

## **FY 2011 NIEHS Director's Statement for the Record**

Department of Health and Human Services  
National Institutes of Health  
FY 2011 Budget Request

House Subcommittee on Labor-HHS-Education Appropriations  
Linda Birnbaum, Ph.D., D.A.B.T., A.T.S., Director  
National Institute of Environmental Health Sciences  
April 28, 2010

Mr. Chairman and Members of the Committee:

I am pleased to present the President's FY 2011 Budget request for the National Institute of Environmental Health Sciences (NIEHS) of the National Institutes of Health (NIH). The FY 2011 budget includes \$707,339,000, an increase of \$17,774,000 over the comparable FY 2010 enacted level of \$689,565,000, comparable to transfers proposed in the President's request.

These are exciting times for the field of environmental health sciences. NIEHS is harnessing new tools and technology and applying them to uncover the mechanisms related to how environmental chemicals and other exposures can cause toxicity, disease and dysfunction. We are learning how to use system-wide, "omics" approaches to enhance our knowledge, rather than just looking at one chemical or one biological pathway at a time. We are focusing on the real-world, translational impact of our scientific research, from bench to bedside and bench to public health as we consider disease prevention through exposure reduction as a tool to bring down the cost of health care. We continue our investment in global environmental health sciences, since the environment knows no borders. Through supporting innovation we are committed to training and supporting young, talented scientists in order to stimulate the growth of creative ideas in the environmental health sciences.

**HIGH THROUGHPUT TECHNOLOGIES FOR ENVIRONMENTAL HEALTH**

Over the past decade, NIEHS has been moving aggressively to apply a variety of high throughput approaches to environmental health sciences. The National Toxicology Program (NTP), an interagency program headquartered at NIEHS, is supporting a High Throughput Screening Initiative in partnership with the National Human Genome Research Institute and the Environmental Protection Agency. This initiative, known as Toxicology Testing in the 21st Century, or “Tox21,” is the foundation for a new testing paradigm, moving toxicology to a better predictive science focused upon a broad inclusion of target-specific, mechanism-based, biology. In this approach, alternative assays targeting the key pathways, molecular events, or processes linked to disease or injury are identified and incorporated into a research and testing framework. These high throughput screening assays are used to test a large number of chemicals, and the resulting data are deposited into publicly accessible relational databases.

NIEHS is also developing key resources for genomics and other high throughput efforts. In collaboration with the University of North Carolina (UNC) General Clinical Research Center, a large volunteer DNA banking project named the Environmental Polymorphisms Registry (EPR) was launched. This valuable resource for human genomic studies was designed for scientists to screen for functionally significant genes and to identify subpopulations of individuals with shared genotypes, and then correlate their genotypes with their phenotypes in a process known as “recruit-by-genotype.” The EPR gives scientists more flexibility in designing follow-up studies, while reducing the biases that can occur in genetic epidemiology studies when subjects are recruited based on phenotype.

## **TRANSLATING BASIC SCIENCE INTO BETTER OUTCOMES**

The results of our research investments, however exciting, lose their significance if we fail to use them to create better health for Americans. This “translation” function encompasses both development of specific treatments and interventions as well as deployment of appropriate regulatory and public health actions; both translational pathways need to be well supported by science. Understanding environmentally

mediated processes of disease can lead to better diagnosis and treatment, but it can also lead to interventions and strategies for disease prevention at all levels. For example, NTP research on cardiac effects and mortality of ephedrine and caffeine in combination contributed to the banning of herbal supplements containing ephedra and caffeine. NIEHS research on environmental causes of asthma led to studies of environmental management of this disease. Results of these studies have yielded effective strategies to reduce exposure, which are now standard practice in asthma control and management.

Another key aspect of translational research is its interdisciplinary nature; the most effective translational approaches bring basic scientists together with clinicians, epidemiologists, toxicologists, statisticians, and many other disciplines. NIEHS supports a variety of interdisciplinary, translational programs focusing on a range of environmental health issues. The most recent is a program called Virtual Consortia for Transdisciplinary/Translational Environmental Research (ViCTER). These consortia will create research teams including basic, clinical, and population-based researchers to accelerate the exchange of knowledge and improve human health in areas where environmental factors are known or expected to influence the development or progression of disease. The “virtual” aspect of these grants will allow researchers at remote locations to form consortia to integrate their research efforts under the umbrella of a center that provides consortium direction, monthly conference calls and annual meetings. This feature brings participation within reach of researchers in smaller or remote institutions and provides an opportunity for new collaborations to be established.

## **ENVIRONMENTAL HEALTH SCIENCE AND HEALTH CARE REFORM**

NIH is well positioned to provide new tools and knowledge in support of a reformed health care system. To lower costs of necessary care and to reduce disease burden, preventing hazardous environmental exposures, and thus preventing disease is a win-win for the American people. NIEHS research continues to provide the data necessary to determine what environmental agents are causing adverse health impacts so that these exposures can be avoided and impacts prevented.

Personalized medicine also entails personalized risk management and disease prevention. Understanding individual environmental and genetic risk factors for disease provides better information for effective exposure reduction strategies, which will ultimately lead to disease prevention and lower individual health care costs. NIEHS-funded scientists are working on a wide variety of studies linking specific genetic variations with higher risks of asthma, cancers, and other health outcomes when coupled with certain environmental exposures. NIEHS is planning new efforts to develop innovative methods for identifying gene-environmental interactions in genome-wide association studies, candidate gene studies, or other gene/environment studies focused on complex diseases.

Research on health disparities is fundamental to health care reform. Environmental issues are especially important since disparities in the burden of environmental impact contribute to the health problems of disadvantaged populations. To address this area, NIEHS is expanding the goals for its Partnerships for Environmental Public Health program, which is the umbrella program for our community-based activities that foster interactions between environmental health scientists and the communities they serve and work in. The goals for the Partnerships program include developing and evaluating strategies to communicate environmental public health messages to diverse audiences, and creating and distributing materials to increase awareness and literacy about environmental health risks.

### **FOCUSING ON GLOBAL ENVIRONMENTAL HEALTH**

NIEHS has funded many important studies on foreign populations which have had significant public health impact in the United States. These include studies on lead exposure in Mexico, environmental neurotoxicity in Egypt, and fish consumption and methylmercury exposure in the Seychelles and Faeroe Islands. Other studies focus on environmental exposures that are public health concerns for non-U.S. populations. For example, in developing countries, indoor burning of some types of cooking fuels results

in poor indoor air quality, causing a high incidence of respiratory disease and affecting lung development and disease in exposed children. NIEHS researchers are studying the effectiveness of providing replacement cookstoves that can improve air quality.

Oceans are a critically important global system with ramifications for climate, food supplies, infectious disease, and pharmaceuticals. NIEHS partnered with the National Science Foundation to create the Centers for Oceans and Human Health. The next phase of this program, planned for FY2011, will combine individual and program project awards covering expanded areas of oceans and health science. These include studies on harmful algal blooms; marine pollution; Great Lakes human health effects; seafood toxicity from both chemical contamination and naturally occurring toxins; bioinformatics and statistical tool development and capabilities to link oceanographic models with exposure and disease models; and climate change impacts on oceans and human health.

Climate change may also potentially affect many other aspects of global health including transmission of infectious disease, energy policy, food production, climate refugeeism, natural resource management, contamination (water, air, soil) from severe weather events, and disruption of delivery and accessibility of health care services. Recently, NIEHS provided support for a series of studies in *The Lancet* which examine the relationships between climate change mitigation measures and household energy emissions, urban land transportation, low-carbon electricity generation, agriculture and food, and short-lived greenhouse pollutants. The researchers found that measures to restrict output of greenhouse gases will also result in benefits to public health and that these co-benefits will offset many of the costs of climate change mitigation. NIEHS is taking a lead role in identifying federal research needs in climate change and health.

## **REINVIGORATING THE BIOMEDICAL RESEARCH ENTERPRISE**

NIEHS has been a pioneer in training, minority scientist recruitment, and career development. Fostering a vigorous biomedical research workforce means paying

attention to each stage of a young investigator's career. Students are targeted through our "Summers of Discovery" program, which has provided laboratory experience for college students and high school teachers for over 25 years. NIEHS has had great success with our Outstanding New Environmental Health Scientist, or "ONES" program, which identifies the most talented young investigators across the breadth of the disciplines contributing to the environmental health sciences and provides research funding for projects and equipment, as well as resources for career enhancement activities to give them the best foundation possible for long-term career success.

Linda S. Birnbaum, Ph.D., D.A.B.T., A.T.S.

On January 18, 2009 noted toxicologist Linda S. Birnbaum, Ph.D., D.A.B.T., A.T.S., began her tenure as director of the National Institute of Environmental Health Sciences (NIEHS) and the National Toxicology Program (NTP). NIEHS is located in Research Triangle Park, North Carolina, and is a component of the National Institutes of Health (NIH).

As director, Dr. Birnbaum oversees multidisciplinary biomedical research programs to discover the environmental causes of disease. The research program is focused on prevention, and includes intervention efforts that encompass training, education, technology transfer and community outreach.

Prior to her appointment as the NIEHS Director, Dr. Birnbaum was a senior advisor at the Environmental Protection Agency (EPA), where she served for 16 years as director of the Experimental Toxicology Division. She has worked as a federal scientist for nearly 30 years.

A native of New Jersey, Dr. Birnbaum earned her M.S. and Ph.D. in microbiology from the University of Illinois, Urbana.

She is a board certified toxicologist, and was president-elect of the International Union of Toxicology, the umbrella organization for toxicology societies in more than 50 countries; former president of the Society of Toxicology, the largest professional organization of toxicologists in the world; former chair of the Division of Toxicology at the American Society of Pharmacology and Therapeutics; and former vice president of the American Aging Association.

Dr. Birnbaum has received numerous awards, including the Women in Toxicology Elsevier Mentoring Award, the Society of Toxicology Public Communications Award, EPA's Health Science Achievement Award and Diversity Leadership Award, and 12 Science and Technology Achievement Awards, which reflect the recommendations of EPA's external Science Advisory Board, for specific publications.

The author of more than 750 peer-reviewed publications, book chapters, abstracts and reports, Dr. Birnbaum's research focuses on the pharmacokinetic behavior of environmental chemicals; mechanisms of actions of toxicants, including endocrine disruption; and linking of real-world exposures to effects. She is also an adjunct professor in the School of Public Health, the Toxicology Curriculum, and the Department of Environmental Sciences and Engineering at the University of North Carolina, Chapel Hill, as well as in the Integrated Toxicology Program at Duke University.