

# FY 2008 NIEHS Director's Statement for Superfund Programs

Department of Health and Human Services National Institutes of Health

## FY 2008 Budget Request

**Witness appearing before the House Appropriations Subcommittee on Interior, Environment, and Related Agencies**

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**National Institute of Environmental Health Sciences**

**March 2, 2007**

Richard J. Turman, Deputy Assistant Secretary, Budget

Mr. Chairman and Members of the Committee:

The FY 2008 budget includes \$78,434,000 for the National Institute of Environmental Health Sciences. The budget includes \$50,198,000 for the NIEHS Superfund Research Program and \$28,236,000 for the NIEHS Worker Training Program.

## Introduction

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Over 14 million people in the U.S. live within one mile of a federal Superfund site (Heitgerd and Lee 2003; Soc Sci Med. 57(6):1117-26). Leakage of hazardous wastes from these sites can create needless health hazards for the surrounding community as well as for workers at these sites. Primary federal responsibility for addressing Superfund health issues resides with the Environmental Protection Agency (EPA). The needs, though, transcend any single federal agency. For this reason the NIEHS Superfund Research Program and Worker Training Program were created to recruit the NIH's biomedical research community as well as nonprofit partners to develop a better understanding of the health effects of chemicals stored in these sites, to develop better remediation strategies, and to train a work force that can address cleanup and emergency needs in ways that protect both public and worker health.

Results of these efforts extend beyond the communities that live around hazardous waste sites. Many of the chemicals stored at these sites are high-volume commercial

compounds that are persistent in the environment and to which the majority of people in the U.S. have some exposure, albeit at lower levels. Thus, research efforts from the Superfund Research Program can translate into discoveries that are relevant to all citizens. Likewise, the Worker Training Program prepares emergency responders for many hazardous scenarios. Many Worker Education graduates were at the World Trade Center following the attack on September 11, 2001. This program continues to train workers in ways that help them respond to terrorist attacks, as well as current and anticipated public health emergencies such as avian flu.

## NIEHS Superfund Research Program

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Research conducted by the NIEHS Superfund Research Program is a coordinated effort with the U.S. EPA, taking into account that agency's needs and goals, and engages multidisciplinary teams of biomedical scientists, environmental scientists and engineers. These teams focus on all the phenomena associated with environmental routes of exposure, biological response to exposure, disease outcomes, and solutions for these problems. Solutions include both interventions at the biological level and innovative remediation technologies for the environment. This past year, we have initiated an individual investigator research program to diversify our research activities and enhance the accessibility of the program to investigators.

I'd like to describe a few of the breakthroughs this program has created.

## Dietary Folate Reduces Arsenic Toxicity

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In addition to being a common contaminant at Superfund sites, arsenic can occur naturally in soils and, at low levels, appears in the drinking water of many people in this country. Arsenic has a number of known health effects, including neurodegenerative conditions and cancer. Since some exposure to arsenic is inevitable, researchers were interested in how to naturally reduce its effect in the body. NIEHS Superfund-supported researchers at Columbia University made a significant discovery when they found that folate (a form of vitamin B) is important in detoxifying arsenic. Diets that are deficient in folate, or individuals who have decreased ability to synthesize folate, are more susceptible to the toxic effects of arsenic since they aren't able to detoxify and eliminate arsenic from the body. These investigators have identified a number of genes associated with folate metabolism that when altered affect the metabolism and toxicity of arsenic, including the susceptibility to skin cancer. Additional evidence for the importance of folate in modulating arsenic toxicity is borne out in a study of residents of Bangladesh, who have been exposed to high levels of arsenic via drinking water. Those individuals who are folate

deficient are at an increased risk for arsenic-induced skin lesions. In a clinical trial, these investigators confirmed that folic acid supplementation lowers total blood arsenic, resulting in improved arsenic detoxification and elimination. This finding has immediate therapeutic implications for people exposed to arsenic both in the U.S. and worldwide.

## Bacteria Can Modify the Toxicity of Polychlorinated Biphenyls (PCBs)

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Polychlorinated biphenyls (PCBs) are mixtures of man-made chemicals that were used extensively in many industrial and commercial applications. More than 1.5 billion pounds of PCBs were manufactured in the U.S. before they were outlawed in 1977 due to concerns over their toxicity and persistence in the environment. Part of the difficulty in addressing PCBs contamination is that these molecules were specifically designed for long-term stability and resistance to breaking down. However, microorganisms can play a role in the initial stages of degradation, and Superfund Research investigators at Michigan State University have found a way to use genetically enhanced microbes to achieve complete degradation of PCBs. These organisms, under sequential condition of oxygen-rich and oxygen-poor environments, can achieve the previously unattainable: complete destruction of PCBs. Additionally, information gained from these studies about which genes are involved in the destruction of the PCBs will be integrated with genomic, physiologic, and geochemical information to predict the potential rate and extent of biodegradation at contaminated sites. This work will lead to better predictions of the behavior of contaminants in particular types of environments, thus decreasing the uncertainty in risk and exposure assessments.

## NIEHS Worker Training Program

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The NIEHS Worker Training Program provides the nation with a workforce trained in the safe handling of hazardous material and waste. It complements the NIEHS Superfund Research Program as a sister prevention program by teaching the skills necessary to prevent injury and exposure to protect the health of hazardous substances workers and emergency responders. Over the last several years this trained workforce has responded to acts of terrorism such as the Oklahoma City bombings, the destruction of the World Trade Center, and the devastating effects of Hurricanes Katrina and Rita. The Worker Training Program is now preparing for pandemic flu and I would like to report on this important activity.

The Worker Training Program provides funds to prepare response workers for potential avian and pandemic flu outbreaks. In order to reach a large audience, the program has funded a national consortium composed of nearly 200 community colleges. With this funding the consortium provides training focused on animal disease detection, agricultural emergency response, large-scale culling of diseased animals, and decontamination and disinfection of avian influenza. For our Nation's health care workers, particularly nurses, the program has provided funds, through the Service Employees International Union, to modify their existing training modules to prepare health care workers for disease detection and the treatment of contaminated patients covering both the avian and pandemic phases of potential human-to-human transmission. To protect our first responders, the NIEHS Worker Training Program funds the International Association of Firefighters to incorporate avian and pandemic flu modules into their Infectious Disease course. These publicly funded curricula are, and will be, available to the public online through the NIEHS Worker Training Program National Clearinghouse for Worker Safety and Health Training.

## Summary

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The efforts I've described paint a comprehensive picture of state-of-the-art research in biomedical and environmental sciences, harnessed to the design of novel interventions and technologies to address the needs of communities and decision makers who are coping with the impacts of exposure to hazardous substances. These efforts complement the opportunities and challenges identified in the recent NIEHS strategic plan, "[New Frontiers in Environmental Sciences and Human Health](#)," which sets goals for improving the understanding of how the environment influences development and progression of disease, as well as using this understanding to prevent illness, reduce disease and promote health.

I thank you for the opportunity to testify, and I welcome your questions.

DEPARTMENT OF HEALTH AND HUMAN SERVICES  
NATIONAL INSTITUTES OF HEALTH  
BIOGRAPHICAL SKETCH

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<b>POSITION</b>	Director, National Institute of Environmental Health Sciences (NIEHS) and Director, National Toxicology Program (NTP)
<b>BIRTHPLACE</b>	Flushing, New York



<b>DATE OF BIRTH</b>	March 3, 1953
<b>EDUCATION</b>	B.A., University of Rochester, 1975; M.D., University of CA, San Diego, 1979; M.P.H., Harvard School of Public Health, 1985
<p><b>EXPERIENCE</b>            Director, NIEHS and NTP, 2005-present; Vice Chair for Research, Department of Medicine, Duke University Medical Center, 2003-2005; Walter Kempner Professor of Medicine, Duke University Medical Center, 2001-2005; Professor of Environmental Sciences and Policy, Nicholas School of the Environment and Earth Sciences, Duke University, 2001-2005; Professor of Medicine and Genetics, Chief, Division of Pulmonary and Critical Care Medicine, Duke University Medical Center, 2000-2005; Director, Center for Environmental Genomics, Institute for Genome Science and Policy, Duke University Medical Center, 2000-2005; Staff Physician, Veterans Administration Medical Center (5/8 full time), 2000-2004; Director, Occupational Medicine, Department of Internal Medicine, University of Iowa, 1988-2000; Sabbatical in Laboratory of Dr. Jeffrey Murray, Department of Pediatrics, University of Iowa, 1994-1996; Assistant, Associate, and Full Professor, Pulmonary Division, University of Iowa, 1988-2000; Pulmonary Fellow, University of Washington, 1985-1988; Clinical Scholar, Robert Wood Johnson Clinical Scholars Program, 1985-1987; Occupational Medicine Residency and MPH, Harvard School of Public Health, 1984-1985; Intern, Resident and Chief Resident, Medicine, Boston City Hospital, 1980-1984.</p> <p><b>PROFESSIONAL ORGANIZATIONS</b> (Active and Inactive)            American College of Chest Physicians, American College of Physicians, American Federation for Clinical Research, American Public Health Association, American Society for Clinical Investigation, American Society of Human Genetics, American Thoracic Society, Association of American Physicians, Society of General Internal Medicine.</p> <p><b>HONORS AND AWARDS</b>            Member, NIH/NHLBI Innovative Grant Program Review Committee, 2001-2004; American Thoracic Society Scientific Accomplishment Award, 2003; Member, NIH/NIEHS Study Section, 1999-2003; Member, American Association of Physicians, 1998; Member and Chair, VA Pulmonary Study Section, 1997-2000.; Member, NIH GCRC Study Section, 1995-1999; American Thoracic Society Grant Review Committee, 1993-1997; Editorial Board, American Review of Respiratory Disease, 1993-1996; Member, American Society for Clinical Investigation, 1995; Member, Central Society for Clinical Research, 1991; Public Service Science Resident, National Science Foundation, 1979; Phi Beta Kappa, 1974.</p>	