

FY 2007 NIEHS Director's Statement for Superfund Programs

Department of Health and Human Services National Institutes of Health

FY 2007 Budget Request

House Appropriations Subcommittee on Interior, Environment, and Related Agencies
David A. Schwartz, M.D., Director
National Institute of Environmental Health Sciences
April 2006

Mr. Chairman and Members of the Committee:

I have the honor of presenting the President's budget for the National Institute of Environmental Health Sciences (NIEHS) Superfund Programs. The FY 2007 budget is \$78,414,000, a decrease of \$694,000 from the FY 2006 appropriation. The budget request includes \$50,185,000 for the NIEHS Superfund Basic Research Program and \$28,229,000 for the NIEHS Worker Education and Training Program.

Introduction

As the Director of the NIEHS, an institute of the National Institutes of Health, I am pleased to report on the status of the NIEHS Superfund programs. These two vital and productive programs, now in their nineteenth year, continue to contribute essential resources and services to the nation's Superfund efforts by providing sound science in support of the decision-making process, new technologies for cleaning up hazardous waste sites, and valuable training for the nation's hazardous waste and emergency response workforce.

Opportunities for New Directions

Although both of the NIEHS Superfund programs are mature programs, they are also dynamic and continually evolving to enhance their productivity and ensure their relevancy to program stakeholders and the public. In 2005, through its university-based grants program, the NIEHS Superfund program supported studies in low-dose exposure to metals, the toxicology of nanostructures, and the neurobehavioral effects of exposure to

pesticides. These new studies will contribute to the understanding of the disease processes associated with environmental exposures. It is anticipated that in 2006, new awards will fund research in a broad range of areas including biomarkers of exposure, environmental genetics and genomics, remediation, and site characterization with a particular emphasis on using advanced technologies. Areas of emphasis for the next competition for funding in 2008 will likely include assessing the use of sequential remediation technologies for the cleanup of a hazardous waste sites, determining the bioavailability of contaminants (i.e., the degree to which a compound is available to be metabolized by an organism) and understanding the basic mechanisms of environmentally mediated diseases. The recently initiated research, when combined with the planned research, provides a well-rounded, multidisciplinary program contributing to the wide-ranging need for knowledge and technologies related to the nation's hazardous waste sites.

The NIEHS Superfund supports the training and education of workers engaged in activities related to hazardous materials and waste generation, removal, containment, transportation and emergency response. In September, 2005, the training program began the first year of its five-year funding cycle. Awards are made on a five-year basis, requiring annual non-competitive re-applications. Over 500,000 workers were trained during the prior five years, and the NIEHS Worker Training Program will build upon this outstanding record during the current period. This includes the further development of federal and state partnerships, the implementation of the new Hazmat Disaster Preparedness Training Program, and the integration of advanced training technologies into the national network of safety and health trainers.

Partnerships

NIEHS continues to place a high priority on communicating, collaborating, and coordinating with its federal partners and other stakeholders. The Research Program has strong ties with the U.S. Environmental Protection Agency (EPA), both in the Superfund office (i.e., Office of Superfund Remediation and Technology Innovation) and the Office of Research and Development (ORD). In FY 2005, NIEHS established a Memorandum of Understanding with ORD to formalize the commitment ensuring coordination between the two agencies' research efforts. In addition, the NIEHS proactively seeks opportunities to mold its research agenda to fit the needs of the EPA, the Agency for Toxic Substances Disease Registry (ATSDR), and other stakeholders. Our ongoing activities in bioavailability exemplify such an effort. Currently, NIEHS grantees are coordinating with the EPA, the ATSDR, other federal agencies, academia and industry to explore research issues, as perceived from differing perspectives, regarding bioavailability as a determinant of

pollution exposure and human health risk. It is through this type of collaborative process that future research efforts will be targeted in context of the most pressing areas of need.

Partnering with other federal agencies, who are charged with responding to national emergencies and disasters, is equally as important to the NIEHS Worker Training Program. Partner agencies include the Occupational Safety and Health Administration (OSHA), the EPA and its Brownfields Program, the Department of Energy, the U.S. Army Corps of Engineers, the Department of Homeland Security including the Federal Emergency Management Agency and the U.S. Coast Guard. On August 29, 2005, Hurricane Katrina devastated Louisiana and Mississippi. Within hours, in partnership with OSHA and EPA, an experienced national network of NIEHS-funded worker safety and health experts, trainers, and support staff began mobilizing to assist in the recovery of the Gulf Coast. This network gained much of its experience during the responses to the World Trade Center, Oklahoma City, and anthrax terrorist attacks. Utilizing the lessons learned, this network developed mechanisms for getting needed safety and health resources into the field. In response to Hurricane Katrina, the NIEHS Worker Training Program, through this network, provided teams of trainers and subject matter experts, printed training materials, on-line electronic learning tools, personal protective equipment, other training supplies, and even useful 'extras' such as safety awareness "podcasts" -- audio tips available through easy download to local trainers. In addition, since October 2005, over 8,000 federal responders and contract personnel have received "just-in-time" site and hazard specific safety and health training. These efforts continue to be successful because of federal partnerships.

Recent Accomplishments

The two NIEHS Superfund programs are timely, productive enterprises that are dedicated to addressing very real environmental problems. The following examples demonstrate some of the important achievements of each of the programs and their contributions to the protection of the nation's public safety and well-being.

NIEHS Responds to Hurricane Katrina

NIEHS, in collaboration with its Superfund grantees and external partners, has created an interactive web-based Geographical Information System (GIS) portal (<http://www-apps.niehs.nih.gov/wetp/index.cfm?current=391>) that integrates existing publicly available spatial data with disaster specific datasets within the context of a user-friendly and highly customizable research environment. The portal allows for "one-stop" access to infrastructure data, such as roads and power plants, potential sources of contaminants, including Superfund and toxic release inventory sites, and census data, indicating

potential human exposures. The GIS portal is intended to provide tools and information for those who are addressing the consequences of these natural disasters by supporting the decision-making process related to identifying sources and routes of contaminants, evaluating the potential for future exposures, assessing human exposures that occurred in the immediate aftermath of the hurricanes and assessing the immediate and longer-term health impacts associated with these exposures.

Trained Gulf Coast Inhabitants Are Well Prepared

When the hurricanes struck the Gulf Coast in 2005, the Poarch Band of Creek Indians in south Alabama was prepared. The band had received funding from the NIEHS Worker Training Program in recent years for Incident Command System (ICS) training. It found the training to be critical in responding to Hurricanes Ivan and Dennis. The tribe's Emergency Preparedness Coordinator, states, "We established the ICS immediately after Ivan struck, and it was invaluable. Things ran so smoothly it was scary. Based on what we learned in responding to Ivan, we activated the ICS 24 hours in advance of Dennis, which was a big help in preparing for it. The system allowed us to maintain a smooth flow of water, food, and ice throughout the reservation after the storms. We used the ICS to assign daily duties to our staff and to maintain accountability, which allowed us to monitor their safety..." The tribe's response earned them recognition at the local and state levels and an award from the Indian Health Service. Although Hurricane Katrina spared the Poarch Band, it caused widespread devastation in neighboring areas, and the Poarch Band was prepared with the training and expertise necessary to assist the neighboring community.

Neurological Effects of Manganese Exposure in Children

Health, earth, and social scientists from the Columbia University NIEHS Superfund research program are conducting collaborative, multidisciplinary studies to examine the dose relationships between arsenic levels in drinking water and health outcomes. In the course of this work, they made an unexpected discovery about the impact of manganese exposure in children. In a recent study of 10 year-old children in Bangladesh, these investigators determined that the arsenic concentration found in drinking water is associated with a lowering of childhood intelligence, in a dose-response manner. Equally intriguing, they also observed a relationship between well water manganese and a decrease in intelligence in the children. The investigators went on to determine that exposure to manganese in drinking water is associated with neurotoxic effects in children in a dose-dependent manner and is independent of the effects of arsenic. (It is important to note that the U.S. Geological Survey reports that approximately 6% of domestic household wells in the U.S. contain manganese in excess of the EPA Health Advisory level of 300ug/L.)

The Columbia study examined 10 year-old children, and it is not yet known whether deficits can be detected earlier in life. This finding is particularly interesting in light of the fact that manganese exposure is also associated with Parkinsonism, a neurological disease in adults. One clear implication is that manganese exposure is associated with serious neurological effects. These important findings contribute critical information to the risk assessment process as hazardous waste site managers consider environmental exposures to manganese.

New Tools for Monitoring Bioremediation

Trichloroethylene (TCE) is the country's most frequently detected contaminant in groundwater and is thought to cause developmental abnormalities and possibly cancer. Once TCE makes its way into subterranean conduits of water, it can take decades to centuries to degrade. While TCE is resistant to degradation, under favorable conditions it can be degraded to harmless products through microbially-mediated processes. There is great interest in understanding the biotransformation of this compound in situ and in manipulating groundwater environments to achieve more rapid and complete remediation. One of the most promising methods for remediating TCE is the use of naturally occurring microorganisms to breakdown contaminants in the absence of oxygen. Unfortunately, microorganisms do not completely biodegrade the chlorinated solvents, and the incomplete degradation creates harmful by-products. Therefore, when in situ bioremediation approaches are used, it is critical to evaluate the effectiveness of the entire biodegradation process. NIEHS-supported investigators at the University of California at Berkeley and Lawrence Berkeley National Laboratory have developed rapid tests to precisely measure molecules within bacteria that lead to the production of solvent-degrading enzymes and track evidence of degradation products to monitor the success of bioremediation strategies. These techniques have been tested and validated and found to be more accurate and faster than currently used approaches. Utilization of these techniques facilitates site assessment and monitoring, leading to substantial cost savings in the application of in situ bioremediation. As a demonstration, application of bioremediation guided by these techniques at one Department of Energy site in Idaho yielded an estimated \$15 million cost savings for cleanup of the site.

Methamphetamine Awareness Training

NIEHS grantees conducted Methamphetamine Awareness training for 35 first responders in June, 2005 for the Lake County Fire Chiefs Association, Indiana. Classes targeted audiences including fire fighters, disaster/emergency management personnel and law enforcement officers. The training incorporated a visual display of clandestine lab

chemicals and equipment used to manufacture methamphetamine. Indiana has one of the country's fastest growing methamphetamine problems and many attendees noted the timeliness of this course with the burgeoning need for worker safety training in this area.

Earthquake Preparedness Training

The University of Washington presumes that a major earthquake will occur and will create a hazardous materials incident across the campus. Part of the University's preparedness response is that a Pre-Entry Assessment Team will evaluate all damaged structures prior to allowing search and rescue personnel to enter the damaged buildings. The non-profit American Federation of State, County, and Municipal Employees Training and Education Institute, which is funded by NIEHS, provided post-earthquake response training to these assessment teams. The training focused specifically on air monitoring strategies, liquids sampling and identification, as well as the use of appropriate personal protective equipment. It included a simulated post-earthquake structure where students were required to develop a plan for entry into the area and design protocols and standard operating procedures to be followed in conducting the assessment of the structure. This simulation provided unique opportunities to design and implement highly-specialized, targeted training.

Summary

The NIEHS Superfund Programs have a legacy of making outstanding contributions in the support of the goals of the nation's Superfund program. The investment in research provides not only immediate benefits, but also provides a solid foundation for reducing the scientific uncertainties facing the managers of the national Superfund cleanup program. The investment in worker education and training provides comprehensive training to handle Superfund cleanups, chemical emergency response, and natural disasters.