Hazards, Learning Disabilities Is Topic of Workshop

Children have a right to realize their full potential, yet we are gambling with the effects of toxic substances on our children's health, warned medical researchers at a February workshop sponsored by the Learning Disabilities Association (LDA) of America. Approximately 150 teachers, nurses, parents, and interested citizens attended "Tots and Toxins: Altered Brains" at LDA's International Conference in San Francisco, California. Children's exposure to hazardous substances is especially troubling, researchers said, because their developing brains have vulnerable periods and processes.

An immature central nervous system (CNS) "is doing things that are not happening in an adult CNS," explained Dr. Patricia Rodier from the University of Rochester Medical School. Learning disabilities and other damage can result if a toxic exposure occurs during a critical period of neurological development. "Something can go wrong during cell production or something can interfere with cell migration or transmission," said Dr. Rodier. (See chart, next page.)

"A developing CNS has no protection from bloodborne teratogens and has a multitude of different functional units, so that loss of only a few can be detrimental," said Dr. Rodier. Yet, because the effects on the brain are subtle, they may not show up on routine neurological screening measures, and the effect may appear years later as a learning disability. Why isn't more known about effects on the developing fetus? According to Dr. Philip Voorhees of the University of Cincinnati, "It's difficult to predict which substances will affect the fetus, based on adult studies."

How are neurotoxic effects assessed? "The preferred outcome measures are IQ and achievement performance tests," said

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Dr. Jane Bernstein with Children's Hospital in Boston, Massachusetts. However, the problem with these kinds of tests is that "lack of change [in IQ score] does not rule out the effect of the toxin. IQ tests tap verbal knowledge, not verbal facility." In fact, Dr. Bernstein believes psychological testing tools are dangerously close to becoming an end in themselves.

A more appropriate assessment strategy is to examine brain/behavior relationships. Neurobehavioral assessment batteries should address both "Level 1: Is there an effect? and Level 2: Where did it come from?" according to Dr. Bernstein. Neurobehavioral assessment includes testing the child and interviewing the child and its caretakers. This kind of assessment can take "3 to 4 hours compared with the 2 hours spent administering an IQ test," said Dr. Bernstein.

What kind of hazardous substances pose a problem? "Metals (including lead, methylmercury, cadmium, and aluminum), polyhalogenated hydrocarbons, pesticides, and solvents," are the most common hazards, according to Dr. Kenneth Reuhl of Rutgers University. Dr. Reuhl said the "contribution of environmental toxicants [in developmental neurotoxicity] is–with the exception of lead–difficult to quantify" and identified lead poisoning as "the most pressing, common, and severe problem." He emphasized the need for more animal research to better understand the developmental effects of toxins, citing a 15-year Canadian study of monkeys.

According to Dr. Reuhl, most of the lessons in neurotoxicity are based on the 1950s methylmercury poisonings in Minamata, Japan, from fish consumption. Paralysis and ataxia (the inability to coordinate involuntary muscular movements) in adults and children were traced to a discharge of inorganic mercury by an industrial plant. The Minamata poisonings revealed fetuses could be poisoned through the placenta and infants could be poisoned through breast milk, yet pregnant mothers may not have symptoms; damage is generalized in the fetus, yet "the effects are more specific with age," said Dr. Reuhl.

The 1-day workshop was presented through the combined efforts of the LDA Scientific Research Committee, the National Institute of Environmental Health Sciences, National Institutes of Health, and the Environmental Protection Agency. Other support was provided by the National Foundation for Brain Research and ATSDR. Proceedings of the conference will be available both as a scientific publication and as a paperback for the lay person. For more information, contact Audrey McMahon, LDA Research Services Committee, 2991 Princeton Pike, Lawrenceville, New Jersey 08648-3224; telephone (609) 882-0622 or LDA headquarters, 4156 Library Road, Pittsburgh, Pennsylvania 15234; telephone (412) 341-1515; fax (412) 341-8077.

Vulnerable Periods in the Functional Development of Infants' and Children's Central Nervous Systems

Prenatal		
	Limb reflex	3 months
	Swallowing	4 months
	Sucking	6 months
	Startle to noise	7 months
Postnatal		
	Visual discrimination	1-2 months
	Cortical dominance	4 months
	Chewing reflex	5-6 months
	Walking	1 year

Physical Development

Prenatal		
	Neural tube closes	day 22-26
	First neurons born	day 26
	Cortical neurons migrate	6 weeks
Postnatal		
	Cortical migration complete	5 months
	Neuron proliferation complete	18 months
	Myelin 50% complete	18 months
	Visual system connections	3-4 years
	Brain mature in form	20 years

Sources of Lead In and Around the Home

Lead is a highly toxic metal, producing a range of adverse human health and environmental effects, particularly in children and fetuses. These adverse effects include reproductive system disorders, delays in neurologic and physical development, cognitive and behavioral changes, and increased blood pressure. The following list includes some of the most common sources of lead exposure.

- Lead-based paint used inside or outside the home
- Air and soil contaminated by traffic fumes from leaded gas or industries that make lead products

- Soil around buildings painted with lead-based paint that has chipped off
- Food grown in gardens near busy roads, or next to buildings where leaded paint has chipped off into the soil
- Dust created by removing lead paint (indoors and outside) as part of renovation
- Colored inks used in newspapers and magazines, or on plastic bags, such as bread wrappers
- Older furniture, such as cribs, and some toys coated with lead paint or lead-based stains
- Pottery made with leaded glaze (usually from foreign countries)
- Lead pipes and plumbing fixtures (check with your landlord or plumber)
- Fumes from burning painted wood and some printed materials
- Hobbies that involve lead, such as making stained glass, lead sinkers, fishing lures, or bullets

To Help Prevent Lead Poisoning

- Have children 6 months to 6 years of age tested regularly. Ask your doctor to test your child.
- Keep your children away from peeling paint; don't let the child chew on painted surfaces.
- Wash your own and your child's hands frequently to rinse off any dust or dirt that may contain lead.
- Wash your child's toys often, especially infant teething toys.
- Do not use warm or hot tap water for making infant formula or for cooking. Older hot water heaters may have been made with leaded solder.
- Serve meals high in iron and calcium to help prevent lead from being absorbed into the body.
- Flush the water from your tap until it runs cold. Use the flushed water for houseplants or other nonconsumable purposes.
- Wet-mop dusty surfaces at least once a week with a heavy duty household cleaner.
- Do not store food in open cans, particularly if the cans are imported.
- Do not use decorative pottery or ceramic ware for food storage or service.
- Cover lead-contaminated soil with grass, bushes, or other ground cover.

Sources of Iron	*Sources of Calcium*
Liver	Milk
Fortified cereal	Yogurt
Cooked legumes (peas, beans)	Cheese
Spinach	Cooked greens
Beef	

- If you work with lead on the job, don't bring it home.
  - Shower and change your clothes before you go home.
  - Wash your work clothes separately from other laundry.
  - Check with your employer or the Occupational Safety and Health Administration (OSHA) about safety requirements when working on battery reclamation, radiator repairs, home improvements, bridge repair, plumbing, or weapons.

CDC's Lead Poisoning Prevention: Changing with the Times

A pediatrician in Southern California is aware that some of her patients' families store juice and punch in pottery imported from Mexico. In her guidance to parents, she warns them that lead can leach from improperly fired pottery. At every routine visit, she asks parents about the use of this pottery and screens any children whose parents use this pottery.

This scenario is one example of how physicians can incorporate lead poisoning prevention into their practices. The source: a document prepared by the Centers for Disease Control and Prevention (CDC) that provides guidance for state and local agencies and pediatric health care providers. *Preventing Lead Poisoning in Young Children*, released in October 1991, helps these health professionals with identification and follow-up of children with elevated blood lead levels.

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The 1991 Statement replaced the single, all-purpose definition of a blood lead level of concern and endorsed multitier "levels of action" at which different interventions should be triggered by specific levels of blood lead. For instance, children with blood lead concentrations of 15-19 µg/dL should receive nutritional and educational interventions and more frequent screening; children with blood lead concentrations of 20-44 µg/dL should receive environmental evaluation and remediation and a medical evaluation. In addition, the blood lead level of concern was decreased from 25 µg/dL (identified in 1985) to 10 µg/dL. If blood lead levels persist greater than 15 µg/dL, environmental inspection and intervention is recommended.

The 1991 Lead Statement was the latest in a continuing sequence of lead statements issued by CDC and the Public Health Service since 1970. The 1991 Statement, like many of its predecessors, was developed with the help of an external advisory committee. Now, CDC is beginning the process of revising *Preventing Lead Poisoning in Young Children* to incorporate new scientific data and to account for recent changes in approaches to environmental hazard reduction. "An advisory committee is being formed to submit recommendations by the spring of 1993," says Dr. Suzanne Binder, chief of the CDC's Lead Poisoning Prevention Branch. Listed below are some of the major revision issues identified since the release of the 1991 Statement.

Adequate laboratory capacity

Does adequate laboratory capacity to perform blood lead testing exist so that blood lead measurement can be the standard of care? The laboratory capacity issue has two components: (1) Are there enough machines and staff to process all samples received by laboratories? and (2) Do all physicians or other health care providers who wish to test children for lead have access to a facility that can process the blood specimen?

When to discontinue screening

The 1991 Statement did not explicitly address when a community no longer needs to screen (based on blood lead data). CDC is working to provide more explicit guidance on this issue.

Lead levels in housing

The concept of what constitutes acceptable management of lead in houses is changing. The 1991 Statement emphasizes removing all lead from homes, because exposure to lead could potentially occur (for example, during renovation) as long as lead is present. However, recent legislation and policy decisions are distinguishing between lead in homes that is intact and not accessible and lead that is a hazard or could easily become a hazard.

Chelation recommendations

The 1991 CDC Statement provided several options for the medical management of children with blood lead levels 20-45 µg/dL. The choices discussed include the following: not using chelation therapy; doing a provocative chelation test and only chelating if the child excreted a large amount of lead in response to a test dose with a chelator; or conducting chelation therapy without first doing a provocative chelation test. Neither adequate scientific data on which to base a recommendation nor a consensus among practitioners currently exist. The National Institute of Environmental Health Sciences, National Institutes of Health, is planning a multicenter trial of succimer, an oral chelating agent, with outcome measures including blood lead levels and cognitive functioning.

Usefulness of risk questionnaire

CDC has gathered data from private practices to determine the usefulness of the risk factor questionnaire (see Table 1 below). Health care professionals have indicated that many people are unable to provide answers to questions about the likelihood of lead exposure in the parents' occupations or about the age of the home.

Table 1. Assessing the risk of high-dose exposure to lead—sample questionnaire

Does your child—

1. Live in or regularly visit a house with peeling or chipping paint built before 1960? This could include a day-care center, preschool, the home of a babysitter or a relative.
2. Live in or regularly visit a house built before 1960 with recent, ongoing, or planned renovation or remodeling?
3. Have a brother or a sister, housemate, or playmate being followed or treated for lead poisoning (that is, blood lead ≥15 µg/dL)?
4. Live with an adult whose job or hobby involves exposure to lead?
5. Live near an active lead smelter, battery recycling plant, or other industry likely to release lead?

Source: CDC, *Preventing Lead Poisoning in Young Children*, October 1991, p. 43.

For more information about CDC lead studies, please contact Suzanne Binder, MD, Chief, Lead Poisoning Prevention Branch, Division of Environmental Hazards and Health Effects, National Center for Environmental Health, CDC, Mailstop F28, 1600 Clifton Road, NE, Atlanta, Georgia 30333; telephone (404) 488-4880, fax (404) 488-4308.

ASTHO Takes the Lead on Lead

Children of all races and ethnic origins are at risk of lead poisoning throughout the United States, yet lead poisoning is a wholly preventable disease. "Prevention" is the key. State health agencies are active and critical players in addressing the nationwide lead poisoning problem, according to the Association of State and Territorial Health Officials (ASTHO). Yet states still have room for improvement to strengthen their lead poisoning prevention programs.

In an effort to assess the level of lead poisoning prevention activities by state agencies, the ASTHO Lead Task Force surveyed the state health agencies to determine how the 1991 revision of the Centers for Disease Control and Prevention's lead policy statement had affected their programs.

The survey was mailed in the summer of 1992 to the 57 members of ASTHO, namely the directors of public health in each of the 50 states, the District of Columbia, and the U.S. Territories and Possessions. Forty-eight states responded.

ASTHO found that most state health agencies are currently engaged in surveillance activities, but only 23 states reported that they collect data on exposure sources or other environmental data from state environmental agencies. More than 20% of state health agencies were unable to furnish data regarding case management and follow-up medical services; many states reported that children who have alarming levels of blood lead are not receiving full medical service.

Most state health agencies receive federal monies for lead prevention programs, but the cost of lead abatement and environmental investigations exceed the available funding; and most state health agencies are using blood lead measurement as a screening mechanism, whereas a small percentage of states are using only the erythrocyte protoporphyrin (EP), commonly assayed as zinc protoporphyrin (ZPP) measurement.

In the 1991 statement, the Centers for Disease Control and Prevention (CDC) lowered the blood lead level (BLL) of concern from 25 µg/dL to 10 µg/dL. In 1990, an estimated 3 million children under 6 had blood lead levels greater than 10 µg/dL. The revised CDC policy significantly increased the number of children at risk of lead poisoning and stressed the need for a strong prevention plan. The statement also introduced a multitiered approach for environmental management. The plan incorporates (1) investigating lead exposure and reducing lead hazards; (2) providing medical follow-up on the basis of an affected child's BLL; (3) implementing universal screening of all young children; and (4) emphasizing the importance of primary prevention. CDC also identifies measurement of blood lead as the screening test of choice, because the EP (ZPP) test is not sufficiently sensitive for BLLs less than 25 µg/dL. [See "Cooperative Research and Development Agreements: Key Strategies in the Fight To Eliminate Childhood Lead Poisoning," page 8.]

Lead is potentially toxic wherever it is found, and it is found everywhere. For infants or young children, lead exposure has been shown to decrease intelligence quotient (IQ) scores, slow their growth, and cause hearing problems. Exposure to high levels of lead can cause brain and kidney damage.

For more information about the ASTHO lead survey, contact David Fischer, ASTHO, 415 Second Street, NE, Suite 200, Washington, DC 20002; telephone (202) 546-5400.

Concentrations of lead in children's blood typically encountered in lead poisoning screening programs range from less than 1 µg/dL in unexposed children to more than 70 µg/dL in severely exposed children.

Cooperative Research and Development Agreements: Key Strategies in the Fight To Eliminate Childhood Lead Poisoning

A new funding mechanism between private industry and the federal government may allow state and community health agencies to eliminate the totally preventable disease of childhood lead poisoning. Because current methods and instrumentation have not been easy to operate, rugged, nor suitable for field use, it has been difficult and costly for local health agencies to implement universal screening of children for lead, as recommended by the Centers for Disease Control and Prevention (CDC) in October 1991. Improved and less expensive techniques for measuring the concentration of lead in blood are needed immediately.

To encourage the rapid development and deployment of blood lead measurement systems, CDC entered into Cooperative Research and Development Agreements (CRADAs) in 1992 with two commercial analytical instrument companies: Radiometer Analytical A/S in Copenhagen, Denmark, and ANDCARE, Inc. (formerly LeadCare, Inc.) in Dunn, North Carolina. Although the ANDCARE, Inc. analytical system is still under development, a prototype instrument from Radiometer Analytical A/S is being evaluated with good results (approximately 10% precision and accuracy at 10 µg/dL). Concentrations of lead in children's blood that are typically encountered in lead poisoning screening programs range from less than 1 µg/dL in unexposed children to more than 70 µg/dL in severely exposed children.

The responsibilities of CDC in the CRADAs are the following: evaluate prototypes by physical ruggedness, reliability, and cost; evaluate user characteristics by ease of use, manual readability, and operator ruggedness; assist in marketing, including identification of applications and customers; assist with documents for FDA approval; and assist in arranging and evaluating field testing. According to John Morrow with CDC's National Center for Environmental Health, the objectives of the CRADAs are to produce "a reliable, rugged, portable, and relatively inexpensive instrument that could be used at local health clinics and physicians' offices," or in other settings by nontechnical personnel.

CDC also awarded grants to five applicants last year for the development of new and innovative technology—or significant improvement of existing technology—to measure lead in whole blood. (See box, right.) The ideal or desired instrument or technique would be reasonably priced, accurate, precise, portable, rugged, and easy to operate. The technology to be developed under this program would be particularly useful for childhood lead screening programs, which serve large numbers of infants and young children, to identify those with lead poisoning.

Before the release of CDC's *Preventing Lead Poisoning in Young Children* in 1991, the level of concern for blood lead was 25 µg/dL or higher. The test of choice for screening asymptomatic children and other populations at risk was erythrocyte protoporphyrin (EP), commonly assayed as zinc protoporphyrin (ZPP). However, the 1991 Statement lowered the level of concern for blood lead to 10 µg/dL and recommended the direct measurement of the concentration of lead in blood to replace EP (ZPP) as the screening measurement of choice. The protoporphyrin test loses sensitivity at lead levels below 25 µg/dL. (See related story, "Researchers Eye Simpler Tests for Low Lead Levels," *Hazardous Substances and Public Health*, vol. 2, no. 1, p. 1, January/February 1992.)

Some lead screening programs have measured lead in blood by atomic absorption spectroscopy (AAS) or anodic stripping voltammetry (ASV) for primary screening or for clinical confirmation. However, commercially available AAS instruments are very costly to operate and maintain, and they require a high level of technical training. Until the introduction of ESA, Inc.'s Model 3010B lead analyzer in 1992, commercially available ASV instruments lacked adequate sensitivity, precision, and accuracy at low blood lead levels. The 3010B is undergoing evaluation by CDC's National Center for Environmental Health. According to ESA, Inc., this model offers improved performance (accuracy and precision) in the lower concentration ranges dictated by the 1991 Lead Statement.

For more information on CDC's CRADAs and grant programs, contact Dayton Miller, John Morrow, or Dan Paschal, Division of Environmental Health Laboratory Sciences, National Center for Environmental Health, CDC, Mailstop F18, 1600 Clifton Road, NE, Atlanta, Georgia 30333; telephone (404) 488-4026; fax (404) 488-4609.

CDC CRADA Partners

- ***Principal investigator:*** Mr. Leif Gudnitz
  Research site: Radiometer Analytical A/S, Copenhagen, Denmark
  Project: "Use of TraceLab® for the Measurement of Lead in Blood"

- ***Principal investigator:*** Dr. Steve Wegner
  Research site: ANDCARE, Inc., Dunn, North Carolina
  Project: "Immobilized Enzyme Sensor for Measurement of Lead in Blood"

CDC Grant Recipients

- ***Principal investigator:*** Dr. James D. Winefordner
  Research site: University of Florida, Gainesville, Florida
  Project: "A Microwave Plasma for the Determination of Lead in Blood"

- ***Principal investigator:*** Dr. Joseph Wang
  Research site: New Mexico State University, Las Cruces, New Mexico
  Project: "Electrochemical Stripping Sensors for Blood Lead Screening"

- ***Principal investigator:*** Dr. Wayne R. Matson
  Research site: ESA, Inc., Bedford, Massachusetts
  Project: "Sampler/Sensor Micro Blood Lead Analysis System"

- ***Principal investigator:*** Dr. Hari Gunasingham
  Research site: Eutech Cybernetics PTE, Ltd., Republic of Singapore
  Project: "Dry Chemistry System for Measurement of Lead in Blood"

- ***Principal investigator:*** Dr. Patrick Parsons
  Research site: Wadsworth Center for Laboratories and Research, New York State Department of Health, Albany, New York
  Project: "Polymeric Sensor for the Determination of Lead in Blood"

Charter Boat Captains Target of Great Lakes Health Study

Do you remember what you ate yesterday? How about last week, or last month? These are questions many charter boat captains and their families are being asked in an effort to assess the health effects of consuming Great Lakes sport fish.

The Great Lakes have become polluted from industrial dumping, and the contaminated fish threaten the safety of the human food chain. Polychlorinated biphenyls (PCBs), furans, dioxin, lead, dieldrin, and mercury are a few of the toxicants found in the lakes.

Five state health departments—Indiana, Illinois, Michigan, Ohio, and Wisconsin—are joining forces to investigate sport fish consumption patterns and fish advisory awareness surrounding Lakes Erie, Michigan, and Superior.

The studies will be used to estimate the disease risk of adverse reproductive outcome, breast cancer, liver cancer, and amyotrophic lateral sclerosis (Lou Gehrig's disease) attributed to ingestion of contaminants in sport fish.

"We want to study several thousand charter boat captains," says Dr. Henry Anderson, chief medical officer, Wisconsin Department of Health and Social Services. "Charter boat captains and their families consume above-average amounts of fish, and we are trying to determine any significant health risk that may be associated with eating contaminated fish."

When monitored for seasonal fish consumption, charter boat captains had higher PCB levels than sport anglers.

"Many charter boat captains ignore health advisories, believing there are no significant risks involved with eating the fish they catch," said Dr. Anderson. But when monitored for seasonal fish consumption, charter boat captains had higher PCB levels than sport anglers. The captains were surprised by the results of this serum study.

The captains and their families are participating in a monthly survey by the Behavioral Risk Factor Surveillance System (BRFS) to monitor consumption patterns.

"We are also looking at birth records from 1970 to the present, analyzing birth outcomes, low birth weight, birth defects, number of pregnancies, and other birth difficulties involved with this group," says Dr. Anderson.

On the basis of the findings, a community health advisory will be developed to educate the community about lowering health risk from eating fish. Risks can be minimized simply by learning which fish to avoid eating and by preparing food properly. Small fish often pose less risk of contamination than large fish. Cooking fish thoroughly and removing fatty tissue before cooking some fish can lower exposure risks.

Charter boat captains are a valuable cohort to educate others about how to reduce risk when consuming fish. They can serve as a liaison to get the advisory information out to their clients. Because charter boat captains are licensed by the state, their identities are known. But charter boat captains are not easy to track down at home, making it difficult to reach them. October and November—their off-season—is the best time to contact them.

The five-state consortium was awarded a grant from the Agency for Toxic Substances and Disease Registry (ATSDR)

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as part of the Great Lakes Critical Programs Act of 1990 to conduct these studies. (See "ATSDR Initiates Research Programs To Study the Impact on Human Health of Fish Consumption in the Great Lakes," below.)

The consortium will conduct health investigations to assess the health effects of fish consumption patterns in charter boat captains, sport anglers, shore and pier anglers, and low-income and minority women.

Through research and coordination, the consortium plans to improve the detection of Great Lakes toxic substances. It will also provide a mechanism for delivery of a health education advisory plan.

For more information about the charter boat captains health study, contact Henry Anderson, M.D., Wisconsin Department of Health and Social Services, 1414 East Washington Avenue, Room 96, Madison, Wisconsin 53703-3044; telephone (608) 266-1253. For information about the ATSDR Great Lakes Research Program, contact Heraline Hicks, Ph.D., ATSDR, Division of Toxicology, 1600 Clifton Road, NE, Mailstop E29, Atlanta, Georgia 30333; telephone (404) 639-6306.

Great Lakes charter boat captains and their families are being studied to determine their level of fish consumption. Great Lakes sport fish are contaminated with polychlorinated biphenyls (PCBs).

PHOTOGRAPH: WISCONSIN DEPARTMENT OF TOURISM

ATSDR Initiates Research Program To Study the Impact on Human Health of Fish Consumption in the Great Lakes

■ The Great Lakes Critical Programs Act of 1990 mandates the Environmental Protection Agency (EPA), in consultation with ATSDR, to prepare a report by 1994 that describes the impact on human health of fish consumption in the Great Lakes. In support of this directive, Congress appropriated $2 million for ATSDR in fiscal year 1992 ($3 million in fiscal year 1993) to support human health effects studies in the Great Lakes region.

The ATSDR Great Lakes Human Health Effects Research Program is designed to investigate and characterize the association between the consumption of contaminated Great Lakes fish and long-term harmful health effects. The objectives of this program are to (1) build upon and amplify the results from past and ongoing research; (2) develop information, databases, and/or research methodology that will provide long-term benefit to the Great Lakes human health research effort; (3) develop directions and methodology for future research on human health effects; (4) provide health information to the subjects of the research and their medical professionals; and (5) increase public awareness of the health implications of the toxic pollution problems in the Great Lakes. In support of these objectives, ATSDR's strategy builds upon the five traditional elements of disease prevention: identification, evaluation, control, dissemination, and infrastructure.

In September 1992, ATSDR awarded nine research grants to investigate potential human health effects resulting from exposure to Great Lakes pollutants through fish consumption. These nine grants include eight epidemiology investigations in presumed susceptible populations, that is, pregnant females, fetuses and nursing infants, Native Americans, sport anglers, and the urban poor; and one study focusing on the development of sensitive methods for detecting persistent Great Lakes contaminants like polychlorinated biphenyls, dioxins, lead, mirex, and mercury in human biologic tissues and fluids.

ATSDR Great Lakes Project Coordinator Dr. Heraline Hicks said, "About one-fifth of the freshwater in the United States comes from the Great Lakes. The Great Lakes serve as a main source of food for many people living in the basin." She added: "These nine grants will further the investigation of how exposure to Great Lakes pollutants through fish consumption may have an impact on human health."

The grant recipients for FY 1992 are State University of New York at Buffalo and Oswego; New York State Department of Health; University of Illinois at Chicago and Urbana-Champaign; University of Wisconsin-Superior; Michigan State University (which received two grants); and the Wisconsin Department of Health and Social Services, on behalf of a consortium of five state health departments. Each of the funded studies focuses on health outcomes that are specific to the people living in the associated areas. ATSDR anticipates funding one to two new awards for fiscal year 1993.

For more information about the ATSDR Great Lakes Research Program, contact Heraline Hicks, Ph.D., ATSDR, Division of Toxicology, 1600 Clifton Road, NE, Mailstop E29, Atlanta, Georgia 30333; telephone (404) 639-6306.

From the tribes

Navajo-Brown Vandever, Navajo-Nan-A-Bah, and Navajo-Desiderio Uranium Mining Areas (Bluewater, New Mexico)

In Arizona, New Mexico, and Utah, the Navajo Nation is working to educate the Navajo people about hazardous substances affecting their quality of life. More than 2,000 uranium sites exist on 25,000 square miles of tribal land; although radiation is naturally occurring, some of the sites have higher levels that could affect Navajo health. Workshops are being sponsored by the Superfund Program of the Navajo Environmental Protection Administration regarding the cleanup process that is currently being conducted across the reservation.

In 1989, ATSDR initiated preliminary investigations of the radiological, chemical, and physical hazards associated with uranium mines at the Navajo-Brown Vandever, Navajo-Nan-a-Bah, and Navajo-Desiderio sites at the request of the U.S. Environmental Protection Agency (EPA) and the Navajo Superfund Program. ATSDR staff concluded that radioactive materials potentially hazardous to human health may be present at these sites. Accordingly, a public health advisory was prepared to inform EPA, the Navajo Nation, the Indian Health Service (IHS), the Bureau of Indian Affairs (BIA), the State of New Mexico, and the public of these potentially significant environmental hazards.

Exposure to uranium occurs by (1) breathing air, eating, drinking, or smoking substances containing the radioactive chemical; (2) having skin contact with the radioactive chemical alone or with a substance containing it; or (3) being near radioactive chemicals in concentrations that may be found at hazardous waste sites or at industrial accidents. The primary public health concern related to exposure to radioactive materials is cancer. The greater the exposure to a radioactive material, the greater the chance of developing cancer. On Navajo land, the risk of exposure to uranium and decay products depends on how near a person's residence is to a site, the amount of time spent on the land, whether sheep or cattle are herded around a site, and whether a water source is near a site.

ATSDR staff therefore recommended that these particular uranium mining sites be evaluated for inclusion on the National Priorities List (NPL). The NPL identifies sites that EPA decides may represent a long-term threat to the public health or the environment. ATSDR's public health advisory has also directed IHS to conduct surveys of areas around abandoned mines to determine if cancer in residents is a result of radiation exposure.

Environmental specialists with the Navajo Superfund Program have been ranking the sites to determine which to clean up first and how; the sites range in size from a 20-foot ditch to a full-fledged mine. The goal is to reduce the radiation to background levels. According to Paul Charp, a senior health physicist with ATSDR, "The Navajo-Brown Vandever and Navajo-Desiderio uranium mining areas have been cleaned up and physical hazards removed."

To advise the public and the medical community about the nature and possible consequences of exposure to ionizing radiation and heavy metal contaminants at these sites, the Navajo Superfund Program has been conducting environmental health education. In August and September of 1992, the Navajo Superfund Program staff, with support from ATSDR, held mini-workshops in the following communities: Prewitt/Baca, Pinedale, Red Valley, Crownpoint, Cove, and Sweetwater. The training was presented in Navajo by the Navajo Superfund Program staff, who discussed uranium mining, tailings, abandoned oil refineries, and other issues affecting the health of the Navajo Nation.

In addition, the Navajo Superfund Program hosted a national conference, "Toxic Substances and Navajo Health," in Ganado, Arizona, on November 18-19, 1992. Attended by more than 50 tribal health workers, the 2-day conference offered presentations with case examples by EPA, IHS, BIA, and ATSDR. The conference also included four concurrent workshops on the following hazardous substances: uranium, coal mining, and heavy metals leachate; solid waste, pesticides, and polychlorinated biphenyls (PCBs); asbestos, radon, and household hazardous waste; and oil, gas, underground storage tanks, and emergency response.

For more information about ATSDR's public health advisory in Bluewater, New Mexico, contact Paul Charp, Ph.D., senior health physicist, Division of Health Assessment and Consultation, ATSDR, 1600 Clifton Road, NE, Mailstop E56, Atlanta, Georgia 30333; telephone (404) 639-6068.

From the states

Massachusetts: Physicians Educated in Environmental Health

Approximately 4,000 Massachusetts health professionals have changed their way of thinking about diagnosing environmental illness as a result of attending grand rounds presentations, according to surveys conducted by the Massachusetts Department of Public Health (MDPH). Since 1990, 9,000 physicians and health professionals in Massachusetts have attended grand rounds at hospitals near Superfund sites, according to MDPH project manager Judy Bygate. And 47% of those attending grand rounds presentations on local

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Superfund sites indicated that attending the presentation affected their diagnostic approach. The state of environmental health education in Massachusetts has come a long way in the 1990s.

In 1989, MDPH administered a survey of physician awareness and knowledge of environmental issues to members of the Massachusetts Medical Society. Approximately 1,600 members completed and returned the survey, and a variety of physicians' needs were assessed. Although most members polled (72%) considered environmentally related illness as part of their differential diagnosis and many (86%) felt that it was important for physicians to be informed about the potential for exposure to hazardous substances, most physicians did not ask their patients about the potential for exposure to hazardous substances.

In addition, most physicians responded that they did not know the appropriate agency to contact for additional information about environmental health hazards, nor had they attended a seminar on the subject during the last 12 months.

As a result of the information gathered from this survey of members of the Massachusetts Medical Society, the Environmental Health Education Project for Physicians and Health Professionals in Massachusetts created a comprehensive curriculum to meet the demanding need for environmental health education. The Project began sponsoring grand rounds programs at Massachusetts hospitals and developing and distributing information resources such as rolodex cards, environmental directories, and chemical-specific fact sheets.

Administered by the Bureau of Environmental Health Assessment at MDPH and funded by ATSDR, the Project is beginning its fourth year educating physicians and health professionals in environmental health. In 1992, the Project sponsored grand rounds presentations at hospitals near six Superfund sites. (For a brief description of the sites, see below.)

To evaluate the impact of the Project, all attendees were asked to provide feedback on the program the day of the talk, and after several months, another questionnaire was distributed. This questionnaire assessed the quality of the grand rounds, whether physicians used the materials created, and whether attendees felt that the grand rounds program was beneficial in their treatment of patients.

As described above, 47% of the attendees reported that attending the grand rounds relating to a local Superfund site affected their diagnostic approach. In addition, 18% of the attendees incorporated the Project's Occupational and Environmental History Form into their patient's records.

At the onset of grand rounds programs, attendees indicated that they did not know the appropriate agency to contact for additional information about environmental health hazards. Therefore, attendees were given an "Environmental Hazards Resource Booklet," which includes important names, addresses, and telephone numbers of agencies, hospitals, and organizations that deal with environmental health issues for health professionals. This booklet was distributed to all attendees of Project-sponsored events and is available to health professionals upon request.

For more information regarding environmental concerns or about the Massachusetts Environmental Health Education Project for Physicians and Health Professionals, please contact Judy Bygate, Project Director, Massachusetts Department of Public Health, Bureau of Environmental Health Assessment, 150 Tremont Street, Boston, Massachusetts 02111; telephone (617) 727-7170; fax (617) 426-7215.

Massachusetts Superfund sites

PSC Resources. The 3-acre PSC Resources site in Hampden County was a waste oil refinery and solvent recovery plant, which operated in the 1970s. Shallow groundwater contamination consisted mostly of volatile organic compounds (VOCs), including benzene and methylene chloride. Polychlorinated biphenyls (PCBs) and lead have been found in soil samples. People may be exposed to contaminants by inhaling air, by touching or ingesting contaminated water or soil, or by eating contaminated fish.

Fort Devens-Sudbury Training Annex. The U.S. Army military installation occupies more than 4 square miles in Middlesex County and includes portions of the towns of Sudbury, Maynard, Hudson, and Stow. Established in the early 1940s, the Annex has served variously as an ammunition depot, an ordnance test station, and a troop training and laboratory disposal center. The groundwater is contaminated with VOCs, including benzene from chemical lab wastes and oils. People in the area are at risk from contaminated private and municipal wells.

Silresim Chemical Corporation. This site covers approximately 4 acres in an industrial area in Middlesex County. Starting in 1971, Silresim began reclaiming a variety of chemical wastes, waste oil, solvents, and sludges containing heavy metals. In 1977, Silresim declared bankruptcy and abandoned the site, leaving 30,000 decaying drums and several large storage tanks. The groundwater is contaminated with VOCs, pesticides, PCBs, and heavy metals. The soil is polluted with VOCs, pesticides, and PCBs. Low levels of dioxin also are present in the soil. People could be exposed to contaminants by coming in contact with off-site soils and groundwater.

Otis Air National Guard/Camp Edwards. The site in Barnstable County covers approximately 3,900 acres on a 21,000-acre parcel of land, known as the Massachusetts Military Reservation. Established in 1935, the base has primarily provided training and housing to Air Force or Army units. The materials found at the site include fly ash, bottom ash, waste solvents, waste fuels, herbicides, and transformer oil. The groundwater is contaminated with VOCs, including trichloroethane, tetrachloroethylene (PCE), and dichloroethylene. People would be at risk by accidentally drinking or touching contaminated groundwater.

Norwood PCB. This site is located on 26 acres of mainly commercial and industrial properties in Norfolk County. Beginning in the 1940s, previous owners or operators used PCBs in the production of electrical transformers and other electrical components. The on-site groundwater is contaminated with PCBs, trichloroethylene (TCE), and vinyl chloride. On-site soil and sediments are contaminated with PCBs, polycyclic aromatic hydrocarbons (PAHs), and VOCs. People may face a health risk by coming in contact with or accidentally ingesting on-site soil and sediments.

Groveland Wells. The Groveland site includes the watershed and aquifer supplying two contaminated municipal water wells, as well as three properties known to be polluting groundwater, soil, and surface water in the area. The site covers 850 acres in Essex County. The groundwater, surface water, and sediments are contaminated with VOCs, chloroform, and heavy metals including lead and arsenic. Accidental drinking of surface waters while swimming, touching contaminated waters, and inhaling vapors and dusts from the site may threaten the public health.

Public Health Service Agencies Need To Improve Risk Communication Efforts, Says Report

According to a report by a Public Health Service (PHS) subcommittee, federal agencies within the PHS need to work harder to communicate risk to the public. The report contains an analysis of risk communication policies and procedures across PHS agencies and recommendations on improving health risk communication (see box, right).

The Public Health Service is part of the Department of Health and Human Services. Eight federal agencies comprise the PHS: the Agency for Health Care Policy and Research, the Agency for Toxic Substances and Disease Registry, the Centers for Disease Control and Prevention, the Food and Drug Administration, the Health Resources and Services Administration, the Indian Health Service, the National Institutes of Health, and the Substance Abuse and Mental Health Services Administration. Representatives from these agencies contributed case studies for the report.

According to Dr. Barry L. Johnson, chairman of the PHS Subcommittee on Risk Communication and Education, "Public health professionals need to understand the basic principles that will assist them in fulfilling their responsibilities to provide to—and receive from—the general public needed environmental health information about environmental exposures and disease."

Health risk communication strategies and practices of the PHS agencies were compared with the Seven Cardinal Rules of Risk Communication developed by the Environmental Protection Agency (EPA), because similar rules were not found in any PHS agency. "Although many of the EPA rules seem obvious, they are continually and consistently violated in communicating with the public about health and environmental risks," the report states.

The report includes an analysis of 10 projects to inform the public of such risks as lead poisoning, sexual behaviors, and hazardous substances in the environment. Seven of the projects are examples of effective risk communication; three are deemed "less effective."

For a copy of *Recommendations To Improve Health Risk Communication*, call Tim Tinker at (404) 639-6205 or write to Risk Communication Project, Agency for Toxic Substances and Disease Registry, 1600 Clifton Road, NE, MS E33, Atlanta, Georgia 30333, Attn: Tim Tinker.

EPA's Seven Cardinal Rules of Risk Communication

"Merely disseminating information without reliance on communication principles can lead to ineffective health messages and public health actions," the Subcommittee's report warns. EPA's rules are as follows:

1. *Accept and involve the public as a legitimate partner.*
2. *Plan carefully and evaluate efforts.*
3. *Listen to the public's specific concerns.*
4. *Be honest, frank, and open.*
5. *Coordinate and collaborate with other credible sources.*
6. *Meet the needs of the media.*
7. *Speak clearly and with compassion.*

Risk Communication Is Risky Business, Experts Say

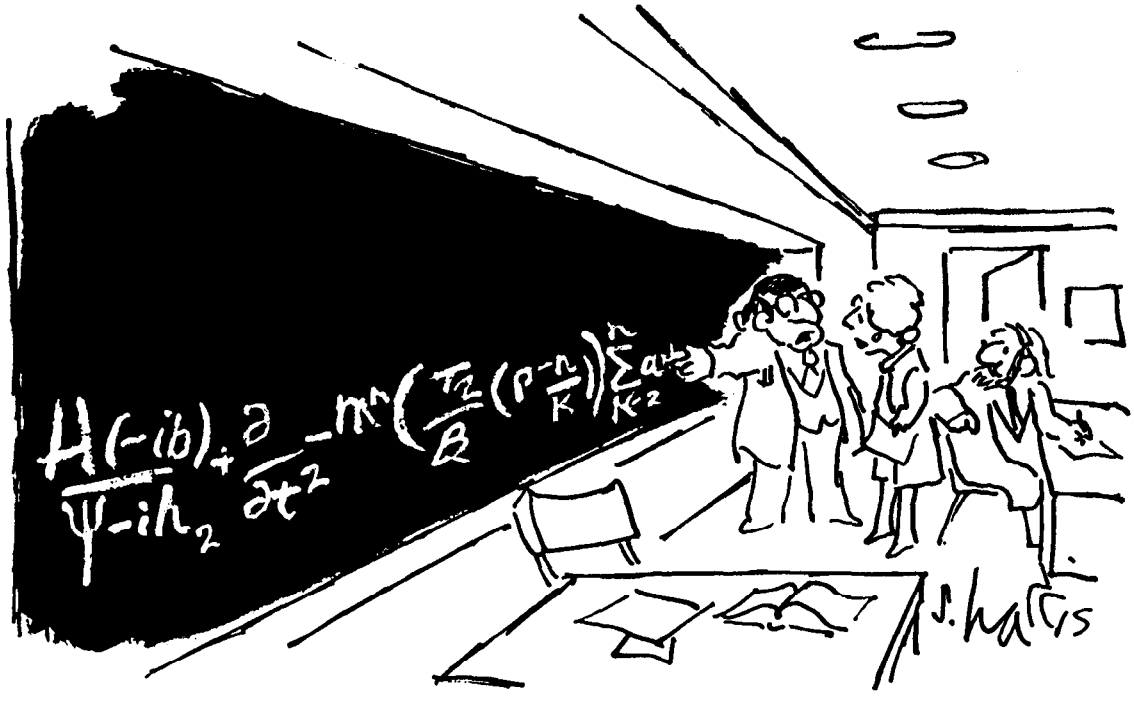
What can federal agencies do to improve risk communication? The Subcommittee's recommendations emphasize the need for both short- and long-term actions to improve health risk communication planning and practice.

1. Each PHS agency should consider developing an office of health risk communication or other resource to direct and evaluate health risk communication efforts.

2. PHS agencies should follow generally accepted practices and guidelines for health risk communication, either developing their own or using the methods and standards such as those outlined in EPA's Seven Cardinal Rules of Risk Communication (see page 13).

3. Increase awareness and visibility of health risk communication issues and trends through an interagency initiative that would include workshops and focus groups.

4. Each PHS agency should develop a set of generally accepted practices or guidelines for effective evaluation. Hiring evaluation specialists or developing evaluation expertise among current staff members is recommended.



"BUT THIS IS THE SIMPLIFIED VERSION FOR THE GENERAL PUBLIC."

ANNOUNCEMENTS

Request for Nominations for Peer Reviewers

The Agency for Toxic Substances and Disease Registry (ATSDR), Public Health Service, U.S. Department of Health and Human Services, is seeking nominations for peer reviewers for studies and research projects conducted or sponsored by ATSDR. The Agency conducts epidemiologic studies of persons exposed to hazardous substances and toxicologic studies of hazardous substances. Protocols and final reports of studies and results of research funded, sponsored, or conducted by ATSDR will be peer reviewed in accordance with legislative mandates that require peer review for results of research.

Such peer review is usually completed within 60 days by panels consisting of three to seven members. Scientific experts are selected for peer review by the Administrator of ATSDR on the basis of their reputation for scientific objectivity and the lack of institutional ties with any persons involved in the conduct of the study or research under review. Peer reviewers must sign statements of compliance with legal conflict-of-interest provisions.

Peer reviewers will be sent protocols and final reports of studies and results of research and asked to provide written comments within an agreed-upon timeframe. Protocols and final reports are categorized as (1) recommended, (2) recommended with required changes, or (3) not recommended. After categorization, protocols and final reports of studies and results of research will be returned to ATSDR. Individual peer review comments will be released to principal investigators and appropriate ATSDR divisions and may be subject to release under the Freedom of Information Act.

Experts in the following areas are needed:

Analytical Chemistry
Aquatic Toxicity/Toxicity Testing
Biostatistics
Cellular and Molecular Epidemiology
Cellular and Molecular Toxicology
Chronic Disease Epidemiology
Clinical Pathology
Communication
Community Medicine
Computer Science
Developmental Pediatrics
Demography
Environmental Chemistry
Environmental Engineering
Environmental Epidemiology
Environmental Fate and Transport of Pollutants
Environmental Health
Epidemiology
Ethics
Genetic Toxicology
Health Physics
Hydrogeology
Immunology
Internal Medicine
Laboratory Medicine
Marine Biology
Minority Health Issues
Neurobehavioral Disease
Neurobehavioral Testing
Neurotoxicity
Neurotoxicology
Occupational Medicine
Pathology
Pediatrics
Physiology
Preventive Medicine
Psychology
Public Health
Pulmonary Medicine
Reproductive Health
Reproductive Toxicology
Risk Assessment
Science Policy
Sociology
Statistics
Toxicokinetics/Pharmacokinetics
Toxicology

Reviewers will be paid a consultation fee for their reviews. In general, persons who review the protocol for a particular study or research will also be asked to review the final report for the study or research.

For further information, contact Dr. John S. Andrews, Associate Administrator for Science, Agency for Toxic Substances and Disease Registry, 1600 Clifton Road, NE, Mailstop E28, Atlanta, Georgia 30333; telephone (404) 639-0708. Persons interested in serving as peer reviewers should send their name, address, telephone number, fax number, and curriculum vitae to Dr. Andrews at the above address. Persons who have previously applied should submit a revised curriculum vitae.

CDC Name Change

To recognize the leadership role of the Centers for Disease Control (CDC) in prevention, Congress formally changed the name of CDC to the Centers for Disease Control and Prevention. The change, which was signed into law on October 27, 1992, was part of the Preventive Health Amendments of 1992. Congress specified that the initials "CDC" continue to be used

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because of widespread name recognition in the domestic and international public health communities and among the public.

Health Studies Available to the Public

Environmental health scientists at ATSDR conduct health studies at various Superfund sites nationwide to evaluate the health effects of hazardous substances on exposed populations. The following health studies are available to the public through the National Technical Information Service (NTIS).

Clear Creek/Central City Mine Waste Exposure Study—Part I: Smuggler Mountain Site (September 1992) NTIS order no. PB93151371. Cost $36.50 (paperback) plus $3.00 shipping and handling.

Community Exposure to Polychlorinated Biphenyls — Bloomington, Indiana (June 1992) NTIS order no. PB93142180. Cost: $19.50 (paperback) plus $3.00 shipping and handling.

Investigation of a Cluster of Pancreatic Cancer Deaths — Livingston and Park County, Montana (September 1992) NTIS order no. PB93136547. Cost: $17.50 (paperback) plus $3.00 shipping and handling.

Missouri Chlordane Exposure Study: A Report on Persons Who Consumed Chlordane-Contaminated Fish (September 1992) NTIS order no. PB93148252. Cost: $36.50 (paperback) plus $3.00 shipping and handling.

Neurobehavioral Test Batteries for Use in Environmental Health Field Studies (December 1992) NTIS order no. PB93145563. Cost: $19.50 (paperback) or $9.00 (microfiche) plus $3.00 shipping and handling.

To order these health studies and others prepared by ATSDR, contact NTIS, Sills Building, 5285 Port Royal Road, Springfield, Virginia 22151; telephone (703) 487-4650; fax (703) 321-8547. For more information on health studies activities, contact Sharon Campolucci, Deputy Director, Division of Health Studies, ATSDR, 1600 Clifton Road, NE, MS E31, Atlanta, Georgia 30333; telephone (404) 639-6200.

1-800-LEAD-FYI Service Operating

The Environmental Protection Agency (EPA) has opened a toll-free telephone service that provides parents with information to help them protect their children from lead poisoning. This service is the first phase of a National Lead Information Center, a public education project of a federal Interagency Lead-Based Paint Task Force.

The toll-free number, which can receive calls 24 hours a day, 7 days a week, is 1-800-LEAD-FYI (1-800-532-3394). Callers hear a recording—in either English or Spanish—that requests their name and address. Callers receive an information package consisting of a brochure on how to protect children from lead poisoning, three fact sheets, and a list of state and local contacts who can provide additional information. The brochure (available in English or Spanish) recommends steps parents can take to protect their children. These include having children tested for lead poisoning, cleaning floors and window sills with a solution of powdered dishwasher detergent and water, and avoiding do-it-yourself removal of lead paint.

The National Lead Information Center is operated by the Environmental Health Center, a division of the National Safety Council, under a grant supported by EPA, the Centers for Disease Control and Prevention, the Department of Housing and Urban Development, and the Department of Defense. The next phase of the National Lead Information Center is an information clearinghouse planned for start-up in mid-1993. The clearinghouse will gather and disseminate a wide range of lead-related information—both technical and nontechnical—to state and local government agencies, health professionals, lead abatement professionals, and private citizens.

Resources Available from Alliance To End Childhood Lead Poisoning

- ✔ *National Action Plan for Preventing Childhood Lead Poisoning* identifies the priority steps necessary to implement Title X (Residential Lead-Based Paint Hazard Reduction Act of 1992) and calls on the Clinton Administration to provide the necessary federal leadership and resources. The plan, which recommends critical actions for 1993-1994, was endorsed by more than 17 other organizations, including the Environmental Defense Fund, the National Education Association, the National Low-Income Housing Coalition, the Laborer's Health and Safety Fund, the Lawyers' Committee for Civil Rights Under Law, and the City of New York. The *National Action Plan* stresses the multiple benefits of federal investments in lead poisoning prevention, including healthier children, reduced medical and special education costs, and renovated housing—as well as the opportunity to create thousands of jobs and train workers.

- ✔ *Guide to Medicaid for Childhood Lead Poisoning Prevention Programs and Other Public Health Providers*, developed with funding by the Centers for Disease Control and Prevention (CDC), was designed to be a user-friendly explanation of Medicaid coverage of services related to childhood lead poisoning. It was written specifically to assist local public health providers in their efforts to obtain Medicaid reimbursement for lead poisoning prevention and treatment services provided to eligible children.

- ✔ *State Medicaid Policies and Childhood Lead Poisoning: National Survey Findings and Policy Recommendations* reports the results of an Alliance survey of state Medicaid agencies to determine the extent to which states are financing lead poisoning prevention and treatment services. The survey data were collected in the summer of 1992 and updated in January 1993. According to the survey, most state Medicaid agency policies are insufficient to cover the services recommended by CDC and documented variation among the states. The report contains specific descriptions of state policies and policy recommendations based on those findings.

Copies of the publications are available for $5 each from the Alliance To End Childhood Lead Poisoning, 600 Pennsylvania Avenue, SE, Suite 100, Washington, DC 20003, telephone (202) 543-1147; fax (202) 543-4466.

Lead Resource from National Health/Education Consortium

The Poisoning of America's Children: Lead Exposure, Children's Brains, and the Ability to Learn, written by Dr. Herbert Needleman of the University of Pittsburgh, is a comprehensive overview of lead poisoning. Dr. Needleman, professor of psychiatry, presents research findings that demonstrate the short- and long-term effects of low-level lead exposure on children's intellectual ability and social adjustment. (National Health/Education Consortium [NHEC] Occasional Paper #6, released November 1992, $5.) Copies of this publication and information on other publications produced by NHEC can be obtained by contacting the National Commission To Prevent Infant Mortality, Switzer Building, Room 2014, 330 C Street, SW, Washington, DC 20201; telephone (202) 205-8364; fax (202) 205-5562.

Courses

ATSDR Courses

The Agency for Toxic Substances and Disease Registry (ATSDR) is offering the following training opportunities.

Clues to Unraveling the Association Between Illness and Environmental Exposure, Special Libraries Association Annual Meeting, Cincinnati, Ohio, June 5, 1993. This full-day course will concentrate on specific case studies to illustrate pertinent associations between illness and environmental exposure.

Clues to Unraveling the Association Between Illness and Environmental Exposure, National Environmental Health Association Annual Conference, Orlando, Florida, June 29, 1993. This full-day course will concentrate on specific case studies to illustrate pertinent associations between illness and environmental exposure.

Environmental Health Databases: An Electronic Information Demonstration, National Environmental Health Association Annual Conference, Orlando, Florida, June 30, 1993. This full-day workshop provides electronic demonstrations of Hazdat, Bulletin Boards, Internet, Online Databases, National Library of Medicine's TOXNET, and CD-ROM environmental information sources.

For further information on these and other courses, please contact Diane Narkunas, Health Education Specialist, ATSDR, 1600 Clifton Road, Mailstop E33, Atlanta, Georgia 30333; telephone (404) 639-6205; fax (404) 639-6207.

Harvard Short Courses

The Harvard School of Public Health Office of Continuing Education is offering the following short courses for health care professionals in the areas of occupational health and safety, medical science and management, nuclear safety and radiation protection, and environmental management.

Advanced Workshop on Occupational & Environmental Radiation Protection, May 10-14, 1993. This course covers updated radiation protection standards, regulatory agency inspection procedures, standards for decommissioning and decontamination, current activities of the National Council Radiation Protection (NCRP) and International Council Radiation Protection (ICRP), including revisions to Title 10 CFR Part 20, and the design and implementation of an as low as reasonably achievable (ALARA) program. Expected attendance: 50. Fee: $1075.

Management & Disposal of Radioactive Wastes, May 24-28, 1993. Topics discussed in course are low-level and "mixed" wastes, problems in the solidification of low-level wastes, alternatives to shallow land burial, status of the high level special (HLS) repository, and problems in the disposal of wastes from decommissioning operations including the decommissioning of wastes below regulatory concern. Expected attendance: 60. Fee: $1050.

Planning for Nuclear Emergencies, June 14-18, 1993. This course provides detailed coverage of scenario development, accident source terms and dose estimates, standards and guides for emergency response, training and notification systems, protective action guides (PAGs), the roles of state and federal agencies, public health needs, and working with public information agencies and the media. This course features a table-top exercise, allowing participants to manage a nuclear emergency on a real-time basis. Expected attendance: 75. Fee: $1075.

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In-place Filter Testing Workshop, June 21-25, 1993. This 5-day course provides laboratory and nuclear air cleaning professionals with an in-depth understanding of air filtration theory, aerosol technology, air-flow measurements, and in-place testing of particulate (HEPA) filters and gas absorption units.

Occupational and Environmental Radiation Protection, August 16-20, 1993. This course covers atomic structure and radioactivity, sources and types of ionizing radiation, biological effects of exposures, external and internal radiation hazards, radiation monitoring and instrumentation, protection standards and dosimetry, and inspection and radiation guidelines.

For further information on these and other programs, please contact Mary F. McPeak, Office of Continuing Education, Harvard School of Public Health, 677 Huntington Avenue, Boston, Massachusetts 02115; telephone (617) 432-1171; fax (617) 432-1969.

Johns Hopkins Summer Course

Control of Biohazards in the Research Laboratory is being offered June 21-25, 1993, by the Office of Safety and Environmental Health, the Johns Hopkins Institutions, and the Department of Environmental Health Sciences, Johns Hopkins University, School of Hygiene and Public health. The 5-day course is designed to provide instruction on the recognition and control of hazards in research involving infectious agents, oncogenic viruses, recombinant DNA, chemical carcinogens, and other toxic agents. Lectures and demonstrations on the practices and procedures of hazard control will be offered. The program has been approved by Johns Hopkins University for three continuing education units and qualifies for five certification maintenance points by the American Board of Industrial Hygiene. Cost is $900, which includes registrations, refreshments, and five meals.

For more information, brochure, and registration procedures, contact Dr. Jacqueline K. Corn, Director of Continuing Education Center, or Linda A. Lamb, Course Coordinator, Department of Environmental Health Sciences, Johns Hopkins School of Hygiene and Public Health, 615 N. Wolfe Street, room 6001, Baltimore, Maryland 21205; telephone (410) 955-2609; fax (410) 955-9334.

University of North Carolina

The North Carolina Occupational Safety and Health Educational Resource Center in Chapel Hill, North Carolina, is offering the following training opportunities.

Sampling and Evaluating Airborne Asbestos Dust (NIOSH 582), May 10-14, 1993. This is a 4-day course covering the aspects of collecting and counting airborne asbestos involving sampling procedures, using the microscope, counting procedures, and optical methods.

"Hazardous Materials Management for Health Care Workers," May 17-19, 1993. This course will address health care workers in the emergency room. Emergency medical technicians and first responders will learn various techniques to provide chemically contaminated patients with life-saving services.

"Designing Asbestos Abatement Projects," June 7-10, 1993. This course is a comprehensive training course for designing abatement projects, addressing asbestos in public and private schools and other buildings. Course has been developed to meet requirements of Asbestos Hazards Emergency Response Action (AHERA) and has full approval of the Environmental Protection Agency.

"Emergency Response to Hazardous Chemicals," June 14-18, 1993. This course addresses the various aspects of emergency response to hazardous chemical incidents. OSHA regulation 29 CFR 1910.120 (q) is emphasized.

"Safety and Health Training for Hazardous Waste Site Personnel (HST24-HST40)," June 21-23, 1993 (24 hr. course), June 21-25, 1993 (40 hr. course). These courses will provide 24 and 40 hours of intensive classroom instruction and hands-on training, fulfilling OSHA requirements (29 CFR 11910.120) as mandated under the Superfund Amendments and Reauthorization Act of 1986 (SARA).

For more information, please contact Larry D. Hyde, Director, Continuing Education and Technical Assistance, Occupational Safety and Health Resource Center, University of North Carolina, 109 Conner Drive, Suite 1101, Chapel Hill, North Carolina 27514; telephone (919) 962-2102; fax (919) 966-7579.

CALENDAR

MAY

***May 3-6:* International Congress on the Health Effects of Hazardous Waste,** Atlanta, Georgia. *Contact:* Dr. John S. Andrews, Associate Administrator for Science, Agency for Toxic Substances and Disease Registry, 1600 Clifton Road, NE, Mailstop E28, Atlanta, Georgia 30333; telephone (404) 639-0708.

May 7-18: **Summer Institute in Environmental Health Studies,** Baltimore, Maryland. *Contact:* Dr. Jacqueline Corn or Linda Lamb, The Johns Hopkins University, School of Hygiene and Public Health, 615 North Wolfe Street, Room 6001, Baltimore, Maryland 21205; telephone (410) 955-2609.

May 10-13: **1993 National Joint Conference of Migrant and Seasonal Farmworkers with the National Association of Community Health Centers,** Denver, Colorado. *Contact:* D. Bellissimo, Migrant Clinicians Network, 2512 S.I.H. 35, Suite 220, Austin, Texas 78704; fax (512) 447-1666.

May 14-16: **American Academy of Pediatrics Conference,** New York, New York. *Contact:* Marisa Goldberg, 141 Northwest Point Blvd., P.O. Box 927, Elk Grove Village, Illinois 60009-0927; telephone (708) 981-7885; fax (708) 228-5088.

May 15-16: **From Coverup to Cleanup: A Citizen's Action Forum on Military Base Contamination in the Northeast (Rescheduled due to March blizzard) Co-Sponsored by the New England Physicians for Social Responsibility and National Toxics Campaign Fund,** Groton, Massachusetts. *Contact:* Maria Valenti, Physicians for Social Responsibility, 19 Garden Street, Cambridge, Massachusetts 02138; telephone (617) 497-7449; fax (617) 864-5164.

May 16-19: **American Industrial Hygiene Association Conference and Exhibition,** New Orleans, Louisiana. *Contact:* American Industrial Hygiene Association, 2700 Prosperity Avenue, Suite 250, Fairfax, Virginia 22031; telephone (703).849-8888; fax (703) 207-3561.

May 23-26: **U.S. Public Health Service Professional Association Annual Meeting,** Scottsdale, Arizona. *Contact:* John Steward, ATSDR, Division of Health Assessment and Consultation; 1600 Clifton Road, NE, Mailstop E32, Atlanta, Georgia 30333; telephone (404) 639-0600.

May 25-27: **1993 Federal Environmental Restoration Conference and Exhibition,** Washington, DC. *Contact:* Hazardous Materials Control Resources Institute, 7237 Hanover Parkway, Greenbelt, Maryland 20770-3602; telephone (301) 982-9500.

JUNE

June 3-4: **Board of Scientific Counselors, Agency for Toxic Substances and Disease Registry,** Atlanta, Georgia. *Contact:* Jean Ball, ATSDR, 1600 Clifton Road, Mailstop E28, Atlanta, Georgia 30333; telephone (404) 639-0708.

Jun. 5-11: **Looking to the Year 2000: Annual Conference of the Special Libraries Association,** Cincinnati, Ohio. *Contact:* Special Libraries Association, 1700 18th Street, NW, Washington, DC 20009; telephone (202) 234-4700; fax (202) 265-9317.

Jun. 20-23: **Health and the Environment: Meeting the Challenge for Human Development,** Arlington, Virginia. *Contact:* National Council for International Health, 1701 K Street, NW, Suite 600, Washington, DC 20006; telephone (202) 833-5903; fax (202) 833-0075.

Jun. 26-30: **National Environmental Health Association Annual Conference,** Orlando, Florida. *Contact:* National Environmental Health Association, 720 South Colorado Boulevard, Suite 970, Denver, Colorado 80222-1925; telephone (303) 756-9090; fax (303) 691-9490.

JULY

July 14-17: **National Association of County Health Officials Annual Conference,** Chicago, Illinois. *Contact:* Nancy Rawding, Executive Director, NACHO, 440 First Street, NE, Suite 500, Washington, DC 20001; telephone (202) 783-5550.

AUGUST

Aug. 7-12: **National Medical Association Annual Conference,** San Antonio, Texas. *Contact:* NMA, 1012 Tenth Street, NW, Washington, DC 20001; telephone (202) 347-1895; fax (202) 842-3293.

Aug. 27-30: **National Association of Community Health Centers Annual Conference,** New Orleans, Louisiana. *Contact:* Kathy Kunkler, Director of Meetings, 1330 New Hampshire Avenue, NW, Washington, DC 20036; telephone (202) 659-8008; fax (202) 659-8519.

Aug. 31-Sept. 2: **Enviro-Pro-HAZTECH International,** Houston, Texas. *Contact:* Bob Frederick, E.J. Krause & Associates, Inc., 7315 Wisconsin Avenue, Suite 450 North, Bethesda, Maryland 20814; telephone (301) 986-7800; fax (301) 986-4538.

Please submit calendar information to *Hazardous Substances and Public Health,* Division of Health Education, ATSDR, 1600 Clifton Road, NE, Mailstop E33, Atlanta, Georgia 30333; telephone (404) 639-6206; fax (404) 639-6207.

hazardous substances & Public Health

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