

IN THIS ISSUE

A MESSAGE FROM DR. HENRY FALK, ATSDR ASSISTANT ADMINISTRATOR	1
CHILDREN'S EXPOSURES	1
ATSDR'S SPECIAL EMPHASIS	3
ATSDR CHIEF MEDICAL OFFICER	5
MODERATE LEAD POISONING: SPOTLIGHT ON REGION 1 PEHSU	5
PEHSUs: WHERE WE ARE	6
NIEHS/EPA/CDC CHILDREN'S RESEARCH CENTERS	8
MEET ELIZABETH (LIBBY) H. HOWZE	9
CHILDHOOD LEAD POISONING IN MISSOURI AND KANSAS	10
ATSDR: PUBLIC HEALTH DETECTIVE	12
THE NATIONAL CHILDREN'S STUDY	13
WEB SITE RESOURCES	14
RECENT PUBLICATIONS	15
CASE STUDIES IN ENVIRONMENTAL MEDICINE	16
SCHOOL LOCATIONS	17
THE IMPACT OF ADHD MAY BE UNDERESTIMATED	19
INTERNET RESOURCES SEMINAR	20
BAM! ANSWERS TO YOUR QUESTIONS	20
CHILDREN'S ENVIRONMENTAL HEALTH CASE STUDY	21
VISIT CHEC'S HEALTHHOUSE	21
A PLEDGE TO PROTECT CHILDREN	21
CALENDAR	22

A Message From Dr. Henry Falk, ATSDR Assistant Administrator This Month: Children's Environmental Health

Welcome to the first issue of *Public Health and the Environment*, the newsletter of the Agency for Toxic Substances and Disease Registry (ATSDR). This inaugural issue of the newsletter, formerly called *Hazardous Substances and Public Health*, focuses on children's environmental health. Because their nervous and other organ systems are undergoing rapid development and change, children are uniquely vulnerable to a variety of exposures to hazardous substances from the air, water, and soil. I hope that you will find this issue helpful in learning more about the growing understanding of the linkages between exposures to toxic substances and disease and developmental disorders in children. I also hope this issue and future issues in which children will be featured will help readers understand how this expanding science base supports efforts by ATSDR, its partner organizations, state and local health and environmental agencies, and others to protect children from harmful environmental exposures and promote environments in which children can be healthy. ☘

Children's Exposures

Children are at higher risk than adults of being exposed to hazardous substances and of suffering adverse health effects as a result of their exposure. Children's activities put them at higher risk of exposure to hazardous substances that might be in water or soil. Their height puts them at a level where they are more likely to breathe dust and vapors close to the ground. Small children often put their hands in their mouths, which can allow contaminants into their bodies.

Children's smaller body size and developing systems also place them

at greater health risk than adults. Because they are smaller, children receive higher doses of toxicants per pound of body weight. Pound for pound, children drink more water, eat more food, and breathe more air than adults do. Many organ systems in young children, such as the nervous system and the lungs, undergo rapid growth and development in the first years of life. During these periods of development, children's organ systems are especially vulnerable to injury. Of special concern is exposure of the fetus, whose organ

Continued on page 2





Children's Exposures

continued from page 1

and body systems are still developing.

Environmental toxicants are a growing cause of preventable illness in children. Exposure to the following toxicants can cause a variety of health and learning disorders.

- ◆ Benzene causes leukemia and possibly other cancers.
- ◆ Environmental tobacco smoke can raise children's risk of ear infections and breathing problems and trigger asthma attacks.
- ◆ Lead causes learning and behavioral problems.
- ◆ Mercury can lead to cerebral palsy, severe mental retardation, neurodevelopmental delays, and seizures.
- ◆ Nitrates and nitrites cause methemoglobinemia (the decreasing capacity of the blood to transport oxygen).
- ◆ Pesticides can cause cancer, birth defects, and nerve damage.
- ◆ Polychlorinated biphenyls (PCBs) might lead to lower intelligence quotients (IQs) in children.
- ◆ Trichloroethylene (TCE) is associated with hearing loss and delays in speech development.

In addition, environmental triggers of asthma are also a concern. Environmental pollutants are major contributors to asthma, the most common admission diagnosis in many children's hospitals.

Some of these environmental toxicants are addressed in this issue; others will be discussed in the Children's Environmental Health section in future issues.*

Suggested Reading

Agency for Toxic Substances and Disease Registry. Healthy children—toxic environments. Report of the Child Health Workgroup. Atlanta: US Department of Health and Human Services; 1997.

Amler RW, Smith L, editors. Achievements in children's environmental health. Atlanta: US Department of Health and Human Services, Agency for Toxic Substances and Disease Registry; 2001.

Bearer CF. Environmental health hazards: how children are different from adults. *Future Child* 1995;5(2):11–26.

Landrigan PJ, Carlson JE. Environmental policy and children's health. *Future Child* 1995;5(2):34–52.



Sarah, age 6



"Papito taking baby Benjamin to the doctor."
Sophia, age 4



ATSDR's Special Emphasis

ATSDR has placed special emphasis on children in conducting its health studies and other activities. The agency has conducted or funded large studies to assess whether the infants of mothers who live near hazardous waste sites are at higher risk for various birth defects or other adverse health outcomes (e.g., small for gestational age). Some of these studies found an increased risk for neural tube defects. Several studies also showed an increased risk for musculoskeletal and heart defects.

Since 1998, ATSDR has been producing *Toxicological Profiles* that highlight the scientific issues relating to children and hazardous wastes. The profiles now have four sections and two subsections specifically addressing child health issues. Other sections also include an additional focus on issues relevant to children. Health care providers treating patients potentially exposed to hazardous substances will find useful information in the *Toxicological Profiles*; these comprehensive, peer-reviewed reference documents are also used by other health professionals, private-sector groups, and members of the public.

The Pediatric Environmental Health Specialty Unit (PEHSU) Program

The ATSDR PEHSU Program promotes children's health by linking medical specialists who have environmental expertise with pediatricians, parents, and communities. PEHSU physicians at 11 units in academic medical centers throughout the United States offer community education, training, consultations, and clinical referrals (see PEHSU map on page 6 and listing on pages 6–7).

In the aftermath of the World Trade Center attacks, the PEHSU in New York City responded in several ways. PEHSU responses included press interviews; public presentations; and consultation with government agencies, parents, and physicians to answer questions over the telephone and in person. The PEHSU also provided practical advice, such as

- ◆ practicing prudent avoidance of visible hazards,
- ◆ limiting time outdoors near the World Trade Center site,

- ◆ limiting outdoor exercise and vigorous play,
- ◆ using high-efficiency particulate air (HEPA) vacuums or damp mops and rags,
- ◆ cleaning air-handling systems properly,
- ◆ keeping windows closed, and
- ◆ taking shoes off at the door.

The PEHSUs increase access to (a) information, (b) clinical referrals, and (c) training in pediatric environmental health and medicine for physicians and other health care providers. The PEHSUs link environmental medicine and pediatric specialists to improve environmental health services for children exposed to hazardous substances.

PEHSU Program partners are ATSDR, the U.S. Environmental Protection Agency (EPA) and its regional offices, and the Association of Occupational and Environmental Clinics (AOEC).

Continued on page 4

Pediatric Environmental Health Specialty Units: What We Did in Fiscal Year 2001

Activity	Number
Number of children evaluated	907
Number of calls received	30,581
Number of health professionals who received education or training	>16,275



Special Emphasis

Continued from page 3

Child Health Workgroup

The ATSDR Child Health Workgroup is a multidisciplinary panel of experts appointed by ATSDR's Board of Scientific Counselors. The workgroup makes recommendations to the agency regarding research and policy directions for pediatric environmental health practice.

The most recent Child Health Workgroup meeting in April 2002 addressed

- ◆ children's environmental health response to bioterrorism and diseases,
- ◆ urban sprawl and brownfields, and
- ◆ characteristics of schools located near hazardous waste sites.

The Children's Trust: The Community's Legacy of a Healthy Environment

ATSDR is developing a community action plan to help communities deal proactively with children's exposure to toxic substances. The

ATSDR's Child Health Program (www.atsdr.cdc.gov/child) emphasizes ongoing focus on relevant child health issues in all of the agency's activities.

action plan will create safe environments for children in communities at risk. The program will

- ◆ provide a comprehensive framework for communities to understand children's risk for exposure to toxic substances,
- ◆ educate residents of all ages about risks and prevention, and
- ◆ enlist and educate agencies and organizations in these communities to do their part to create safe environments for children.

A key component of the project will be the development of a database of information about educational, policy, and programmatic resources available for community use. This database will

include products from government, medical, and educational organizations. The plan will include the roles of and suggested activities for segments of the community that have an impact on environmental health and children, including health care and public health, government, education, media, and business and industry. This plan will be developed with experts in the field and state and community representatives.

Conclusion

ATSDR recognizes that children today face an array of exposures to potentially toxic environmental hazards. These exposures can have a significant impact on their health and well-being. Children are at risk for learning disabilities, chronic and acute respiratory diseases, cancers, and illnesses caused by damage to the nervous system from hazardous substances. The incidences of chronic childhood diseases are increasing. It is essential that every effort be made to better understand children's unique susceptibilities to environmental hazards.*

"In 1998, 7% of children ages 5 to 17 were limited in their activities because of one or more chronic health conditions, compared with 3% of children younger than 5."

—Federal Interagency Forum on Child and Family Statistics. *America's children: key national indicators of well-being, 2001.* Washington, DC: US Government Printing Office; 2001.

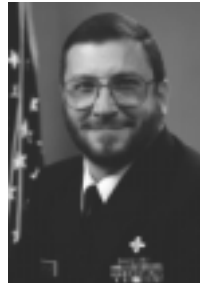
Children's Environmental Health: Interagency Collaboration

To Promote Children's Health was held in January 2002 in Research Triangle Park, North Carolina. Attendees included staff from the 11 PEHSUs in the United States, 12 Centers for Children's Environmental Health and Disease Prevention Research (see page 8 for more information about the centers), ATSDR, National Institute of Environmental Health Sciences (NIEHS), EPA, and PEHSUs in Canada and Mexico. The meeting focused on opportunities for collaboration among and between the centers and the PEHSUs.



ATSDR Chief Medical Officer

Dr. Robert Amler is an epidemiologist and emergency room physician. He has worked in public health for 25 years and at ATSDR for 15 years. He administers the Child Health Program and heads the Office of Children’s Health (OCH), created in 1998. The office coordinates ATSDR’s program activities in children’s health. He says he chose public health because “I believe that public service is the highest calling, and the most important mission in medicine is to protect the health of all people, especially those with the least access to health care.”



OCH works closely with the divisions to focus on children’s issues. In the future, OCH plans to examine ways to expand the effectiveness of the PEHSUs, increase the distribution of toxicological reference materials, and work with professional organizations and other federal agencies to develop professional training and practice standards for children’s environmental health.

Dr. Amler also practices emergency medicine at Children’s Health Care of Atlanta because “I enjoy helping people during emergencies,” he says, “and because it keeps me current in the latest techniques and methods in handling medical and surgical emergencies.”

Moderate Lead Poisoning: Spotlight on Region 1 PEHSU

Three children were referred by their pediatrician to the Region 1 Pediatric Environmental Health Specialty Unit (PEHSU) for evaluation and management of moderate lead poisoning. All three children (2, 3, and 4 years old) had lead levels of 21–26 micrograms per deciliter (µg/dL) with corresponding elevations in blood concentration of zinc protoporphyrin. (Elevated blood lead levels are defined as greater than or equal to 10 µg/dL.)

The children’s mother reported that her home had been completely renovated, and she believed it was lead free. (The state childhood lead poisoning prevention program inspected the home and found no accessible lead hazards.) When asked about other potential environmental sources of lead, the mother said that the children often played outside in the home’s unfinished driveway. An environmental inspection of the driveway found that the soil lead concentration was greater than 25,000 parts per million (ppm), far above the 400 ppm considered acceptable by the U.S. Environmental Protection Agency. The mother was later told that the driveway had been used by previous residents for car repair

Estimated Costs (Billions) of Pediatric Disease of Environmental Origin, United States, 1997

Disease	Best Estimate	Low Estimate	High Estimate
Lead poisoning	\$43.4	\$43.4	\$43.4
Neurobehavioral disorders	\$9.2	\$4.6	\$18.4
Asthma	\$2.0	\$0.7	\$2.3
Cancer	\$0.3	\$0.2	\$0.7
Total	\$54.9	\$48.8	\$64.8

Adapted from Landrigan PJ, Schecter CB, Lipton JM, Fahs MC, Schwartz J. Environmental pollutants and disease in American children: estimates of morbidity, mortality, and costs for lead poisoning, asthma, cancer, and developmental disabilities. *Environ Health Perspect* 2002;110(7):721–8.

Continued on page 7



PEHSUs: Where We Are

Region 1, Massachusetts (featured in Spotlight on Region 1 PEHSU, page 5): **Pediatric Environmental Health Center, Children's Hospital Boston**

Toll-free telephone: 1-888-Child14 (1-888-244-5314)

Web site: www.childrenshospital.org

(In the "find" box, enter the key word "environmental")

Region 2, New York: **Mt. Sinai Pediatric Environmental Health Unit/Mt. Sinai-Irving J. Selikoff Center for Occupational and Environmental Medicine, New York**

Toll-free telephone: 1-866-265-6201

Web site: www.mssm.edu/cpm/peds_enviro.html

Region 3, Washington, DC: **Mid-Atlantic Center for Children's Health and the Environment (MACCHE), George Washington University Medical Center, Washington, DC**

Toll-free telephone: 1-866-MACCHE1 (1-866-622-2431)

Web site: www.health-e-kids.org

Region 4, Georgia: **The Southeast Pediatric Environmental Health Specialty Unit at Emory University, Atlanta**

Toll-free telephone: 1-877-33PEHSU (1-877-337-3478)

Web site: www.sph.emory.edu/PEHSU

Region 5, Illinois: **Great Lakes Center for Children's Environmental Health, Cook County Hospital, Chicago**

Toll-free telephone: 1-800-672-3113

Web site: www.uic.edu/sph/glakes/kids

Region 6, Texas: **Southwest Center for Pediatric Environmental Health, University of Texas Health Center at Tyler, Tyler, Texas**

Toll-free telephone: 1-888-901-5665

Web site: research.uthct.edu/swcpeh

Region 7, Iowa: **Midwest Regional Pediatric Environmental Health Center, University of Iowa, Iowa City, Iowa**

Toll-free telephone: 1-866-697-7342

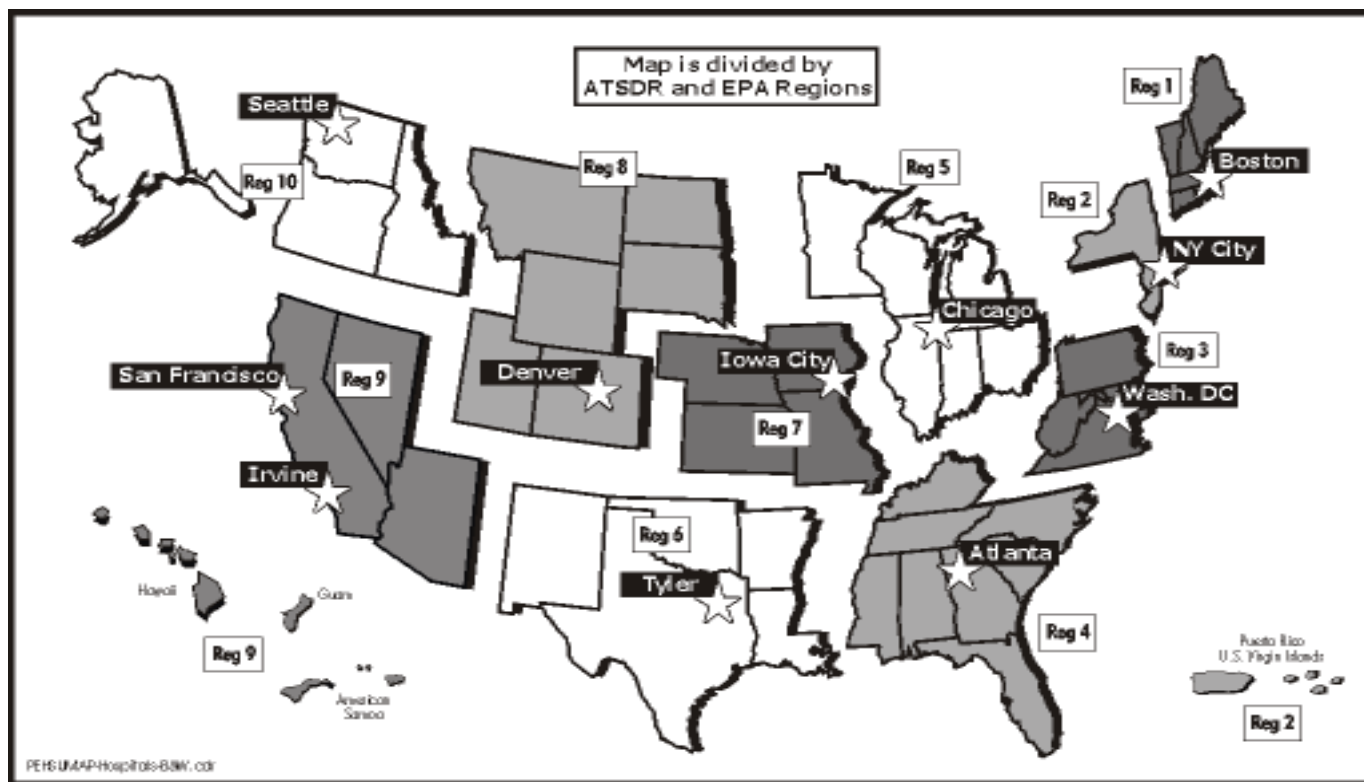
Web site: www.uihealthcare.com/depts/pediatricenvironmentalhealth/index.html

Region 8, Colorado: **Rocky Mountain Regional Pediatric Environmental Health Specialty Unit, National Jewish Medical and Research Center, Denver**

Toll-free telephone: 1-877-800-5554

Web site: rnrpehsu.org

Continued on page 7



Stars indicate PEHSU locations on map.



Region 1 Spotlight

Continued from page 5

that included sanding, painting, and soldering.

Despite the availability of state funds for residential lead abatement, funds were not available to clean up soil. However, with the PEHSU serving in an advocacy role, funds were secured and the driveway soil was completely cleaned up. In less than 6 months, the children's blood lead levels dropped to less than 20 µg/dL as a result of the combination of abatement, close monitoring, and a brief course of chelation therapy. "This unusual case showed us that outdoor lead sources are occasionally significant. We also learned that resources for the abatement of out-of-home lead hazards are insufficient. Additional infrastructure and support are needed to help families such as this one," said Dr. Michael W. Shannon, MD, MPH, Co-Director of the Pediatric Environmental Health Center. ❄️

The Pediatric Environmental Health Center at Children's Hospital Boston

is Region 1's PEHSU. The center offers multidisciplinary consultation, evaluation, and management of children with known or suspected exposure to environmental toxicants. The center provides medical management for illnesses or intoxications resulting from exposures to heavy metals, indoor air pollutants, outdoor pollutants, and adolescent occupational hazards. The center coordinates the care of children and adolescents exposed to a wide range of poisons.

In addition to providing clinical services, the staff and affiliated staff are doing research to answer important questions in pediatric environmental health, including

- ◆ How do lead and mercury affect children of different ages?
- ◆ What is the best way to treat children who have lead and mercury poisoning?
- ◆ When should chelation be used?
- ◆ What types of exposures to hazardous substances do adolescents who work have, and how can harmful exposures be prevented?
- ◆ What do other health professionals, such as pediatric primary care providers, need to know about pediatric environmental health?
- ◆ What are the best ways to promote education about pediatric environmental health issues?

Where We Are

Continued from page 6

Region 9, California: **University of California-San Francisco (UCSF)/University of California-Irvine (UCI) Pediatric Environmental Health Specialty Unit**

Toll-free telephone: 1-866-UC-PEHSU
(1-866-827-3478) (for both sites)
Web site: www.ucsf.edu/ucpehsu

Region 10, Washington State: **Pediatric Environmental Health Specialty Unit, Harborview Medical Center, Seattle**

Toll-free telephone: 1-887-KID-CHEM (1-887-543-2436)
Web site: www.depts.washington.edu/oemp/grants/PEHSU.html ❄️

For more information on the PEHSU Program, call

- ◆ Katherine Kirkland, MPH, Executive Director, AOEC (202-347-4976) or
- ◆ Christine Rosheim, DDS, MPH, Project Officer, ATSDR (404-498-0323).



NIEHS/EPA/CDC Children's Research Centers

In 1998, the National Institute of Environmental Health Sciences (NIEHS), the U.S. Environmental Protection Agency (EPA), and the Centers for Disease Control and Prevention (CDC) developed the Centers for Children's Environmental Health and Disease Prevention Research program. The program promotes both basic research and the translation of research findings into applied intervention and prevention methods. The following 12 centers in the program address a range of environmental health-related issues, diverse populations, and a variety of settings:

- ◆ University of California at Davis: **The Center for the Study of Environmental Factors in the Etiology of Autism** investigates how environmental risk factors might contribute to childhood autism.
- ◆ Robert Wood Johnson Medical School/University of Medicine and Dentistry of New Jersey: **The Center for Childhood Neurotoxicology and Exposure Assessment** assesses the possible influence of mercury, lead, and valproic acid on autism, learning disabilities, and regression.
- ◆ Children's Hospital Medical Center of Cincinnati: **The Children's Environmental Health Center** heads a research program in which community participants attempt to lower lead levels in their homes so that their children accumulate only traces of lead.
- ◆ University of Illinois at Urbana-Champaign: **The Friend's Children's Environmental Health Center** works with nearby Hmong and Laotian communities to study the impact of polychlorinated biphenyls (PCBs) and mercury on the motor, sensory, and mental development of their children.
- ◆ Columbia University School of Public Health: **The Columbia Center for Children's Environmental Health** is undertaking a comprehensive community-based assessment of environmental risks to African American and Latino children living in New York.
- ◆ University of Southern California: **The Respiratory Disease and Prevention Center** is assessing the impact of environmental tobacco smoke and determining whether sensitization to cockroach and dust mite allergens can be reduced to improve the health of a multiethnic cohort of children in Los Angeles who have asthma.
- ◆ The Johns Hopkins University: **The Center for Childhood Asthma in the Urban Environment** examines how exposures to environmental pollutants and allergens exacerbate asthma in children living in Baltimore's inner city and searches for new ways to reduce the incidence of asthma by reducing exposure to these agents.
- ◆ Mt. Sinai School of Medicine: **The Center for Children's Health and the Environment** identifies, characterizes, and prevents neurodevelopmental deficits that result from exposures to pesticides in the home and polychlorinated biphenyls in the diet.
- ◆ University of Michigan School of Public Health: **The Michigan Center for the Environment and Children's Health** investigates mechanisms of asthma in children and translates those findings into risk assessment

Continued on page 9

For more information about the centers, visit the following Web sites:

- ◆ es.epa.gov/ncer/centers/cecehdpr/98/ (EPA) or
- ◆ www.niehs.nih.gov/dert/programs/translat/children/children.htm (NIEHS).



Centers

Continued from page 7

and comprehensive neighborhood and household interventions.

- ◆ University of Iowa School of Medicine: **The Children's Environmental Airway Disease Center** studies environmental models of asthma to investigate the biological origin and persistence of airway disease in children.
- ◆ University of Washington School of Public Health and Community Medicine: **The Center for Child Environmental Health Risks Research** conducts research to understand the mechanisms that define children's susceptibility to pesticides and the implications for assessing pesticide risks to normal development and learning.
- ◆ University of California at Berkeley, School of Public Health: **The Center for the Health Assessment of Mothers and Children of Salinas (CHAMACOS)** focuses on the environmental health risks of Latino farmers in California. Children in this region are exposed to organophosphate pesticides. The effects of chronic low-level exposures on the growth and development of these children are unknown.✿

Meet Elizabeth (Libby) H. Howze

Elizabeth (Libby) H. Howze, ScD, CHES, is the new Director of the Division of Health Education and Promotion at



ATSDR in Atlanta, Georgia. Dr. Howze worked in family planning in the Peace Corps in Sri Lanka during 1967–1969. She graduated from the Johns Hopkins University School of Hygiene and Public Health in 1985 with a doctorate in public health education.

Dr. Howze moved to Atlanta in 1994 to serve as Chief of the Health Interventions and Translation Branch in the National Center for Chronic Disease Prevention and Health Promotion at the Centers for Disease Control and Prevention (CDC). Her branch was instrumental in helping redirect public health research and practice in nutrition and physical activity from a focus on individual behavior change to a public health ecologic framework that emphasized policy and environmental change. As

branch chief—and later as the Associate Director for Health Promotion in the Division of Nutrition and Physical Activity at CDC—she provided leadership in the development, release, and dissemination of the first Surgeon General's report on physical activity and health. Dr. Howze also directed the nutrition and physical activity communications team, one of the first social marketing initiatives at CDC.

About her work as a division director at ATSDR, Dr. Howze says, "I've spent most of my public health career working on the prevention and control of chronic diseases. Coming to work in environmental health promotion at ATSDR presents a whole new set of challenges for me. First, how can we most effectively assist communities that have been impacted by hazardous chemicals? And second, what public health actions can be taken to prevent similar harm from occurring to other communities? The growing science base linking environmental exposures to chronic diseases makes the work that ATSDR does all the more important. I'm excited to be part of it."✿

"About 17% of U.S. children under 18 years of age have a developmental disability."

—CDC. Developmental disabilities. Available at URL: www.cdc.gov/ncbddd/dd.



Childhood Lead Poisoning in Missouri and Kansas

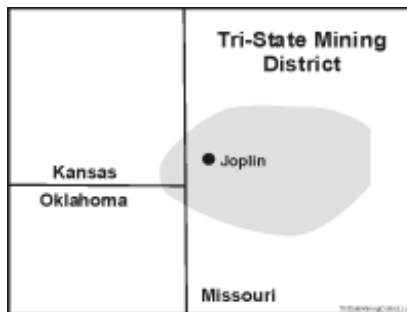
Lead poisoning in children remains a problem in many areas with older homes and poor families. ATSDR has conducted screening programs to detect lead poisoning in children and provided funds for its state public health partners to develop community screening programs.

A Closer Look

Initial lead exposure studies in Jasper County, Missouri (1), and Galena, Kansas (2), led to follow-up health studies to determine whether blood lead levels in children decreased in response to soil remediation and a health education campaign for the community and health professionals. ATSDR funded follow-up health studies for these areas through an interagency agreement with the U.S. Environmental Protection Agency (EPA).

Missouri Department of Health and Senior Services, Oronogo-Duenweg Mining Belt Site, Jasper County, Missouri

The Oronogo-Duenweg Mining Belt site is in Jasper County in southwestern Missouri. The site is part of the Tri-State Mining District, which covers an area of approximately 2,500 square miles in southwestern Missouri, southeastern Kansas, and northeastern Oklahoma. Mining, milling, and



smelting of lead and zinc ore began in 1850 and continued in the district until the 1970s.

In 1991, the Missouri Department of Health and Senior Services conducted a health study of people exposed to lead and cadmium and living in areas affected by past mining activities at the Jasper County Superfund site (1). The study, completed in May 1994, indicated that 14% of children aged 6 to 71 months and living in the study area had blood lead levels ≤ 10 micrograms per deciliter ($\mu\text{g}/\text{dL}$). The study also showed that the primary cause of elevated blood lead was exposure to lead-contaminated soils.

Subsequently, EPA released a plan to set priorities for and remediate areas with elevated levels of soil lead. The plan called for

time-critical removal of surface soil at 294 residences and six day care centers. By June 2000, EPA had remediated 2,288 residential yards; by October 2000, an additional 51 yards had been remediated.

Kansas Department of Health and Environment, Cherokee County Superfund Site, Galena Subsite, Cherokee County, Kansas

Galena, Kansas, is in the southeast corner of Cherokee County, Kansas. The Galena Superfund site is one of six former smelter subsites in Cherokee County. In the Tri-State area of Kansas, Missouri, and Oklahoma, mining and smelting operations for lead ore recovery began in 1876 and ended in 1979. Mining and smelting for zinc ore recovery began in the 1890s and ended in the 1960s.

In July 1990, the Kansas Department of Health and Environment conducted a human exposure study of lead and urine cadmium in children between 6 months and 6 years of age living near the Galena, Kansas, Mine Tailings

Continued on page 11

Follow-up study activities include

- ◆ collecting blood lead samples from a selected number of children younger than 6 years.
- ◆ collecting and analyzing environmental samples (such as dust, soil, interior paint, and tap water).
- ◆ collecting behavioral, occupational, and socioeconomic data.



Lead Poisoning

Continued from page 10

Superfund site (2). The study concluded that children younger than 6 years had higher blood lead levels than did a control group of same-aged children. Lead levels in six (10.5%) of 57 children in Galena exceeded the Centers for Disease Control and Prevention lead guideline of 10 µg/dL (3). No children in the control community had elevated blood lead levels (n=128).

Since the initial health study, EPA has completed residential cleanups at 664 properties in Galena, where more than 1,500 properties were tested.

Follow-Up Studies

Near the end of the soil remediation activities, ATSDR entered into grants with the Missouri Department of Health and Senior Services and Kansas Department of Health and Environment to conduct a follow-up health study in each state. Each study is an EPA initiative and fully funded by EPA. The goal of the follow-up health studies is to

- ◆ evaluate the effects of major interventions in each area (soil remediation plus an extensive community and professional health education campaign) and
- ◆ determine their effectiveness in reducing the mean blood lead levels of all children, thereby reducing the proportion of children with elevated blood lead levels.

Missouri Department of Health and Senior Services study participants included

- ◆ 215 participants from the original study area and
- ◆ 72 participants from an expanded area. Participants were children from 6 months to 6 years of age.

Study activities in Missouri include

- ◆ environmental and biologic sampling (completed),
- ◆ soil exposure questionnaires (completed),
- ◆ statistical analysis of all data, and
- ◆ comparison of follow-up study results with those of the initial study.

The **Kansas Department of Health and Environment** study included analysis of

- ◆ blood samples from 100 children between 6 months and 6 years of age,
- ◆ parent or guardian responses to questions about behavioral risk factors associated with blood lead levels,
- ◆ dust wipe samples of window sills and floors from three rooms in each of the 72 houses in the expanded study area, and
- ◆ composite soil samples from the general yard areas, play areas, and drip line of each house.

For more information on the Jasper County study, contact

Scott Clardy, Section Chief
Section for Environmental
Public Health
Missouri Department of
Health and Senior Services
573-751-6404

For more information on the Cherokee County study, contact

Maria Albert, Manager,
Pre-Renovation Education
Program
Kansas Childhood Lead
Poisoning Prevention
Program
Kansas Department of Health
and Environment
785-368-7389

In February 2002, the Missouri Department of Health and Senior Services released a draft final report for public comment. The Kansas Department of Health and Environment will release its draft final report for public comment later in the year.—SCOTT CLARDY; MARIA ALBERT; AND LAKEISHA SYKES, MPH

References

1. Agency for Toxic Substances and Disease Registry. Jasper County, Missouri, Superfund site lead and cadmium exposure study. Atlanta: US Department of Health and Human Services; 1995.

Continued on page 12



Lead Poisoning

Continued from page 11

2. Agency for Toxic Substances and Disease Registry. Lead and cadmium exposure study, Galena, Kansas. Atlanta: US Department of Health and Human Services; 1996.

3. Centers for Disease Control and Prevention. Screening young children for lead poisoning: guidance for state and local public health officials. Atlanta: US Department of Health and Human Services; 1997. ❧

ATSDR: Public Health Detective

ATSDR had to play detective when it undertook the Camp Lejeune survey on birth outcomes in children who were exposed in the womb to trichloroethylene (TCE) and tetrachloroethylene (PCE). ATSDR's challenge was to find and survey an estimated 16,500 children who might have been conceived or carried in utero during 1968–1985 at Camp Lejeune in Jacksonville, North Carolina, while their mothers lived in on-base housing at U.S. Marine Corps (USMC) Base Camp Lejeune. Birth certificates were available for 12,493 of these children, but no locating information (such as social security numbers [SSNs]) was listed on the birth certificates.



TCE and PCE contamination was found in the wells used at the on-base housing areas at Camp Lejeune. The sources of these contaminants were improper chemical disposal at an on-base motor pool area and an off-base dry-cleaning business. The contamination was discovered during routine tap water sampling, as required for compliance with the Safe Drinking Water Act. No drinking water standards existed for TCE and PCE until 1991 (see box). Early exposure to these contaminants in drinking water has been associated with hearing loss, delays in speech development, and impaired fetal development.

Challenges Faced in This Survey

- ◆ We sought women who conceived or were pregnant when they lived on the base between 17 and 34 years ago (1968–1985), as well as the children of those women.
- ◆ Most of these women or their spouses had already left the USMC, and the women's last names could now be different.
- ◆ Many of the children are now adults; some of them could now be deceased.
- ◆ Initially, we were unable to use files or databases managed under the Department of Defense (DOD) because of concerns about protection of privacy.

TCE and PCE are solvents that were used as degreasers and as dry cleaning agents. TCE and PCE levels were 1,400 parts per billion (ppb) and 215 ppb, respectively, at the tap. The maximum contaminant level (MCL) (passed in 1991) for both TCE and PCE is 5 ppb. MCLs are standards used to define levels above which water is unsafe for drinking.

Successes

In medical files at the Camp Lejeune Naval Hospital, we found contact information for almost one-third of the 12,493 children for whom we had birth certificates. Additional information was found by reviewing old birth announcements from files of the local newspaper (the *Jacksonville Daily News*). In addition, the DOD privacy officer agreed that the USMC could try to match names from the 12,493 birth certificates with the Defense Manpower Data Center (DMDC). A USMC staff person was assigned to find databases within the USMC system that could help ATSDR. If a database was found, USMC personnel searched it for ATSDR to see if it contained current addresses, telephone numbers, or SSN information for those persons who had not yet completed the

Continued on page 13



Public Health Detective

Continued from page 12

telephone survey. Only exact matches were released to ATSDR. Much information was obtained through this process, and it has been extremely helpful.

What Has Our Investigation Revealed to Date?

The data collection phase of the survey ended on January 26, 2002; 12,598 surveys were completed. A summary report will be available in fall 2002. The report will give the rates of birth defects and childhood cancers in children who participated in the project. If the rates in children conceived or carried at Camp Lejeune are elevated compared with the national rates for these same conditions, further study will attempt to determine potential factors that might have attributed to these increased rates.—MARIE L. SOCHA, DRPH, MS, MSPH✉

“Asthma now affects nearly 5 million people who are younger than 18 years of age.... Asthma is the third-ranking cause of hospitalization among those younger than 15 years of age.”

—Centers for Disease Control and Prevention. Air pollution and respiratory health. Asthma control programs and activities related to children and adolescents: reducing costs and improving quality of life. Available at URL: www.cdc.gov/nceh/airpollution/asthma/children.htm.

The National Children’s Study

In 1998, the Developmental Disabilities Work Group of the President’s Task Force on Environmental Health Risks and Safety Risks to Children recommended the commission of a longitudinal cohort study of environmental impacts on children. The purpose of the study is to identify subtle, but important, effects of low-level environmental exposures, as well as other biological and social factors on children’s health. In addition, the study will become a valuable resource to answer other questions of scientific interest.

Under the auspices of the task force, several federal agencies, including ATSDR, the National Institute of Child Health and Human Development, the Environmental Protection Agency, the National Institute of Environmental Health Sciences, and the National Center for Environmental Health of the Centers for Disease Control and Prevention have

“In 1990, all children lived in counties in which the one-in-a-million and 1-in-100,000 cancer risk benchmarks were exceeded by at least one hazardous air pollutant. Six percent of children lived in counties in which at least one hazardous air pollutant exceeded the 1-in-10,000 benchmark.”

—US Environmental Protection Agency. America’s children and the environment: a first view of available measures. Washington, DC: US Environmental Protection Agency; 2000. EPA Report No.: EPA 240-R-00-006.

For information about related research, refer to the Children’s Environmental Health and Safety Inventory of Research (CHEHSIR) (oaspub.epa.gov/chehsir/chehsir.page). CHEHSIR is a public database of research, conducted or funded by the federal government, regarding environmental health and safety risks to children.

begun work to plan and implement this proposed study. Planning groups of federal scientists and other experts will define specific study hypotheses, study design, technology applications, and ethical guidelines over the next year. Methodologic development and pilot studies are planned for fiscal year 2001–2003. The study is planned to begin in 2004.

The April 2002 study assembly meeting reports will soon be available on the study site (www.nationalchildrensstudy.gov).✉



Web Site Resources

Children's Health Government Resources

www.ahcpr.gov/research/chilres1.htm

The Agency for Health Care Policy and Research (AHCPR) Research on Children's Health highlights the key findings of the agency in the area of children's health.

www.atsdr.cdc.gov/child/ochchildhlth.html

Home page of ATSDR's Office of Children's Health.

www.childstats.gov

The Federal Interagency Forum on Child and Family Statistics provides statistics in areas such as children's health.

www.nlm.nih.gov/medlineplus/childrenshealth.html

Medline Plus Children's Health home page provides an overview of diseases, prevention, and research.

www.nichd.nih.gov

The National Institute of Child Health and Human Development provides information concerning children's health.

Nongovernment Resources

www.aap.org

Home page of the American Academy of Pediatrics.

www.childrennow.org/links/links-health.html

Children Now features a list of links on children's health.



www.cfw.tufts.edu
Tufts University Child and Family Webguide features sections on physical and mental health, typical development, education and learning, and more.

Children's Health and the Environment Government Resources

yosemite.epa.gov/ochp/ochpweb.nsf/homepage

The EPA Office of Children's Health Protection is a gateway to information about environmental threats to children.

www.epa.gov/iaq/schools/tools4s2.html

Information on EPA's Indoor Air Quality Tools for Schools Kit.

<http://www.health.state.mn.us/divs/eh/children/directory/dirframe.html>

The Children's Environmental Health Resource Directory is sponsored by the Minnesota Department of Health, Environmental Health Division.

www.niehs.nih.gov/dert/programs/translat/children/children.htm

The Centers for Children's Environmental Health and Disease Prevention Research promote translation of basic research findings into applied intervention and prevention methods.

Nongovernment Resources

www.childenvironment.org

The Center for Children's Health and the Environment evaluates the link between exposure to contaminants and childhood illness.

www.childwatch.uio.no

The Childwatch International Research Network is involved in research on children's rights, protection, and well-being.

www.cehn.org/cehn/Aboutceh.html

The Children's Environmental Health Network is a resource on children's environmental health.

www.chechnet.org

The Children's Health Environmental Coalition educates the public about environmental chemicals that can affect children's health.

www.inchesnetwork.org/about.html

Inches (the International Research and Information Network on Children's Health, Environment and Safety) promotes the protection of children against environmental hazards.

www.iceh.org

The mission of the Institute for Children's Environmental Health is to mitigate children's exposure to toxicants. The organization sponsors several initiatives.

www.kidsforsavingearth.org

Kids for Saving Earth provides free environmental education curricula for all ages.

www.cehi.org

The Children's Environmental Health Institute is dedicated to improving children's environmental health through education, research, and policy.

Continued on page 15



Web Sites

Continued from page 14

www.cepis.ops-oms.org/enwww/salunino/infonoex.html

Children's Health and the Environment is a collection of facts on the topic of children's health and the environment from the World Health Organization.

www.ocefoundation.org

The mission of Our Children's Earth Foundation is to protect children through the enforcement of the Clean Air Act.

www.partnersforchildren.org

The Partnership for Children's Health and the Environment is an international coalition of entities whose mission is to protect children from harmful environmental exposures.

www.psr.org/ceh.htm

The Physicians for Social Responsibility home page on children's environmental health. This organization represents 20,000 physicians, nurses, and other health care professionals who are concerned about environmental health and other issues.

www.preventingharm.org

Preventing Harm is a nonprofit organization and resource center focusing on children's environmental health. ❄️

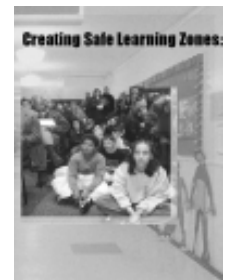
Recent Publications

Following is information on two recent children's environmental health publications.

Creating Safe Learning Zones: Invisible Threats, Visible Actions

Child Proofing Our Communities Campaign, c/o Center for Health, Environment and Justice, PO Box 6806, Falls Church, VA 22040 (telephone: 703-237-2249; Web: www.childproofing.org; e-mail: childproofing@chej.org).

This publication is a followup to the March 2001 Child Proofing Our Communities Campaign publication, *Poisoned Schools: Invisible Threats, Visible Actions*. *Creating Safe Learning Zones: Invisible Threats, Visible Actions* includes model school siting legislation to help local communities promote laws and policies that protect children's health. The report also outlines action steps that parents can take to ensure that their children are not sent to schools that pose unnecessary health risks. The report is available at childproofing.org/cslzindex.html.



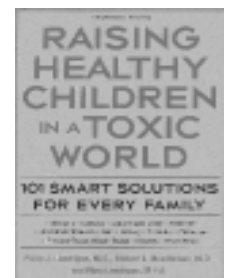
The *Creating Safe Learning Zones: The ABCs of Healthy Schools* primer was also recently published on the campaign's Web site (www.childproofing.org).

Raising Healthy Children in a Toxic World: 101 Smart Solutions for Every Family

Phillip J. Landrigan, Herbert L. Needleman, and Mary Landrigan

Paperback, 152pp. ISBN: 087596947X. Published by St. Martin's Press, Inc., February 2002.

This publication discusses many environmental dangers that parents and their children face and provides strategies for avoiding those dangers. Topics include allergens, asbestos, contaminated water, heavy metals, herbicides, household chemicals, pesticides, phthalates, pressure-treated wood, radon, solvents, and unsafe foods. ❄️



"From 1990 through 1998, approximately 25% of children lived in a county in which at least one air quality standard was exceeded during the year."

—US Environmental Protection Agency. *America's children and the environment: a first view of available measures*. Washington, DC: US Environmental Protection Agency; 2000. EPA Report No.: EPA 240-R-00-006.



Case Studies in Environmental Medicine

Case Studies in Environmental Medicine: Pediatric Environmental Health is ATSDR's newest case study. It has been accredited and will soon be online on the case study home page (www.atsdr.cdc.gov/HEC/CSEM). Continuing medical education (CME) credits, continuing nursing education (CNE) credits, continuing health education specialist (CHES) credits, and continuing education unit (CEU) credits are available. Following is an excerpt from the case study.

A mother brings her 2½-year-old son to you for consultation. She explains that her family moved to your community about 7 months ago when her husband changed jobs. Over the past month and a half, the boy has developed progressive loss of appetite and weight loss. He has also suffered from an increasingly severe and itchy rash. Although usually very active and pleasant, he has become ill-tempered and, for the past couple of days, he refuses to walk around, preferring to lie in bed or be carried. He rubs his knees and cries periodically throughout the day. Neither the parents nor the child's grandmother, who lives with them, has been ill.

The boy's medical history has been unremarkable. His height and weight have been consistently in the

After completion of this educational activity, the reader should be able to

- ◆ describe how and why children differ from adults in their susceptibility to environmental hazards,
- ◆ incorporate knowledge of environmental medicine in the evaluation of well and sick children,
- ◆ consider parental occupation and hobbies as a part of the environmental history, and
- ◆ identify additional sources of environmental health information.

25th percentile for his age. He is on a regular toddler diet, and all developmental milestones have been appropriately met. He is not taking any medications. The mother denies any family use of dietary supplements or herbal medicines. The family history is negative for blood transfusions and use of illicit drugs, human immunodeficiency (HIV) infection, and metabolic or genetic diseases. A review of systems and a brief assessment of how the family functions are negative. No one in the family has been traveling in a foreign country.

During the day, the child stays at home with his mother or grandmother. The mother works part-time as a bookkeeper-clerk in a local dry-cleaning facility. The father works as a production manager in a thermometer factory. The mother states that both parents are concerned about environmental contaminants, specifically those that might be associated with their workplaces, and whether or not



these contaminants can put their family at risk. The parents have heard neighbors' and co-workers' comments about ailments associated with mercury exposures. The parents also mention reports of teenagers in the community taking mercury from the local high school chemistry lab over the past several months. These incidents resulted in an ongoing investigation by the environmental division of the state health department. One of the teenagers who reportedly took mercury from the lab helped with odd jobs around the parents'

Continued on page 17



Case Studies

Continued from page 16

house, including indoor house-cleaning.

Questions To Consider

1. What additional information should you gather by interview?
2. What would you include in this patient's problem list?
3. What is the differential diagnosis for this patient?

For the answers to these questions and the complete *Case Studies in Environmental Medicine: Pediatric Environmental Health*, visit the case studies home page (www.atsdr.cdc.gov/HEC/CSEM).✱

School Locations

Characteristics of Schools Sited On or Near Hazardous Waste Sites in Brownfields Communities

Healthy schools are an essential part of healthy communities. The physical location and siting of schools are important issues in many communities, especially in population-dense areas in the Northeast and in major cities where land for schools is scarce. ATSDR is using geographic information systems (GIS), a spatial analysis approach, to estimate the number and sociodemographic characteristics of public and private elementary and secondary schools located on or near the approximately

Many students attend schools on or near NPL sites. However, school-specific exposure assessments must be done to determine whether environmental hazards affect the school population.

1,550 National Priorities List (NPL) or Superfund hazardous waste sites in the United States.

In an initial analysis using 1999 school data, we found that 438 schools were built on or within 1 mile of 61 NPL sites in 16 brownfields showcase communities designated by EPA. One hundred thirty-eight of these schools (with a total enrollment of more than 92,000 students) had been built directly on an NPL site. Seventy-six percent of these on-site schools were built above contaminated groundwater plumes. Because of remediation efforts, none of the schools above the plumes are currently exposed to contaminated groundwater.

An additional 189,366 children attended schools within 1 mile of an NPL site. Although most of these students attended schools that were close to only one NPL site, one-fifth of the children (N=55,956) attended schools built

Proximity does not equal exposure.

on or within 1 mile of two or more NPL sites. Many of these 55,956 students were very young children—more than one-third were in prekindergarten through third grade. Proportionately more minority and poor children attended these schools than would be expected.

This initial analysis suggests that, across the country, a substantial number of students attend schools near or built on top of an NPL site. However, proximity is not equivalent to exposure. A school-specific exposure assessment must be done to determine whether any chemical hazards from nearby NPL sites have affected the school population (see pilot exposure assessment section).—ROBIN WAGNER, PHD, MS

Pilot Exposure Assessment of Schools Sited On or Near Hazardous Waste Sites in Brownfields Communities

Because it is possible that site conditions or the availability of information on exposures might have changed since the date of release of a public health assessment (PHA) on a National Priorities List (NPL) site, ATSDR initiated a pilot field project in summer/fall 2001 to evaluate whether specific exposure pathways exist for school populations near these sites. ATSDR selected a subset of NPL sites in the United States for follow-up

Continued on page 18



Schools

Continued from page 17

examination through this pilot project.

For the pilot study, we used 16 brownfields showcase communities and 61 NPL sites in those communities. From these 61 NPL sites, we chose a subset of 13 that

1. were categorized as **indeterminate public health hazard** or **public health hazard** (defined in box at right) in their PHA documents **and**
2. had schools within 1 mile of the site boundary.

The sites selected were in Florida, Oregon, Texas, Utah, and Washington. More than 50 schools are located on or within 1 mile of these 13 sites.

Findings from this pilot study indicate that no current pathways of exposure exist for schoolchildren in relation to the sites evaluated. We found that any school-related exposure concerns are being addressed by the PHA process, which includes a review of new environmental data and pathway issues by ATSDR and our state partners. We also found that a

“In 1997–1998, 5.4% of all children had asthma. Non-Hispanic Black children living in families with incomes below the poverty level had the highest rates of asthma of any group: 8.3%.”

—US Environmental Protection Agency. America’s children and the environment: a first view of available measures. Washington, DC: US Environmental Protection Agency; 2000. EPA Report No.: EPA 240-R-00-006.

Key findings of the field project

- ◆ No current pathways of exposure exist for schoolchildren in relation to the sites evaluated.
- ◆ A 1-mile radius may be too far away to assess potential exposure pathways associated with a given site. This is particularly true for older, inactive NPL sites.

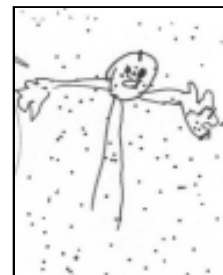
Public health assessment (PHA) categories

Indeterminate public health hazard: Term used in a PHA when a professional judgment on the level of health hazard cannot be made because information critical to such a decision is lacking.

Public health hazard: Term used in a PHA for sites that pose a public health hazard because of long-term exposures (longer than 1 year) to sufficiently high levels of hazardous substances that could result in harmful health effects.

1-mile radius seems to be too far away to assess potential exposure pathways related to a given site. ATSDR should continue to prepare geographic information system (GIS) databases related to NPL site boundaries and school locations. The school location data, based on Department of Education databases, will be useful to ATSDR and state partners as new

sites are identified. A careful review of the site-specific environmental data is needed before any public health conclusions can be made on (a) the presence of exposures to school populations and (b) further evaluation of any potential adverse health effects related to the population.—LESLIE C. CAMPBELL, MS[†]



“My teacher.” Claire, age 4



The Impact of ADHD May Be Underestimated

The public health impact of attention deficit-hyperactivity disorder (ADHD) may be greatly underestimated by school and public health officials, say scientists at the National Institute of Environmental Health Sciences (NIEHS).

In a recently published study, the NIEHS scientists and their colleagues at the University of North Carolina School of Medicine in Chapel Hill reported that when they queried parents in a “typical” county of rural and suburban homes (Johnston County, North Carolina), the parents reported more than 15% of boys in grades one through five had been diagnosed with ADHD and about 10% (or two-thirds of those diagnosed) were taking medication for the condition. Asking the parents was a key to the higher figures, the researchers thought, because school nurses might not be aware of children who were receiving medication treatment entirely at home.

“Treatment rates are usually viewed as abnormally high if they exceed the 3% to 5% prevalence estimate for ADHD cited in an American Psychiatric Association manual in 1994,” the authors said. “Therefore, the national public health impact of ADHD may be

greatly underestimated by both educators and public health officials.”

The study used parental and teacher reports of 6,099 children in 17 public elementary schools in the semirural county. Because Johnston County has a racial/ethnic and educational profile similar to North Carolina as a whole, the authors of the study said they thought that medication treatment rates are probably similar in many other counties in North Carolina and elsewhere. The researchers said similar data need to be collected nationally to better understand ADHD medication treatment patterns.

The research appears online in the February issue of the *American Journal of Public Health*, a publication of the American Public Health Association. The journal is accessible at www.apha.org.

“Fifty percent of children live in counties that had Superfund sites in 1990 and still have Superfund sites in 2000.”

—US Environmental Protection Agency. *America’s children and the environment: a first view of available measures*. Washington, DC: US Environmental Protection Agency; 2000. EPA Report No.: EPA 240-R-00-006.

The principal investigator, Dr. Andrew S. Rowland, may be reached for interviews at 505-272-1391. Dr. Dale P. Sandler, the senior investigator, is available at 919-541-4668. (Dr. Rowland is now with the University of New Mexico Health Sciences Center.)



Sarah, age 8



Internet Resources Seminar

Last year the Mid-Atlantic Center for Children's Health and the Environment (MACCHE), in conjunction with ATSDR Region 3, the U.S. Environmental Protection Agency (EPA) Region 3, and the National Library of Medicine, held a 1-day seminar on The Use of the Internet for Children's Environmental Health. MACCHE is the Region 3 Pediatric Environmental Health Specialty Unit (PEHSU) and is located at George Washington University in Washington, D.C.

The seminar educated professionals about available Internet resources on children's health and introduced them to the new PEHSU. The seminar will be repeated at several locations throughout the region in the coming year. Persons from Delaware, the District of Columbia, Maryland, Pennsylvania, Virginia, and West Virginia who might be interested in having this course presented to their organization should contact MACCHE at 202-994-1166 or toll-free at 1-866-MACCHE1 (1-866-622-2431).—LORA S. WERNER, MPH✉

Decreased Exposure to Lead Equals Economic Gain

Children's reduced exposure to lead in the environment means that children who were 2 years old in 2000 will see an increase in overall future earnings of \$110–\$318 billion more than those who were 2 years old in the mid-1970s.

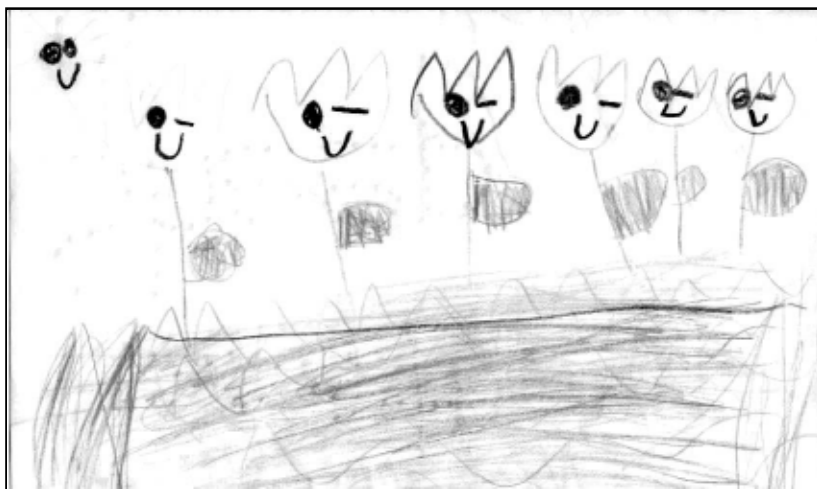
—Grosse SD, Matte TD, Schwartz J, Jackson RJ. Economic gains resulting from the reduction in children's exposure to lead in the United States. *Environ Health Perspect* 2002;110:563–9.

BAM! Answers to Your Questions

Visit the Centers for Disease Control and Prevention's BAM! (Body and Mind), an e-zine for kids, at www.bam.gov. BAM! was created to answer kids' questions on health issues and recommend ways to make their bodies and minds healthier and stronger. BAM! is aimed at youth aged 9–13 years and is published quarterly. BAM! also serves as an aid to teachers, providing them with interactive activities to support their health and science curricula.✉

"Lead poisoning is entirely preventable. However, nearly 1 million children living in the United States have lead levels in their blood that are high enough to cause irreversible damage to their health."

—Centers for Disease Control and Prevention. CDC's lead poisoning and prevention program. Available at URL: www.cdc.gov/nceh/lead/factsheets/leadfcts.htm.



"Winking flowers." Nasreen, age 4



Children's Environmental Health Case Study

Visit the interactive online pediatric toxicology case study on the Great Lakes Center for Children's Environmental Health Web page (www.uic.edu/sph/glakes/kids; select the "Education and Training" link).✿



"A little kitty and a big doggy. They are friends." Claire, age 4

Visit CHEC's HealthHouse

HealthHouse (www.checnet.org/healthhouse/home/index.asp) is an interactive resource for information on environmental health risks children face in the home. The site features a virtual house you can tour room by room and a personalized home profiler that can offer suggestions on how to make your home safer.✿

A Pledge to Protect Children

The Bangkok Statement

More than 300 participants from 35 countries attended the World Health Organization's international conference on "Environmental Threats to the Health of Children" in Bangkok on March 3–7, 2002. A full report of the meeting can be requested from Dr. Peter Van den Hazel (P.J.van.den.Hazel@inter.NL.net).

At the meeting, participants pledged to promote the protection of children's environmental health. An excerpt from the Pledge To Promote the Protection of Children's Environmental Health follows:

"We affirm

- ◆ That the principle 'children are not little adults' requires full recognition and a preventive approach. Children are uniquely vulnerable to the effects of chemical, biological, and physical agents. Every child should be protected from injury, poisoning, and hazards in the different environments where they are born, live, learn, play, develop, and grow to become the adults of tomorrow and citizens in their own right.
- ◆ That every child with no exception should have the right to safe, clean, and supportive environments that ensure his/her survival, growth,



development, healthy life, and well being. The recognition of this right is especially important as the world moves forward towards adopting sustainable development practices.

- ◆ That it is the responsibility of professionals, community workers, local and national authorities and policy-makers, and organizations dealing with health, environment, and education issues to ensure that actions are initiated, developed, and sustained in all countries to promote the recognition, assessment, and mitigation of physical, chemical, and biological hazards that threaten children's health and quality of life."✿



Noah, age 8



Calendar



October 12, 2002

In Harm's Way: Toxic Threats to Child Development, Minneapolis, Minnesota. Hosted by the University of Minnesota School of Public Health. Contact Kathleen Schuler, Institute for Agriculture and Trade Policy, by e-mail: kschuler@iatp.org or telephone: 612-870-3468.

October 18–20, 2002

International Symposium on Children's Health and the Environment, Istanbul, Turkey. Hosted by the Association of Physicians for the Environment of Turkey. Contact Gunay Can by e-mail: alpinca@yahoo.fr or telephone: ++90-212-586-1549.

October 28–29, 2002

3rd European Conference on Pediatric Asthma, London. Contact Castle House Medical Conferences by telephone: +44 (0)1892-539606; e-mail: asthma@castlehouse.co.uk; or Web site: www.castlehouse.co.uk.

November 4–5, 2002

Research, Technologies, and Applications in Biodefense, McLean, Virginia. Contact Mary Addonizio by telephone: 617-630-1373 or e-mail: addonizio@healthtech.com.

November 6–9, 2002

American Evaluation Association Annual Conference, Arlington, Virginia. Contact Susan Kistler by telephone: 1-888-232-2275 or e-mail: aea@eval.org.

November 7–8, 2002

Advisory Council for the Elimination of Tuberculosis, Atlanta. Contact Paulette Ford-Knights by telephone: 404-639-8008 or e-mail: pbf7@cdc.gov.

November 7–9, 2002

9th Annual Minority Health Conference: Healthy Texans 2010, Irving, Texas. Contact Linda Freeman by telephone: 972-721-3629; e-mail: healthtx@ci.irving.tx.us; or Web site: www.ci.irving.tx.us/healthtx.

November 8–9, 2002

Society for Public Health Education (SOPHE) 53rd Annual Meeting, Philadelphia: Declaring Our Interdependence: United for Health Education. Contact: Society for Public Health Education, 750 First Street NE, Suite 910, Washington, DC 20002-4242; telephone: 202-408-9804; e-mail: info@sophe.org; or Web site: www.sophe.org.

November 9–12, 2002

Association of Schools of Public Health 62nd Annual Meeting, Philadelphia. Contact: Mary Stickley by e-mail: mes@asph.org.

**November 9–13, 2002**

American Public Health Association 130th Annual Meeting, Philadelphia: Putting the Public Back into Public Health. Contact: APHA Meeting Coordinator Edward Shipley by telephone: 202-777-2478; fax: 202-777-2530; e-mail: edward.shipley@apha.org; or Web site: www.apha.org/meetings.

November 13–15, 2002

Brownfields 2002: Investing in the Future, Charlotte, North Carolina. Contact: Brownfields 2002, c/o Engineers' Society of Western Pennsylvania, 337 Fourth Avenue, Pittsburgh, PA 15222; telephone: 412-261-0710, ext. 32; e-mail: brownfields@eswp.com; or Web site: www.brownfields2002.org.

November 16–20, 2002

2001 Society for Environmental Toxicology and Chemistry (SETAC) Conference. Contact: SETAC North America Office, 1010 North 12th Avenue, Pensacola, FL 32501-3367; telephone: 850-469-1500; fax: 850-469-9778; e-mail setac@setac.org; or Web site: www.setac.org.

November 18–21, 2002

20th International Neurotoxicology Conference, Little Rock, Arkansas. Hosted by the University of Arkansas for Medical Sciences. Contact Dr. Joan Cranmer by telephone: 501-320-2986 or e-mail: CranmerJoan@uams.edu.

November 19–21, 2002

2002 Conference on Tobacco or Health, San Francisco. For more information, contact the National Conference on Tobacco or Health by telephone: 301-294-5664; e-mail: registrar@feddata.com; or Web site: www.tobaccocontrolconference.org.

December 1–3, 2002

Hope 2002—Second International Conference on HIV and Substance Abuse, Mumbai, India. Contact Dr. Yusuf Merchant by telephone: 009122-3453253; e-mail: info@hopeconference.org; or Web site: www.hopeconference.org.

December 6–8, 2002

Primary Care Research Methods and Statistics Conference, San Antonio. Hosted by the University of Texas Health Science Center at San Antonio. Contact Susan Duncan, Director of CME, by telephone: 210-567-4446 or e-mail: duncan@uthscsa.edu.

December 11–13, 2002

The 8th Annual Maternal and Child Health Epidemiology Conference, Clearwater, Florida. Jointly sponsored by the University of South Florida Colleges of Medicine and Public Health, Centers for Disease Control and Prevention, and the Lawton and Rhea Chiles Center for Healthy Mothers and Babies. Contact Erica Thomas by telephone: 813-974-6695 or e-mail: contend@hsc.usf.edu.



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