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PEHSU Mission

- Reduce environmental health threats to children;
- Improve access to expertise in pediatric environmental medicine; and
- Strengthen public health prevention capacity.
PEHSU History

- In 1997, in partnership with the U.S. Centers for Disease Control and Prevention/Agency for Toxic Substances and Disease Registry, EPA established PEHSUs in the United States.
- The PEHSUs improve children’s medical care through greater awareness of the preventable and manageable environmental threats that children face.
- Each PEHSU educates health providers; consults on the prevention, diagnosis, management, and treatment of environmentally related illness; and engages the public on children’s environmental health.
In the United States, the PEHSUs are academically based, primarily at research hospitals.

A wide range of expertise is a critical element of the PEHSU network.

The PEHSU model has proven successful over the past decade in training, outreach, and improving treatment for environmentally-related childhood illnesses.
PEHSU Program Successes

- Trained over 100,000 health professionals
- Consulted with doctors, parents, health and environmental officials
- Over 3,000 community events and academic lectures in 44 states since 2001
Health Risks of Wildfires for Children – Acute Phase
James M. Seltzer, M.D., Mark Miller, M.D., M.P.H., and Diane L. Seltzer, M.A.
Pediatric Environmental Health Specialty Unit (PEHSU) Region IX
University of California, Irvine School of Medicine
University of California, San Francisco
October 28, 2007
Publish widely…

• *Pediatric Clinics of North America*, 2007

• *Safe and Healthy School Environments*, 2006

• Over 250 professional journal articles and other publications since 2000
Speak Out…

- Media appearances
- Across borders
- Fact sheets, BPA for example
- Work with local, state, and federal agencies
Our task is to…..

- Improve our understanding of the relationship between environmental factors and the health and development of children through research
- Educate professionals and the public about children's environmental health
- Develop strategies and policies to
  - reduce environmental hazards
  - protect children from hazards and
  - treat them if they have been exposed
Pediatric Environmental Health Specialty Units (PEHSU)

- Established by the EPA & ATSDR around the Country
- To provide further assistance to the public and to clinicians around the issues of the Environment and Children's Health
- PEHSU role
  - Education
  - Consultation
  - Referral
Objective: to increase knowledge base of pediatric environmental medicine by providing a forum for environmental specialists and pediatricians to combine knowledge
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THE BEGINNING……

• 1996 ATSDR Child Health Initiative
• 1996 to 1998 PEHSU Program Catalyst
  – Methyl Parathion Exposure in 400+ children
  – Mercury Exposure
• 1998 first 2 PEHSU sites formed
WHAT IS A PEHSU?

A PEHSU site is comprised of collaboration between AOEC Occupational & Environmental Medicine clinic and institution’s pediatric department

PEHSU staff = project director, OEM physician, pediatrician, project coordinator and other specialists.
**PEHSU SERVICES**

◆ **Consultation** – *Provide clinical/medical consultation to practicing clinicians and health officials*

◆ **Education/Outreach** – *Provide pediatric environmental health education to practicing clinicians/health professionals, clinical trainees and the general public*

◆ **Referral** – *Provide referral to public health agencies and clinical sub-specialists with interest in pediatric environmental health*
Role of PEHSU Program

Referral

Educational And Outreach

Medical Advice & Consultation

General Public

Clinicians & Health Professionals

Clinical Trainees
Funding for PEHSU Program

• Agency for Toxic Substances Disease Registry (ATSDR)
• U.S. Environmental Protection Agency (EPA)

• Association of Occupational & Environmental Clinic (AOEC) provides program management
Southeast PEHSU at Emory University

- Howie Frumkin, MD, Occupational and Environmental Health, Rollins School of Public Health
- Janice Nodvin Administrator
- Gerry Teague, MD, Pulmonologist
- Robert Geller, MD, Toxicologist
- Leslie Rubin, MD, Developmental Pediatrician

Santiago, Chile
Case Study #1:
Anniston, AL
Anniston, Alabama
Anniston, Alabama

- Population: 26,000
- 1872: Anniston founded as a company town for the Woodstock Iron Company
- By 1929: 117 foundries, mostly in west Anniston
- Late 1920s: Biphenyl manufacturing began
- 1935: Monsanto began manufacturing PCBs, parathion, phosphorous pentasulfide, para-nitrophenol, and polyphenols
Exposure history

• Two large landfills were used throughout the plant’s operation, one (west) until 1961, the other (south) until 1988

• Some product was given to local people for termite control, fencepost treatment, etc.

• 1970s-80s: Intermittent PCB detection in downstream fish and sediment

• Early 1990s: Recognition of downstream fish contamination; ADPH fish advisory.
Anniston, Alabama
PCB levels in blood

• 1995 ATSDR sampling of 103 people:
  – 46 (45%) with serum PCBs >10 ppb
  – 28 (27%) with serum PCBs >20 ppb
  – 5 (5%) with serum PCBs >100 ppb

• 1999 Plaintiff sampling of ≈ 2,970 people:
  – 1,037 (35%) with serum PCBs > 10 ppb
  – 521 (17.5%) with serum PCBs >20 ppb
  – 41 (1.4%) with serum PCBs >100 ppb
PCBs: Inadequate Margin of Safety

PCB SERUM LEVELS (ppb)

REPORTED HUMAN EXPOSURES

Great Lakes fish eaters 15
Great Lakes non-fish eaters 10
Midwest and Northeast US women
Michigan mothers 5
North Carolina mothers
Wisconsin women
Dutch mothers

REPORTED HEALTH EFFECTS

decreased reflexes, memory, visual discrimination, IQ, attention
hypotonia and decreased reflexes, psychomotor development, and neurologic “optimality”

From: In Harm’s Way, GBPSR May 2000
Anniston PCB Site
LEAD Sampling Results

Industrial Facilities  Lead Sample(s)

- ≥ 400 ppm
- < 400 ppm

Tetra Tech EMI START
Summary of the Situation

- History of Pollution in Anniston
- An Affronted Citizenry
- Litigation
- Fractious situation
- EPA & ATSDR involvement
- Need for information and education
Southeast PEHSU at Emory University
PEHSU in Anniston

- **Late 2000**
  - Preliminary work
- **Jan 2001**
  - Presentations to Pediatricians
  - Meetings with Community representatives
- **Spring 2001**
  - Developing a Vision
- **2001-2004**
  - Community Forums and Health Fairs

SE PEHSU Anniston Project
The Steering Committee
Goals of Steering Committee

- Gather information on status of children
- Gather information on existing resources
- Develop ways of improving availability and access to services for the children and their families
- Explore potential funding sources for improving services and developing research project initiatives
- Reaching out to the Community at large
Community Outreach
Community Outreach
Children's Health Fair
August 2002

SPONSORS

City of Anniston - Pediatric Environmental Health Specialty Unit - Alabama Power Co.
Community Against Pollution - EPA - Huron Valley Steel - RMC - Sunny King - Regions Bank
JSU - Anniston Water Works - Job Education Training - AnStar - Anniston Ice Co.
Agency for Toxic Substance Disease Registry - Ayers State - Alabama Public Health Dept. Area VI
Mothers and Daughters Protecting Children's Health - Area Pediatricians and Nurses - Southtrust Bank
Farmers & Merchants Bank - Calhoun County Medical Society
ANNISTON HIGH SCHOOL
Health Screening

- Growth
- Hearing
- Vision
- Dental
- Pulmonary
Health Education
Community Partners

• Vision 2020
• Community Representatives
• Alabama Early Intervention Services
• Anniston School Systems
• Local Pediatricians
• Local Business
• Academic Institutions
Long Term Goals of PEHSU in Anniston

- Develop a research infrastructure and community-based research projects to advance the knowledge of the effects of environmental toxins
- Enhance developmental & educational services to the children improve their opportunities for social and economic success in life
Summary of Project

• History of Industrial Pollution
• Adverse effects on Children's Health
• PEHSU involvement
• Community based collaborative project
• Strategies for advancement of knowledge and improvement of health
• Sharing of experiences
• Building network infrastructure
Case Study #2: Deep Creek, WA
Contamination of Well Water in Eastern Washington – Deep Creek

• NW PEHSU Contacted by Washington State Department of Health in July, 2006

• Fairchild Nike Battery 87 - property of the US Air Force and a liquid rocket fuel site in the distant past
Contamination of Well Water in Eastern Washington

- Range of Measured Levels of Chemicals in Deep Creek Drinking Water Wells
  - NDMA: < 0.0001 – 0.0071 ppb
  - Perchlorate: <0.01 – 2.1 ppb
  - TCE: <1.0 – 59.5 ppb
Handouts Created

Deep Creek Groundwater Contaminants: Health Statement

What kind of health effects could we expect given current levels of exposure?

It is unlikely that NDMA, perchlorate, and TCE would cause identifiable health effects at current exposure levels.

Studies that examine long-term exposure resulting in higher cumulative doses show the following health consequences:

**NDMA:** Liver toxicity and DNA damage, and increased risk of certain types of cancer with long-term exposure.

**Perchlorate:** Long-term exposure can decrease thyroid hormone levels in the body.

**TCE:** Liver, kidney, and heart damage and increased risk of kidney/prostate/cervical cancers, leukemia, and lymphoma.

Are there any populations that are more susceptible to the effects of these chemicals?

**NDMA:** Persons who smoke, drink excessive amounts of alcohol, or have protein deficient diets may be more susceptible to the effects of NDMA because these affect the metabolism of NDMA. Currently, studies do not support special vulnerabilities of the developing fetus or children to the effects of NDMA.

**Range of Measured Levels of Chemicals in Deep Creek Drinking Water Wells**

- NDMA: 0.0011 - 0.0071 ppb
- Perchlorate: <0.01 - 2.3 ppb
- TCE: <1.0 - 59.5 ppb

**Perchlorate:** The developing fetus is more susceptible to health risks than adults. However, most human studies have not found changes to thyroid function in neonates whose mothers were exposed to low levels of perchlorate in drinking water.

**TCE:** Children and the developing fetus are more susceptible to the effects of TCE than adults. Several studies link TCE-contaminated drinking water and increased incidence of birth defects. Adverse birth outcomes include low birth weight, neural tube defects, cleft lip, and heart defects (most of these studies have much higher maternal exposure to TCE). Water that contains TCE above the MCL of 5 ppb should not be used for consumption.

Can these chemicals get into breast milk?

NDMA, TCE, and perchlorate have all been found in human breast milk. Currently, it is not clear to what extent drinking water exposures contribute to these levels. Further research needs to be conducted to determine sources of exposure for contaminated breast milk and potential doses to the breast feeding infant.

Are there any tests for these chemicals in our bodies?

There are tests to detect exposure to all three of these chemicals but they are not readily or routinely available in commercial medical laboratories. Use of these units in research studies has not yet provided reference levels for interpreting how urine or blood levels relate to specific health effects in an individual patient.

If you or your family member is experiencing symptoms that you are concerned may be related to exposure to NDMA, TCE, or perchlorate, consultation with your health care provider is recommended. There are routinely available tests of organ function that can be performed (see below).

**NDMA:** Your doctor may conduct liver function tests if you are experiencing symptoms of liver toxicity (nausea/vomiting, upper abdominal pain, yellow skin).

**TCE:** Your doctor may conduct liver, kidney, or heart function tests if you are experiencing symptoms related to these organs (nausea/vomiting, upper abdominal pain, yellow skin, increased anemia, whole body swelling/shaoting, palpitations/shortness of breath).

**Perchlorate:** Your doctor may conduct thyroid function tests if you are experiencing symptoms of hypothyroidism (dry skin, brittle hair, fatigue, increased weight gain).

When should I see my health care provider?

If you are having any kind of health symptoms out of the ordinary, we recommend seeing your health care provider.

What if my health care provider isn’t knowledgeable about the health effects of these contaminants?

Staff at the Washington State Department of Health and physicians at the University of Washington Pediatric Environmental Health Specialty Unit (children) are available to provide consultation to general practice providers who may be unfamiliar with these exposures. Contact information is provided below.

**Is it safe to drink the water?**

Based on sampling to date, the levels of contamination should not result in health problems. It is important to closely monitor contaminant levels to continue to identify any increases in exposure levels.

**Factsheet Prepared by:**

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**Pediatric Environmental Health Specialty Unit (PEHSU)**

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Contamination of Well Water in Eastern Washington

Evening Community Meeting
- Dr. Sheela Sathyanarayana M.D., Pediatric Environmental Health Fellow, Child Health Institute, UW
- Mike Lascuola, Environmental Health Specialist, Spokane Regional Health District
- Rob Duff, Director, Office of Environmental Health Assessments, Washington State Department of Health
- Wayne Clifford, Manager, Site Assessments Section, Washington State Department of Health
- Barbara Trejo, Health Assessor, Washington State Department of Health
- Ed Perry P.E, Regional Engineer, Spokane County, Office of Drinking Water, Washington State Department of Health

Physician Expertise
- Presentation
- Handout
- Individual Counseling for families that had questions
Lessons Learned

• Feedback – very positive overall
  • Neutral expert presenting health information
  • Trustworthy
  • Handout informative and specific to community issue
*Alleviate Community Distrust of Government/EPA
- Independent review and analysis of data
- Recommend medical specialists
- Independent expert “voice” at community meetings

*Provide guidance on reducing or preventing children’s exposure to environmental hazards at site
- Contribute information to community fact sheets

*Help the community assess the unique vulnerabilities of children when reviewing the remedial Proposed Plan (i.e. adequate signage and fencing to keep out curious children; protective cleanup levels)

*Provide training to local health professionals to recognize and treat potential environmental health-related conditions in children

*Advise community on reuse options to improve children’s environmental health
- Safe playgrounds and parks
- Health benefits of smart growth communities (walk-ability)
- Reducing exposure to indoor and outdoor air pollution
- Health benefits of Green buildings (school and daycare siting)