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NGA Prepares U.S. Governors To Implement Risk Communication

To help governors prepare for the types of environmental crises that involve a gubernatorial response, the National Governors' Association (NGA) has produced *A Governor's Guide to Environmental Risk Response*. This 24-page handbook describes the experiences of six governors in handling environmental problems that demanded their involvement. Some of the situations required the governor to respond because community concern turned to outrage as a result of negative publicity. In other situations, the governor was called upon to act before community concerns escalated. In a few cases, the governor acted as the state's defender against perceived threats from other states or the federal government.

Developed from the findings of a year-long series of interviews with governors in 12 states, the *Governor's Guide* contains six scenarios that involve one or more of factors listed above that exacerbate public fear or outrage:

- A 1989 federal raid of the Rocky Flats nuclear plant near Denver, Colorado, triggered concerns among area residents that they were being exposed to radioactive wastes. Governor Roy Romer acted swiftly to inform the public of the actual risks posed by the facility. He then negotiated greater state authority to oversee plant operations, established a citizens advisory committee for the site, and secured an agreement to accelerate cleanup of the plant.

- When a well-publicized trainload of hazardous waste reached Utah for disposal in May 1991, citizens groups protested that Utahans were being "dumped on" by other waste-generating states. Governor Norman Bangerter became a champion of states' rights to control waste imports and advocated federal legislative remedies before Congress and among governors.

- Newly elected Montana Governor Stan Stephens faced unexpected public outcry when he endorsed a local clean-up plan for groundwater contamination in the town of Livingston. Recognizing that his information sources had underestimated the depth of the community's concerns, the Governor acted quickly to involve the citizens in reaching a settlement with the responsible parties and to enable them to oversee the clean-up process.

- Federal designation of Yucca Mountain, Nevada, as the only site in the nation to be considered for a high-level radioactive waste repository met with fervent opposition from Nevadans. Governor Bob Miller became their chief advocate, signing state legislation prohibiting nuclear waste disposal, repeatedly testifying before Congress.

- A 1988 oil storage tank rupture on the shores of Pennsylvania's Monongahela River threatened the water supply of 200,000 citizens. Governor Robert P. Casey made sure that the media and the public received accurate and timely information on the crisis and that they were told how to conserve threatened water resources.

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- When a 7-mile-wide benzene cloud approached Duluth, Minnesota, from neighboring Wisconsin, Governor Arne H. Carlson ensured that the public received frequent and thorough updates on the state's response efforts and advice about precautions to take. This communication, coordinated among state agencies in Minnesota and Wisconsin, facilitated the temporary evacuation of 50,000 people.

The six case studies featured in the *Governor's Guide* share many characteristics. All of the governors stepped into the environmental controversy for compelling reasons. Although none of these cases could stand alone as a "textbook" example of how governors should respond to an environmental threat, each case illustrates key factors governors should consider when trying to relieve public concerns through risk communication and crisis management. The following guiding principles are drawn from these case studies:

- Delegate elements of the response when possible.
- Weigh all sides of the issue before acting.
- Acknowledge perceived risks.
- Join forces with the community.
- Work with the media to publicize the state's response.
- Use the unique authority of the governor's office.
- Recognize the governor's role as head of state.

The nature of the environmental threats, the sources of public concern, and the factors that influenced the governors' decisions to act provide valuable lessons for successful risk communication and management. The case studies lend insight into why a governor may choose to engage in risk communication, the groundwork needed to ensure an informed and effective response, and the ways in which politically and environmentally sensitive situations have been handled to benefit states and their citizens.

A Governor's Guide to Environmental Risk Response was developed by NGA through a cooperative agreement with ATSDR. The report is available for $18.95 from NGA, 444 North Capitol Street, Washington, DC 20001-1512; fax (202) 624-5313. Contact Shelley Borysiewicc at (202) 624-5330 for more information.

When political leaders become involved in environmental controversies, they must understand the roots of community concern about risk. Environmental controversies are rooted in the public's fear of risk to health, natural resources, livelihood, or property. Successful response to risk depends as much on understanding the factors that trigger public fear or outrage as it does on responding to the hazard itself. These factors include the following:

- *Involuntary risk.* People are less concerned about the risks they choose than they are about those that are thrust upon them, particularly when the government imposes the risk.
- *Risk under government control.* People will more readily accept the risks they can control themselves, such as driving a car, than the risks they must trust the government to control.
- *Unfair risk.* A community may accept risks as a trade-off for some benefit, such as emissions from an industrial facility that provides jobs, but it will resist risks that are imposed without apparent justification.
- *Unnatural risk.* People show less concern about naturally occurring risks, such as indoor radon, than they do about risks created by human activity, such as radon released as a result of uranium mining.
- *Exotic risk.* Risks encountered every day are not as frightening as risks resulting from a poorly understood or extraordinary source.

We hope that *Hazardous Substances and Public Health (HSPH)* is a valuable resource for our readers. But to ensure its usefulness, we need to hear from you. *HSPH* welcomes your comments and suggestions.

All correspondence should be addressed to Managing Editor, *Hazardous Substances and Public Health*, Agency for Toxic Substances and Disease Registry, 1600 Clifton Road, NE, Mailstop E33, Atlanta, Georgia 30333; fax (404) 639-6208.

Environmental Risk Communications in the Year 2000: Prospects and Challenges for the Future

Indoor air pollutants, radon gas, and childhood lead poisoning are only a few of the many environmental health issues that will receive continuing public debate and action into the next century. As more Americans become informed and educated through advanced communications technologies, the demand for meaningful and reliable information about scientific and technological uncertainties will increase. Global warming and environmental tobacco smoke are two issues, for example, that during the late 1970s and early 1980s received only scant national and media attention, yet are today embraced by a public that desires to know more about the threats to personal health posed by environmental factors.

As change and progress continue, public health practitioners face an equal number of prospects and uncertainties. ***Healthy People 2000***, a national health promotion and disease prevention campaign, provides the public health community with an effective forum for anticipating and responding to changing environments and events. The ***Healthy People 2000*** campaign contains three overarching public health goals: (1) to dramatically cut health-care costs, (2) to prevent the premature onset of disease and disability, and (3) to help all Americans achieve healthier, more productive lives.

Because of its central role in the processes of human development, health, and disease, environmental health is the focus of 16 of the 300 ***Healthy People 2000*** objectives to be achieved by the year 2000 (see Table 1). Primary targets of change identified include health status, risk reduction, environmental public awareness, professional education and awareness, services and protection, and surveillance and evaluation.

Environmental risk communication is a powerful tool for converting ***Healthy People 2000*** goals, objectives, information, and statistical data into communication strategies that influence how individual Americans and communities in the United States make decisions and take actions concerning health. For the purposes of this discussion, environmental risk communication is defined as "the purposeful exchange of information about the existence, nature, form, severity, or acceptability of environmental risks."

Changing environments emphasize the need for public health practitioners to assess their communication readiness. The public health community needs to have a clear understanding of how "change" could lead to problems underlying what should be communicated, in what form, to whom, and when. An optimal combination of communication methods and channels will enable public health practitioners to set priorities to achieve desired health outcomes.

It is important to recognize that, by itself, environmental risk communication alone cannot cause and sustain behavior change, or overcome poor quality services or treatment by health care providers. To be truly effective, environmental risk communication should be an integral component in a broader, more comprehensive prevention effort. Environmental risk communication can be combined with other key prevention strategies for addressing ongoing and emerging environmental health issues of the 1990s and the year 2000. Major strategies and activities include the following:

1. **Vision**. Articulate a clear and common vision of environmental risk communication's role in the prevention program effort.

2. **Public health policy and practice**. Advocate and develop a focus specific to environmental risk communication within the public and private health care communities.

3. **Information and communications technologies**. Promote universal data access for the health care and scientific communities. Create and improve linkages between information-rich organizations, agencies, and individuals. Provide quick access and a wider range of information options for the data-consuming public.

4. **Training**. Provide for the professional development of an environmental work force that is responsive to unmet environmental needs and opportunities.

5. **Partnerships**. Promote an enhanced level of collaboration and action among a critical mass of environmental health organizations, industries, individuals, employers, community groups, and all levels of government. Forge a common agenda for environmental issues.

6. **Research**. Identify current data and information gaps (e.g., scientific uncertainty) in knowledge of environmental health issues. Identify effective and less effective communication principles, strategies, and practices (i.e., what works and what doesn't).

7. **Evaluation**. Enlarge the focus of communications interventions to include **behavioral** outcomes, not merely health outcomes. Program effectiveness will hinge on the ability to show desired changes in awareness, knowledge, attitudes, and behaviors.

With the advent of new technologies, urbanization, and

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industrialization, America's focus on environmental health as a serious public health concern will continue into the next century. Public health practitioners should be mindful that "change" is an elusive target and will most likely appear different in the late 1990s and in the year 2000 than it does today. Indeed, the implications of "managed health care" may radically redefine how the year 2000 service and protection objectives are implemented.

Healthy People 2000: National Health Promotion and Disease Prevention Objectives, published by the U.S. Department of Health and Human Services in 1990, was developed by a consortium of more than 300 national organizations and state and territorial health departments. The collaboration was organized by the Public Health Service and the National Academy of Sciences' Institute of Medicine. Full and summary reports are available from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402; telephone (202) 783-3238.

Table 1. Healthy People 2000, Chapter Eleven: Environmental Health

Health Status Objectives

11. 1 Reduce asthma morbidity, as measured by a reduction in asthma hospitalizations, to no more than 160 per 100,000 people. (Baseline: 188 per 100,000 in 1987)

11. 2 Reduce the prevalence of serious mental retardation among school-aged children to no more than 2 cases per 1,000 children. (Baseline: 2.7 per 1,000 children aged 10 in 1985-1988)

11. 3 Reduce outbreaks of waterborne disease from infectious agents and chemical poisoning to no more than 11 per year. (Baseline: Average of 31 outbreaks per year during 1981-1988)

11. 4 Reduce the prevalence of blood lead levels exceeding 15 µg/dL and 25 µg/dL among children aged 6 months through 5 years to no more than 500,000 and zero, respectively. (Baseline: An estimated 3 million children had levels exceeding 15 µg/dL, and 234,000 had levels exceeding 25 µg/dL, in 1984)

Risk Reduction Objectives

11. 5 Reduce human exposure to criteria air pollutants, as measured by an increase to at least 85% in the proportion of people who live in counties that have not exceeded any Environmental Protection Agency standard for air quality in the previous 12 months. (Baseline: 49.7% in 1988)

11. 6 Increase to at least 40% the proportion of homes that homeowners or occupants have had tested for radon concentrations and that have either been found to pose minimal risk or have been modified to reduce risk to health. (Baseline: Less than 5% of homes had been tested in 1989)

11. 7 Reduce human exposure to toxic agents by limiting total pounds of toxic agents released into the air, water, and soil each year to no more than the following levels:

0.24 billion pounds of those toxic agents included on the U.S. Department of Health and Human Services list of carcinogens (Baseline: 0.32 billion pounds in 1988)

2.6 billion pounds of those toxic agents included on the ATSDR list of the most toxic chemicals (Baseline: 2.62 billion pounds in 1988)

11. 8 Reduce human exposure to solid waste-related water, air, and soil contamination, as measured by a reduction in average pounds of municipal solid waste produced per person each day to no more than 3.6 pounds. (Baseline: 4 pounds per person each day in 1988)

11. 9 Increase to at least 85% the proportion of people who receive a supply of drinking water that meets the safe drinking water standards established by the Environmental Protection Agency. (Baseline: 74% of 58,099 community water systems serving approximately 80% of the U.S. population in 1988)

11.10 Reduce potential risks to human health from surface water, as measured by a decrease to no more than 15% in the proportion of assessed rivers, lakes, and estuaries that do not support designated beneficial uses, such as fishing and swimming. (Baseline: An estimated 25% of assessed rivers, lakes, and estuaries did not support designated beneficial uses in 1988)

Service and Protection Objectives

11.11 Perform testing for lead-based paint in at least 50% of homes built before 1950.

11.12 Expand to at least 35 the number of states in which at least 75% of local jurisdictions have adopted construction standards and techniques that minimize elevated indoor radon levels in new building areas locally determined to have elevated radon levels. (Baseline: 1 state in 1989)

11.13 Increase to at least 30 the number of states requiring that prospective buyers be informed of the presence of lead-based paint and radon concentrations in all buildings offered for sale. (Baseline: Two states in 1989 required disclosure of lead-based paint; one state in required disclosure of radon concentrations; two additional states in 1989 required disclosure that radon has been found in the state and that testing is desirable)

11.14 Eliminate significant health risks from National Priorities List hazardous waste sites, as measured by performance of cleanup at these sites sufficient to eliminate immediate and significant health threats as specified in public health assessments completed at all sites. (Baseline: 1,082 sites were on the list in March of 1990; of these, public health assessments have been conducted for approximately 1,000)

11.15 Establish special collections for recyclable materials and household hazardous waste in at least 75% of counties. (Baseline: Approximately 850 programs in 41 states collected household toxic waste in 1987; extent of recycling collections unknown)

11.16 Establish and monitor in at least 35 states plans to define and track sentinel environmental diseases. (Baseline: 0 states in 1990)

Source: Public Health Service. Healthy people 2000: national health promotion and disease prevention objectives——full report, with commentary. Washington, DC: US Department of Health and Human Services, Public Health Service, 1991:317-32;DHHS publication no.(PHS)91-50212.

Planting the Seeds of Risk Communication: Fernald, Ohio

"A basic tenet of risk communication in a democracy is that people and communities have a right to participate in decisions that affect their lives, their property, and the things they value."

Seven Cardinal Rules of Risk Communication
U.S. Environmental Protection Agency

Citizens and government researchers at the Centers for Disease Control and Prevention (CDC) are learning from each other about the risks of living near a nuclear weapons facility. When an investigation began in the town of Fernald, Ohio, CDC scientists discovered that concerned members of the community, who organized a group called Fernald Residents for Environmental Safety and Health (FRESH), had already gathered information they could use—in the form of a map identifying the homes of residents who had developed specific diseases. CDC staff are conducting an initial investigation in Fernald to examine the feasibility of conducting a full-scale study of the potential health effects of exposure to ionizing radiation. The map of health outcomes is a clear example of the benefits of involving the affected community in scientific efforts to evaluate the public health consequences of environmental exposures.

The source of radiation exposure in Fernald was the former Feed Materials Production Center (FMPC), a government-owned, contractor-operated facility that converted uranium ore concentrates and materials recycled from other stages of nuclear weapons production to either uranium oxides or ingots of uranium metal. These materials were machined into tubular form for reactor fuel cores and other uses in a Department of Energy (DOE) weapons complex. FMPC operated from 1952 until 1988, when production was terminated.

CDC researchers are stepping into a situation with a long history of distrust between the community and government agencies. "'We're from the government, and we're here to help you' is not going to fly in this town. Any government agency has a lack of credibility here. We are going to have to earn the trust of those potentially affected by the plant," says CDC Statistician Dr. Owen Devine, "and the first step is open communication."

The need for scientific credibility must be balanced with the concerns of the affected citizens, according to CDC researchers. One goal of the potential study is to identify whether an association exists between FMPC-related radiation exposure and health effects in the community. The second goal is to respond to community concerns about the risks of FMPC exposures.

Researchers are investigating all pathways of exposure, including wind patterns and water flow of the Great Miami River. The river flows northeast to southwest, where the majority of FRESH members live.

The goal of involving the community in the CDC research effort has been facilitated by the efforts of the contractor responsible for estimating the amounts of radioactive material released by the plant during its operation. Radiological

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Assessments Corporation (RAC) established a rapport with the community through ongoing workshops, which CDC has continued. CDC staff are using these forums to explain to residents "what a health study can and can't do. We're trying to get the epidemiologic concerns publicly examined before the initiation of any research effort," says Dr. Devine.

In addition, CDC is learning from the community. Fernald residents will be a valuable source of information during any potential epidemiologic effort. For example, CDC staff presented during a public workshop estimates of the number of people who resided within specified distances of the plant. After the presentation, adjustments were made to the estimates based on the knowledge of long-time area residents.

The potential study population comprises people who lived within 8 to 10 kilometers of the FMPC site any time from 1952 to 1988. Potential sources of residential data with which to reconstruct this population include motor vehicle records, real estate records, voting rolls, tax records, and school records. CDC researchers have also learned about the makeup of the study population by talking to local sources such as FRESH.

Estimates of radiation exposure in the Fernald community are being developed in a dose-reconstruction project that will be completed in December 1993. For more information on CDC's investigation in Fernald, Ohio, contact Radiation Studies Branch, Division of Environmental Hazards and Health Effects, National Center for Environmental Health, CDC, 1600 Clifton Road, NE, Mailstop F35, Atlanta, Georgia 30333; telephone (404) 488-7040; fax (404) 488-7044.

Perceiving Risk: How Attitudes Affect Behavior

The National Research Council defines risk communication as "an interactive process of *exchange of information and opinion* among individuals, groups, and institutions" [italics added]. Defined in this way, risk communication goes far beyond the one-sided sending of risk messages, to include discussions about risk types and levels, and about methods for managing risks. An interactive approach to risk communication recognizes that people discussing a specific risky situation might have very different (a) perceptions of risk, (b) methods for making decisions under risky conditions, and (c) value structures—all of which lead to different choices about risk management. Therefore, before truly interactive dialogue about risk can take place, risk communicators must understand human risk perception and decision making. Some of the key constructs from the literature on risk perception and decision making will be discussed here; for a more comprehensive introduction, see Yates (1992); Fischhoff (1989a); Fischhoff, Bostrom, and Jacobs-Quadrel (1993); and Holtgrave, Tinsley, and Kay (in press).

Dimensions of Risk Perception. Empirical research shows that humans do not believe that all risks are of the same type. That is, people seem to have a taxonomy of categories into which they place risks; comparisons of risks are likely to be better received if they involve risks from the same category. Some of the dimensions that define this taxonomy are as follows: voluntariness, dread, controllability, knowledge, catastrophic potential, novelty, and equity (Slovic, Fischhoff, and Lichtenstein, 1986; Slovic, 1990). For example, people might see risk of radiation from a nuclear power plant in a neighboring state as qualitatively different from the risk of radiation from household radon gas that has been detected but purposively ignored—the first risk is involuntarily imposed, but the second exposure is chosen. Energy officials who attempt to compare the level of radiation from their plant to that being emitted by household radon gas may be greeted with a negative community reaction. Currently, researchers on risk perception are attempting to further refine the understanding of the dimensions that people use to categorize risks.

Estimating Cumulative Probabilities. Research has shown that people often have difficulty dealing with information about probabilities. Humans tend to exhibit the following characteristics: (a) easy-to-imagine events are judged relatively more likely to occur than they really are; (b) small probabilities are often overweighted and large probabilities are underweighted; and (c) probabilities are not appropriately revised when new information becomes available. Furthermore, people have difficulty estimating the cumulative probability that an event will occur (after many chances that the event might occur) even if they are presented with the probability of occurrence after one chance. For example, based on the work of Fischhoff, college students drastically underestimated the probability of HIV infection after 10 and 100 unprotected sexual encounters, even if one takes as correct the students' estimates of transmission on one unprotected encounter. Risk communicators therefore should be careful to provide probabilistic information both in a cumulative and "one-shot" format.

Optimistic Bias. In some circumstances, people tend to exhibit an optimistic bias. In particular, many people believe that they are at less risk of radon-induced lung cancer than other people living nearby. If people exhibit this bias, they may be putting themselves in unnecessary danger. Hence, those involved in risk communication dialogues need to be vigilant for signs of such optimistic bias in themselves and others.

Mental Models. "Mental models" are actually intuitive theories of how risks operate. One illustration of a mental model might be a person's understanding of how all of the factors related to radon-induced lung cancer risk interrelate. These factors include the source of radon, how it enters one's home, how it circulates within the home, how household occupants come into contact with it, how radon enters the body, and how it negatively affects human health. The understanding of this network of causal factors is important for understanding how people think about radon risk, and understanding such thought processes is important for meaningful risk communication dialogue. Indeed, if two or more parties in a risk communication dialogue have different mental models of a particular risk, it is important for them to assess, articulate, acknowledge, and resolve such information-processing differences.

In this brief article, only a few of the interesting and important developments in the areas of risk perception and decision making research can be mentioned. However, these are important areas for risk communicators to study; the references provided allow for further inquiry into these topics.

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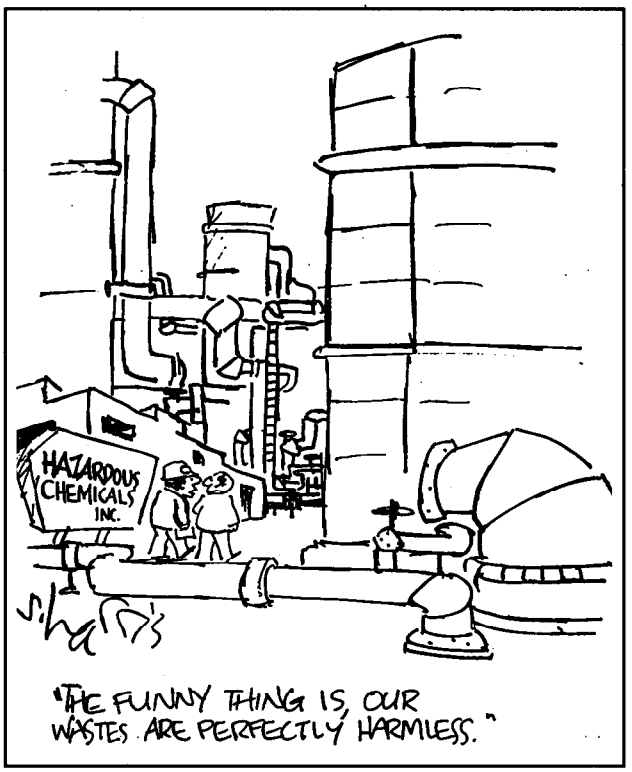

From the States...

New York: Tribal Community Participates in Study

The New York State Department of Health (NYSDOH) and the Mohawk Nation at Akwesasne are working together to conduct a long-term health investigation of Mohawk men, women, and infants who live along the St. Lawrence River. Three large industrial facilities near the Akwesasne Reserve have seriously contaminated the soil near their plants, affecting the sediments and fish of the adjacent St. Lawrence River. The goals of the study are to investigate the associations between the consumption of locally caught fish, residential exposure, body burdens of polychlorinated biphenyls

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(PCBs), and liver enzyme induction. Communicating these health risks is vital to protecting the health of this tribal community. (See related story, "New York: Polychlorinated Biphenyl [PCB] Exposure Study of Native American Women and Infants," *Hazardous Substances and Public Health,* vol. 3, no. 1, p. 5, February/March 1993.)

The contamination of fish and wildlife is a major concern of the Mohawk people because their tradition and culture emphasize the interdependence of people and their environment. Before the contamination was discovered, many residents depended heavily on local fish and waterfowl for food.

"Half of the Tribe follows many traditional practices regarding religion, diet, and language," says Dr. Kelley A. Brix, NYSDOH. "To convince the community to participate in the study and inform them that their eating habits may need to be modified is a big challenge."

Polyaromatic hydrocarbons (PAHs), PCBs, cyanide, fluoride, polychlorinated dibenzofurans, and dioxins are some of the contaminants found in or near the St. Lawrence River as a result of industrial dumping.

To minimize cultural barriers, NYSDOH has recruited Mohawks to be field investigators. Most women are interviewed by a registered nurse who has lived at Akwesasne and has worked in health care locally for several years. Most men are interviewed by a Mohawk male who has many years of experience as a medical technician and radio interviewer.

The interviewers explain the potential benefits of the study to individual tribe members and to the community. They explain that the study is intended to benefit the Mohawk people through increasing knowledge of contamination levels, sources of exposure, and potential health effects. Concern about possible health effects on future generations is of particular relevance to pregnant and nursing women.

To ensure informed consent, the interviewers explain the inherent risks of participation. The procedures pose little risk to subjects. Venipuncture is the only invasive technique. Some individuals participate in a study of liver enzyme induction through the use of the caffeine breath test. This test may temporarily increase heart rate and cause nervousness following ingestion of caffeine.

A $20.00 gift certificate is offered as an incentive for participation. After completion of the interview and collection of biological samples, women receive gift certificates for use at a local pharmacy. Men receive certificates for use at an auto supplies store.

In addition to administering the questionnaires and obtaining serum and breast milk samples, the interviewers often spend time on health education. They offer information on the results of the study to date, fish advisories, and, to pregnant or nursing women, information on parenting skills and the benefits of breast-feeding.

When the analyses of the levels of PCB and 1,1-dichloro-2,2-*bis*(p-chlorophenyl)ethylene (DDE) in biological specimens are completed, the results are mailed to participants and their physicians with an interpretation. Consultation with a NYSDOH physician coordinator is available and, if desired, is encouraged. Information about potential health risks associated with specific contaminant levels is included in the interpretation.

Public meetings, fish advisories, and television, radio, and print media are used to inform the community about potential health effects associated with the site.

As a result of risk communication, consumption of fish by Mohawk adults dropped from about four local fish meals per month in 1981 to about four local fish meals per year among pregnant women in the 1990s.

The results for the first 57 Mohawk women and the first 109 comparison Caucasian women are available. Mohawk women who gave birth during the period 1986 to 1989 showed higher breast milk PCB levels than the comparison group. In 1990, the levels in the Mohawk women had declined to those of the control group. PCB levels in the Mohawks have dropped further in the 1990s, probably because of the significant reduction over time of their fish consumption.

For more information about the Mohawk health study, contact Kelley Brix, MD, New York State Department of Health, Bureau of Environmental and Occupational Epidemiology, 2 University Place, Albany, New York 12203; telephone (518) 458-6206.

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The New York State Department of Health (NYSDOH) continues to investigate the problem of contamination of Great Lakes tributaries. In 1992, NYSDOH received a Great Lakes research grant from the Agency for Toxic Substances and Disease Registry (ATSDR) to further study health effects associated with the consumption of locally caught fish and wildlife and the body burden of polychlorinated biphenyls (PCBs) and 1,1-dichloro-2,2-*bis*(p-chlorophenyl)ethylene (DDE) in men who live along the St. Lawrence River. (See related story, "ATSDR Initiates Research Program To Study the Impact on Human Health of Fish Consumption in the Great Lakes," *Hazardous Substances and Public Health,* vol. 3, no. 2, p. 10, May 1993.)

Residential and occupational exposure to the contaminants will also be examined.

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

From the Tribes...

A community meeting was held in Española, New Mexico, on March 18, 1993, as a part of a 2-day conference entitled "Protecting Mother Earth: A Working Conference to Explore Solutions." The meeting was held at Northern New Mexico Community College by the Eight Northern Indian Pueblos Council and the Northern Pueblos Institute to present health concerns of north central New Mexican communities, including Indian pueblos, resulting from the past 50 years of activities at Los Alamos National Laboratory. The laboratory is operated by the University of California for the U.S. Department of Energy (DOE).

About 30 area residents attended the meeting, which was also attended by federal and state health agency representatives, including staff from the Centers for Disease Control and Prevention, the New Mexico Tumor Registry, the Indian Health Service, and the Agency for Toxic Substances and Disease Registry. Some of the concerns expressed were related to rates of thyroid disease in pueblo residents, cancer incidence and prevalence, occupational exposures, community involvement and participation, and the way DOE is providing information. Federal, state, and tribal activities related to the Los Alamos site will continue.

For more information, contact Leon Tafoya, director, or M. Pamela Bumsted, associate director, Environmental Office, Eight Northern Indian Pueblos Council, at (505) 852-4265.

The Northern Pueblos Institute has recently produced a manual entitled *Introduction to Environmental Management for Tribal Lands*. This document is the first of a series of planned publications on the environment and is intended to prompt the reader to think in terms of a comprehensive approach to environmental management. Copies of this document are available from Karen Young of the Northern Pueblos Institute at (505) 747-2194.

Risk Communication Lessons Learned from Patients' Education Materials

You've checked into the hospital for major surgery. Men and women in white flit in and out of your room. You're handed a 12-page guide filled with medical and hospital jargon (*neurological impairment, intravenous infusion, postoperatively*); vague words and phrases (*eventually, strenuous exercise, high temperature*); and impersonal language (*Your nurse will keep an accurate record of your intake and output. Please inform your nurse of any discomforts.*) Does this help you feel better about your surgery? Probably not. And especially not for the 50% of American adults who are unable to read at the 8th grade level.

Well-planned and well-written patients' education materials, on the other hand, can do much to reassure hospital patients that they will receive the best health care possible. The goals of patients' education writing are to educate, to allay anxiety and fear, to involve the patient and family, to link the patient and family with the hospital staff even after discharge, and to help the patient and family learn about self-care. The goals are not to impress or intimidate readers with the author's writing style or medical knowledge, or to provide more information than the reader needs.

Effective education materials for patients are practical, easy to understand and remember, inviting in tone and design, personal, correct, logically ordered (from the patient's point of view), and as short as possible. The following guidelines for producing patient education materials were developed by a patients' education writer at St. Luke's Episcopal Hospital in Houston, Texas.

- Remember your audience: patients and families, people with low or no literacy, non-native speakers of English, and people of all ages from many different backgrounds (educational, cultural, religious, and socioeconomic).

- Write in plain English. Make your language friendly, almost conversational. Avoid formal and stuffy words, phrases, and grammatical constructions. Use lay language, not medical and hospital jargon.

- Write to the patient. Say *you*, not *he* and *she*.

- Think like a patient. Look at events and procedures as a patient would encounter them. Ask patients what they would want to hear. Have patients review the information.

- Include information from all disciplines involved in the patient's care. Don't limit the information to that provided by just one person.

Continued

Continued from page 9

- Separate technical information from procedures. Make it easy for patients to follow directions.
- Be complete, but include only the necessary information. Patients don't want history or public relations, and they will be put off by long, detailed text. They won't read it, and they won't remember it.
- Build in feedback. Provide questions most often asked, suggest questions the patient might ask the doctor, leave space for notes, and suggest items that are particular to that patient (for example, *your next appointment:*).
- Write in strong language. Use active verbs more often than passive. Avoid *it is* and *there are*.
- Avoid sexist language. Don't assume that all doctors are men and all nurses are women. Use the plural *they* when possible to avoid *he* and *she*.
- Concentrate on brevity. Break long sentences (more than 20 words) into shorter ones. Then, shorten your sentences even more by cutting out unnecessary words, phrases, and even ideas. And when you have a choice, choose the shorter of two words—unless the longer word is more familiar than the shorter one.
- Make your information look inviting. Break it up into chunks. Spread it out, leaving plenty of white space. Use lots of heads and subheads. Arrange lists with bullets, instead of running them into sentences. Include graphic elements when possible. Use large enough type (12 points), a serif typeface, a ragged right margin (not justified), uppercase and lowercase letters (not all caps), and black ink on light paper (good contrast).

This style guide for patient education materials is based on readability research, including eye movement, associations, and retention; readability levels; and the audience (patients are sick, medicated, anxious, distracted, and disoriented). For more information, contact Gayle Nesom, Corporate Communications, St. Luke's Episcopal Hospital, Texas Medical Center, 6900 Fannin Street, Suite 555, Houston, Texas 77030-2697; telephone (713) 791-4194; fax (713) 791-4366.

Literacy Statistics

- Twenty percent of American adults (and 11% of America's management professionals) are functionally illiterate (they lack basic skills beyond a 4th grade level).
- Fifty percent of American adults are unable to read at the 8th grade level.
- One in nine American adults cannot read at all.
- U.S. Army training manuals are written at the 7th grade level.
- *Time* and *Newsweek* are written at the 10th grade level. So are the instructions on an aspirin bottle.
- Most health literature averages between the 8th and 13th grade reading levels.
- Studies reveal that the average patient population misunderstands 30% to 60% of the words commonly used by health care professionals in communicating with patients.
- In one study, 80% of the women questioned confused *anemia* with *enema*. Fifty percent thought *maternity* meant a type of dress.

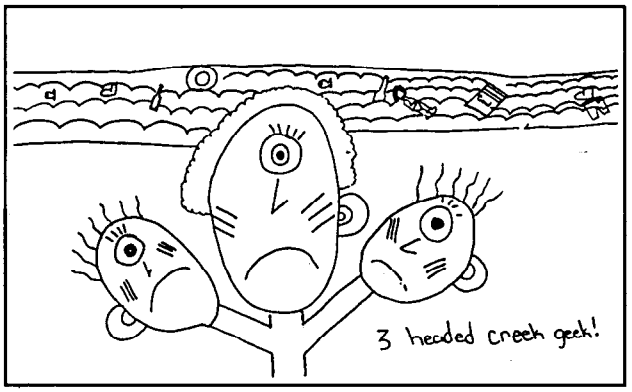
  Provided by Gayle Nesom, Corporate Communications, St. Luke's Episcopal Hospital, Houston, Texas.

Editorial Note: Many of the guidelines for producing patients' education materials can be applied to writing education materials on hazardous substances, most notably, "Remember your audience." Keep in mind how the document will be received by its readers. Are they physicians, other health professionals, sanitarians, the public in general, people living near hazardous waste sites, local health departments? The use of scientific terms such as *carcinogenic potential* and *parts per million (ppm)* assumes a very high level of education. In addition, different audiences have different uses for the material they read. Scientists and physicians may want to know the physical properties of a chemical, but the general public may be more interested in the answers to questions such as "What about a substance makes it hazardous? What is it used for? Where might it be a problem? Who is at risk?"

Risk Communication for Children

Would you want to be a 'Creek Geek'? Probably not. And the 4th and 5th graders at Calvin Donaldson Elementary in Chattanooga, Tennessee, certainly don't.

Representatives from the Agency for Toxic Substances and Disease Registry (ATSDR) visited four Chattanooga schools to teach children not to fish, swim, or play in the polluted Chattanooga Creek this summer. The effort was launched as part of the petitioned public health assessment



A child's vision of a Creek Geek.

process, which also included health education for community members, health professionals, and Chattanooga's leaders.

"There are approximately 42 hazardous waste sites in the area surrounding the creek causing the water to be contaminated," says Dr. Fred Rosenberg, an ATSDR physician. "The U.S. Environmental Protection Agency (EPA) may propose to add up to 37 of the 42 sites to the National Priorities List (NPL), a listing of the EPA's most hazardous sites. When we asked the kids if they played or fished in the creek, six out of each class answered 'yes'."

Before school let out for summer vacation, a team of three ATSDR employees, Saju Isaac, Fred Rosenberg, DO, and Lynelle Neufer, RN, MPH, designed and implemented a health education plan to inform children that playing around the creek could make them sick. To accomplish this, teaching plans were developed for kindergarten through 8th grade.

The youngest children learned how to do a 'fish dance.' If a fish is swimming in clean water, it is a happy and cheerful swimmer. But if a fish has to live in dirty water, it wears a frown and swims sideways.

The 7- and 8-year-olds looked at three jars of water. One jar contained dirty water, another contained water and vinegar, and the third jar contained clean water. Each student inspected the jars closely. By smelling the vinegar and water mixture, the children learned that even if the water appears clean, that doesn't mean it is.

"Don't swim or fish in the creek—Don't be a Creek Geek" was the message 4th and 5th graders received. A Creek Geek drawing contest was held among the kids, and the pictures were taken to ATSDR headquarters to be judged. The contest was based on the idea that self-image is very important at this age; no one wants to be 'uncool.'

In science class, the older children learned about bioaccumulation and exposure pathways. They were encouraged to be a big brother or big sister to the younger children and to help keep them away from the creek during the summer break.

Follow-up materials included a fact sheet explaining the creek's pollution; children were encouraged to take it home and share it with their parents. Also, teachers and school nurses were given a poster-size map of the contaminated area for classroom display, along with a teacher's packet to reinforce the hazards of the creek to the children.

ATSDR staff also met with city officials in Chattanooga to encourage the reopening of a community pool to give kids a place other than the creek to swim. The Agency recommended that more warning signs be posted around the creek.

ATSDR will continue to work with the community and health professionals in the area as part of the petitioned public health assessment process to protect the public's health. For more information on the health education efforts at Chattanooga Creek, contact Dr. Fred Rosenberg, Division of Health Education, ATSDR, 1600 Clifton Road, NE, Mailstop E33, Atlanta, Georgia 30333; telephone (404) 639-6205.

Dying for Art

"An artist's studio should be messy, littered with half-finished canvases and wilting still lifes."

—*Newsweek*

The popular conception of the artist as a creative being whose teeming ideas are reflected in a cluttered workplace actually conceals a serious health threat, occupational specialists say. Exposures suffered by artists, craftspeople, and hobbyists are among the most dangerous in any occupation. The peril is magnified by the apparent disregard with which many use the tools of their trade.

"If you walk into a college chemistry department, you'll see warning signs, students wearing many forms of protective equipment, and clean, carefully maintained laboratories. There will be ventilator hoods and eyewash fountains. Yet in the art department, where many of the same chemicals are used, you'll find few of these precautions," says Merle Spandorfer, an artist and principal author of *Making Art Safely: Alternative Methods and Materials in Drawing, Painting, Printmaking, Graphic Design, and Photography.*

Lacking positive role models and trained in academic settings where risk is seldom a topic, students adopt a noncha-

Continued

lant attitude about exposures associated with their work. Many artists refuse to discuss the hazards or even the techniques they use. Anselm Kiefer, a very successful artist, works with molten lead, pouring it onto canvas. A smoker, he works in an unventilated studio. "Some of my students want to imitate him," says Spandorfer, who teaches classes on safe artistic practices.

This devil-may-care attitude may affect not only artists but their families as well. Many artists work at home, unwittingly exposing their parents, spouses, pets, or children to hazardous materials such as solvents, nitric acid, or Dutch mordant.

The effects on children and the elderly can be particularly dangerous, according to Michael McCann, PhD, CIH, founding director of the Center for Safety in the Arts. "Children under 12 cannot understand and carry out precautions on a daily basis," Dr. McCann says, noting that he has found children in a day-care center using permanent markers and solvent-containing rubber cement. Elderly people may be taking medication that can worsen the effects of some exposures; if they have vision problems, they may work too closely to their creations or to glazes, paints, or solvents. Physically and mentally disadvantaged people are another high-risk group who are often exposed to toxic art supplies. Dr. McCann knows of seven fatalities among emotionally disturbed adolescents who sniffed correction fluid.

How much, how long, and how often artists are exposed; the toxicity of the materials used; and multiple exposures are key risk factors. Other risk factors are medical conditions, smoking, and drinking. Potters who had childhood asthma and use unvented kilns often relapse from inhaling sulfur dioxide. Photographers may contract asthma and other respiratory ailments from exposure to toxic chemicals used in development. Exposure to solvents can worsen liver damage such as that incurred by heavy drinkers or people who have had hepatitis. Solvent exposure can have severe, even lethal effects on people taking certain medications, especially tranquilizers. Smokers are at higher risk because of the synergistic effects of tobacco smoke on many chemical exposures.

Artists tend to lack awareness of the dangers posed by chronic exposure to hazardous substances as well. Irritant contact dermatitis is a common skin condition among artists, often caused by exposure to acids, alkalis, or solvents. Photographic developers are classic irritants, particularly color developers. Allergic reactions to turpentine are common, often emerging after years of use. Dr. McCann recommends against its use because of its high rate of dermal absorption.

What can be done to reduce the risk of practicing art? When she speaks to artists, Merle Spandorfer emphasizes that art can be created safely without compromising its quality. "Chemical and physical hazards can safely be replaced with nontoxic materials and safer practices," she asserts. Dr. McCann advises physicians to ask patients about art and hobbies in the work history. (For other tips, see box below.)

More information on safe art practices can be obtained from the following sources:

McCann M. Artist beware. 2nd ed. New York: Lyons and Burford, 1992.

Center for Safety in the Arts, 5 Beekman Street, Suite 1030, New York, New York 10038; telephone (212) 227-6220. The Center maintains the Art Hazards Information Center, publishes *Art Hazards News*, and offers a number of educational programs, including an art hazards course.

Spandorfer M, Curtiss D, Snyder J. Making art safely: Alternative methods and materials in drawing, painting, printmaking, graphic design, and photography. New York: Van Nostrand Reinhold, 1993.

How Artists Can Avoid Hazardous Exposures

1. Know your materials. Manufacturers of hazardous substances are required to provide employers a Material Safety Data Sheet that tells about ingredients, needed protective equipment, possible health effects, and emergency care. Obtain one for each hazardous product you must use. Poison control centers, the Occupational Safety and Health Administration, and the National Institute for Occupational Safety and Health (1-800-35-NIOSH) are other sources of information. Avoid working with unknown or found materials. Some items, such as lead-painted metals, may present serious hazards when welded.
2. Substitute safer materials for dangerous substances. "Hexane [often used in rubber cement and fixatives] is more toxic than heptane, for example," Dr. McCann explains. Merle Spandorfer, painter and printmaker, switched from oil-based to water-based materials.
3. Control exposure conditions. Artists working in enclosed spaces should have carefully planned ventilation systems.
4. Limit the length and frequency of exposure. "At art schools, the end of the school term often means longer exposures for students who are finishing projects," says Dr. McCann. Use the smallest amount of solvent necessary.

5. Use caution when storing and handling art materials. Flammable solvents are serious fire hazards.
6. Do not eat or drink in the workplace. Toxic substances can easily be ingested. Dr. McCann tells of an artist who developed mercury poisoning from ingesting acrylic paint on sandwiches eaten in the studio. Hygiene is important; handwashing can prevent or limit some exposures.
7. Use personal protective equipment. Gloves are recommended to protect against dermal exposures to some substances. Some artists may need eye goggles, face masks, or respirators to make art safely. However, warns Dr. McCann, "respirators don't provide as much protection as people think," especially for bearded men.
8. Have regular medical checkups. Be sure your doctor understands the nature and hazards of your artistic practices.

ANNOUNCEMENTS

Courses

ACOEM Courses

The American College of Occupational and Environmental Medicine (ACOEM) is an international society of 6,000 physicians who promote the practice of occupational and environmental medicine through preventive medicine, clinical care, research, and education.

ACOEM will offer 11 postgraduate seminars on a variety of environmental and occupational medicine topics and will premiere a core curriculum of eight scientific sessions in environmental medicine developed by ACOEM and the Agency for Toxic Substances and Disease Registry (ATSDR) at the ACOEM annual state-of-the-art scientific conference to be held October 25-29 at the Fairmont Hotel, Dallas, Texas.

The conference, open to occupational health professionals, will address (1) upper extremity disorders and work, (2) impairments caused by environmental agents, (3) corrective eye lenses, and (4) toxic tort litigation from environmental exposure; will offer a strategic review for the American Board of Preventive Medicine occupational medicine exam and a medical review officer update; and will offer updates on toxicology and the Americans with Disabilities Act.

Keynote speakers include Jerry B. Martin, director of environmental affairs, Dow Chemical Company, and Bernard D. Goldstein, director of the Environmental and Occupational Health Science Institute and its National Institute of Environmental Health Sciences Center of Excellence. Both are joint programs of Rutgers University and the University of Medicine and Dentistry — Robert Wood Johnson Medical School.

The pilot curriculum in environmental medicine will be presented by Jonathan B. Borak, MD, assistant clinical professor of internal medicine at Yale University. Four model case studies (childhood lead, dioxin, criteria air pollution, and radon) will serve as touchstones in the curriculum, which will feature 21 experts in environmental medicine.

For more information, please contact Kaye Coyne, ACOEM, 55 W. Seegers Road, Arlington Heights, Illinois 60005; telephone (708) 228-6850; fax (708) 228-1856.

ATSDR Courses

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

Clues to Unraveling the Association Between Illness and Environmental Exposure, American Public Health Association Annual Conference, San Francisco, California, October 24, 1993. This full-day course will use specific case studies to illustrate pertinent associations between illness and environmental exposure. Enrollment: 60.

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

Epidemiology in Action

The Centers for Disease Control and Prevention (CDC) and Emory University will cosponsor a course designed for practicing state and local health department professionals. This course, "Epidemiology in Action," will be held at CDC November 8-19, 1993. It emphasizes the practical application of epidemiology to public health problems and comprises lectures, discussions, workshops, classroom exercises (including actual epidemiologic problems), and an on-site community survey. The topics covered will include descriptive epidemiology and biostatistics, analytic epidemiology, epidemic investigations, public health surveillance, surveys and sampling, computers and Epi-Info 5, and discussions of selected prevalent diseases. Tuition is $575.

Continued

Applications must be received by September 15, 1993. Additional information and applications are available from Department PSB, Emory University School of Public Health, 1599 Clifton Road, NE, Atlanta, Georgia 30329; telephone (404) 727-3485 or 727-0199; fax (404) 727-4590.

Harvard Short Course

The Harvard School of Public Health Office of Continuing Education is offering the following short course for health care professionals in the area of occupational and environmental radiation protection.

Occupational and Environmental Radiation Protection, August 16-20, 1993. Topics include 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. An excellent fundamentals course for industrial hygienists and radiation safety officers. Expected attendance: 60. Fee: $1075.

For further information, 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.

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.

Emergency Response to Hazardous Materials, October 4-8, 1993. This course will address various aspects of emergency response to hazardous chemical incidents. OSHA regulations 29 CFR 1910.120 (q) will be emphasized.

Sampling and Evaluating Airborne Asbestos Dust (NIOSH 582), October 11-15, 1993. This 4-day course covers aspects of collecting and counting airborne asbestos involving sampling procedures, microscopy, counting procedures, and optical methods.

Certified Hazardous Material Manager (CHMM) Review, October 13-15, 1993. This course is designed to assist in preparing for the Institute of Hazardous Materials CHMM examination. The CHMM Exam will be administered the last day of the course.

Asbestos Identification by Polarized Light Microscopy, October 18-21, 1993. This 4-day course is designed to teach the techniques of asbestos identification. It is designed for technical personnel with little or no background in microscopy. After the study of known samples, at least 10 hours of laboratory time will be available for analysis of unidentified samples.

Safety and Health Training for Hazardous Waste Site Personnel (HST 24 - HST 40), October 25-27 and October 25-29, 1993. These courses will provide 24 and 40 hours of intensive classroom instruction and hands-on training, fulfilling OSHA requirements (29CFR 1910.120) as mandated under the Superfund Amendments and Reauthorization Act 1986 (SARA). Students may register for either the 24- or 40-hour option.

University of Washington

The University of Washington Northwest Center for Occupational Health and Safety in Seattle, Washington, is offering the following courses for continuing education in occupational medicine, occupational health nursing, and industrial hygiene and safety to upgrade the skills of people working in these and ancillary disciplines.

Occupational and Environmental Lead Exposure, October 21, 1993. This course will examine evidence of the neurotoxic effects of low-level lead exposure and efforts to monitor and reduce lead exposure in children and adults. Fee: $145.

Risk Communication, November 18, 1993. This course will examine principles and applications of risk communication as they relate to workplace safety and environmental pollution, the role of the news media in shaping perceptions of risk, and the contribution that effective risk communication can make to risk management. Fee: $145.

Risk Assessment, November 19, 1993. This course is an overview of current approaches in risk assessment, with discussion of methodology used to identify and characterize hazards. Fee: $145.

For more information about these and other available courses, contact the Northwest Center for Occupational Health and Safety, Department of Environment Health, SC-34, University of Washington, Seattle, Washington 98195; telephone (206) 543-1069.

Neurobehavioral Symposium To Be Held in Cairo, Egypt, December 1994

The Egyptian Society of Pesticides Hazards and Cairo University are hosting the Fifth International Symposium on Neurobehavioral Methods and Effects in Occupational and Environmental Health, in Cairo, Egypt, December 3-7, 1994. The symposium is being organized with the coopera-

tion of the Scientific Committee on Neurotoxicology and Psychophysiology of the International Commission on Occupational Health. Submission deadlines are as follows: for abstracts, February 28, 1994; for full papers, October 31, 1994. For more information, please contact the regional secretariat for the Americas: Barry L. Johnson, PhD, Office of the Assistant Administrator, Agency for Toxic Substances and Disease Registry, 1600 Clifton Road, NE, Atlanta, Georgia 30333 USA; telephone (404) 639-0700; fax (404) 639-0744.

Secretary Shalala Names Acting Administrator of ATSDR and Acting Director of CDC

On June 30, 1993, William L. Roper, MD, stepped down from his position as administrator of the Agency for Toxic Substances and Disease Registry (ATSDR) and director of the Centers for Disease Control and Prevention (CDC). Dr. Roper had headed the two public health agencies for 3½ years. He will remain in Atlanta to head the Health Services Research Center for Prudential Insurance Company.

Walter R. Dowdle, PhD, deputy director of CDC and deputy administrator of ATSDR, has been selected by U.S. Department of Health and Human Services Secretary Donna E. Shalala to serve as acting administrator of ATSDR and acting director of CDC. Dr. Dowdle, who served as acting administrator of ATSDR and acting director/administrator of CDC from 1989 to 1990, has been deputy director of the agencies since 1987. He became CDC's deputy director for AIDS in 1986 and before that served 5 years as director of the National Center for Infectious Diseases and coordinator of AIDS activities in the Public Health Service in Washington, DC.

CALENDAR

AUGUST/SEPTEMBER

Aug. 23-Sept. 3: 11th Annual Occupational Health and Safety Institute, Minneapolis, Minnesota. *Contact:* Lois Ophoven, Midwest Center for Occupational Health and Safety, 640 Jackson Street, St. Paul, Minnesota 55101; telephone (612) 221-3992; fax (612) 292-4773.

Aug. 27-Sept. 1: National Association of Community Health Centers, Inc. (NACHC), New Orleans, Louisiana. *Contact:* NACHC, 1330 New Hampshire Avenue, NW, Suite 122, Washington, DC 20036; telephone (202) 659-8008; fax (202) 659-8519.

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

OCTOBER

Oct. 12-15: 15th Annual Health Conference sponsored by the Lead Industries Association, St. Louis, Missouri. *Contact:* Lead Industries Association, Inc., 295 Madison Avenue, New York, New York; telephone (212) 578-4750; fax (212) 684-7714.

Oct. 24-28: American Public Health Association, San Francisco, California. *Contact:* Michelle Horton, 1015 Fifteenth Street, NW, Washington, DC 20005; telephone (202) 789-5600; fax (202) 789-5661.

Oct. 25-29: **Course in Occupational and Environmental Medicine,** University of California, San Francisco. The Division of Occupational and Environmental Medicine, Department of Medicine, University of California, San Francisco School of Medicine, has offered short-course training in occupational and environmental medicine for the past 15 years. Previously, the course was presented in three sessions, totalling 5 weeks of instruction. Comparable course material is now being presented in five 1-week sessions over a 2-year period to accommodate practicing physicians who find it difficult to leave their practices for more than one week at a time. Future sessions are scheduled for January 31-February 4, 1994; October 24-28, 1994; January 30-February 3, 1995; and October 23-27, 1995. *Contact:* Joseph LaDou, MD, UCSF Box 0924, San Francisco, CA 94143-0924; telephone (415) 476-4951.

Oct. 25-30: City 93/EPH 93 Urban Environment, Social Issues, and Health in Cities—Environment and Public Health in Modern Society, Antwerp, Belgium. *Contact:* Society for Research on Environment and Health, Community Health Services, Uitbreidingsstraat 506, 2600 Antwerp, Belgium; telephone (323) 230-9232; fax (323) 230-1644.

Oct. 30-Nov 5: American Academy of Pediatrics, Washington, DC. *Contact:* Marisa Goldberg, American Academy of Pediatrics, 141 Northwest Point Boulevard, P.O. Box 927, Elk Grove Village, Illinois 60009-0927; telephone (708) 228-5005; fax (708) 228-5088.

NOVEMBER

Nov. 4: Biological Mechanisms and Quantitative Risk Assessment, Research Triangle Park, North Carolina. *Contact:* Research Evaluation Association, Inc., 100 Europa Drive, Suite 590, Chapel Hill, North Carolina 27514; telephone (919) 968-4961; fax (919) 967-4098.

hazardous substances & Public Health

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