

DEPARTMENT OF HEALTH AND HUMAN SERVICES

NATIONAL INSTITUTES OF HEALTH

Budget Request for FY 2011

Witness appearing before the
House Subcommittee on Labor-HHS-Education Appropriations

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Mr. Chairman and Members of the Committee:

I am pleased to present the President's Fiscal Year 2011 Budget request for the National Institute of Allergy and Infectious Diseases (NIAID), a component of the National Institutes of Health (NIH). The FY 2011 budget includes \$4,977,070,000, which is \$160,344,000 more than the FY 2010 appropriation of \$4,816,726,000. NIAID conducts and supports biomedical research to understand, treat, and prevent infectious and immune-mediated diseases, including HIV/AIDS, tuberculosis, malaria, influenza, emerging and re-emerging infectious diseases, asthma and allergies, immune deficiencies, autoimmune diseases and the rejection of transplanted organs. Using a multidisciplinary approach that engages academic, private-sector, governmental, and non-governmental partners, NIAID remains committed both to basic immunology and infectious disease research and the application of this knowledge to the development of strategies to detect, prevent, and treat these diseases.

GLOBAL HEALTH

Despite many important advances in medicine and public health, the World Health Organization (WHO) estimates that infectious diseases account for approximately one-quarter of all deaths worldwide, including about two-thirds of all deaths among children younger than five years of age. The President's Global Health Initiative and the NIH Director's stated emphasis on global health underscore the importance of NIAID research projects that feed the "pipeline" of new countermeasures—notably diagnostics, therapeutics, and vaccines—that are critical to the implementation of a robust global health program. Of course, NIAID research already has contributed substantially to our Nation's efforts in global health. Of note, NIAID-supported research was pivotal in the development of nearly 30 antiretroviral drugs (ARVs) that have transformed the medical management of HIV/AIDS. Domestically, these drugs have dramatically improved and prolonged the lives of people with HIV/AIDS. These

drugs also are having a great impact in the developing world through such programs as the President's Emergency Plan for AIDS Relief (PEPFAR); the Global Fund to Fight AIDS, Tuberculosis, and Malaria; and numerous other efforts in low- and middle-income countries.

While we have made extraordinary strides in treating those who become infected with HIV, the 2.7 million new infections worldwide every year, including the sobering statistics right here in Washington, D.C., underscore the need for improved tools of prevention to control the HIV/AIDS pandemic, both globally and domestically. The most powerful prevention tool would be a safe and effective HIV vaccine. In 2009, a large Phase III clinical efficacy trial in Thailand of a "prime/boost" vaccine regimen provided the first, albeit modest, signal that a vaccine could prevent HIV infection in people. This study, conducted in Thailand by the U.S. Army and the Thai Ministry of Public Health with NIAID and other partners, has provided important new leads that we will pursue vigorously along with other avenues in the development of a safe and effective HIV vaccine. These efforts include basic research to identify specific components of the virus that could potentially be used as vaccine candidates. For example, NIAID-supported researchers are evaluating which regions of the HIV envelope might elicit a neutralizing immune response that could be induced by a vaccine to prevent infection.

NIAID also continues its efforts to advance other modalities of HIV prevention. In collaboration with the Washington, D.C. Department of Health, NIAID will assess the feasibility of a voluntary "seek-test-and-treat" strategy, which mathematical modeling suggests could significantly reduce the number of new HIV infections by treating and suppressing the virus in infected individuals, thus making them less likely to infect others. The Institute also is investigating the feasibility of pre-exposure prophylaxis (PrEP) for HIV prevention, which involves providing ARVs to HIV-negative individuals who are at high risk of HIV infection. A number of clinical trials of PrEP are underway, with the earliest results expected later this year. NIAID also supports a robust research portfolio to develop topical microbicides for the prevention of HIV

infection, evaluating new products and formulations as well as different routes of administration.

In addition to HIV/AIDS, NIAID has accelerated research activities, including public-private partnerships, to combat other global health scourges such as malaria, tuberculosis (TB), and neglected tropical diseases (NTDs). For example, the Institute has embarked on a major effort to capitalize on advances in biomedical research to bring the long-neglected tools for prevention, diagnosis, and treatment of TB into the 21st century. NIAID intramural and extramural scientists are identifying new drug candidates as well as testing existing therapies for other infections to treat TB, including drug-resistant TB. The Institute's support for public-private partnerships has been instrumental in linking research across sectors to build a robust pipeline of new vaccines, promising novel therapies, and improved diagnostic tools to combat TB. NIAID also supports wide-ranging research on malaria and NTDs, encompassing genomics, basic, translational, clinical and field research with the goal of improving our understanding of these diseases and supporting the development of new interventions.

EMERGING AND RE-EMERGING INFECTIOUS DISEASES

We have long known that the threats posed by infectious microbes do not remain static, but change over time as new microbes emerge and familiar ones re-emerge with new properties or in new settings. The research activities of NIAID related to emerging and re-emerging infectious diseases are critical, as current and as-yet unrecognized health threats will require new diagnostic, preventive, and therapeutic interventions. The emergence of strains of infectious microbes that are resistant to drugs illustrates the constantly changing nature of bacteria, viruses, and fungi. Global killers such as TB and malaria, as well as more common infections that typically are easily controlled with antibiotics, have emerged in drug-resistant forms that are difficult to treat. For example, the Centers for Disease Control and Prevention (CDC) estimates that more than two-thirds of the more than two million healthcare-associated infections that occur annually in the United States are resistant to at least one commonly used antibiotic.

NIAID supports an extensive basic research portfolio on antimicrobial resistance, including studies to determine how bacteria develop and share resistance genes and to identify new therapeutic targets. In addition, the Institute is supporting clinical trials to determine the optimal treatment of a number of infections using existing off-patent antimicrobial drugs with the goal of reducing the risk of drug resistance.

Influenza, which usually changes slightly from year to year, is the classic example of a re-emerging infectious disease. Periodically, influenza viruses also can undergo more drastic genetic changes that enable them to evade pre-existing immunity and cause a pandemic, such as the deadly influenza pandemic of 1918. Traditionally, NIAID has supported a vigorous research portfolio related to vaccines, therapeutics, and diagnostics for influenza. It was within this framework that we played a major role in the Nation's—and the world's—efforts to respond to the 2009 H1N1 influenza pandemic. For example, clinical trials performed in the decades-old and highly successful NIAID Vaccine and Treatment Evaluation Units played a key role in determining how best to use the 2009 H1N1 influenza vaccine. In this regard, NIAID showed conclusively that a single standard 15 µg-dose of the vaccine was safe and effective in inducing an immune response that would be predictive of protection in adults, the elderly, pregnant women, and older children. As with the seasonal influenza vaccine, two doses of the vaccine were necessary to induce a robust immune response in unprimed children aged six months to nine years. In addition, NIAID continues its efforts to bring influenza vaccinology into the 21st century. To this end, we are pursuing new platforms for influenza vaccine, including recombinant protein subunit, recombinant vector, and DNA-based approaches, as well as a “universal” influenza vaccine. Over the last several years, NIAID-supported researchers have made significant breakthroughs in identifying the regions of influenza viral proteins that are unchanged among both seasonal and pandemic strains. Universal influenza vaccines that capitalize on these findings might one day provide protection against the broad range of viruses arising from seasonal antigenic drifts and pandemic antigenic shifts that are the hallmark of influenza.

Through programs such as the Regional Centers of Excellence for Biodefense and Emerging Infectious Diseases (RCEs), NIAID has developed a physical and intellectual research infrastructure that has bolstered our ability to develop new countermeasures to respond to new and re-emerging infectious diseases as well as potential agents of bioterrorism. For example, RCE researchers recently discovered a small molecule that could serve as a therapeutic agent against an entire class of viruses, a finding with broad potential value against both emerging and deliberately introduced viral diseases.

IMMUNE-MEDIATED DISORDERS

Autoimmune diseases, immune deficiency diseases, allergic diseases, asthma, rejection of transplanted organs, and other immune-mediated disorders are significant causes of chronic disease and disability. NIAID supports research to understand the immunologic mechanisms underlying these diseases and to translate these discoveries into new strategies to detect, prevent, and treat them. For example, the NIAID Immune Tolerance Network, celebrating its tenth anniversary, is conducting proof-of-principle studies of multiple immune tolerance-inducing strategies. These studies are demonstrating that it is possible to “wean” some kidney and liver transplant recipients off immunosuppressive drugs altogether and maintain the health of other transplant recipients with minimal immunosuppression.

Allergies and asthma affect the health and quality of life of many Americans, particularly children, and NIAID remains committed to basic research and clinical studies to advance the understanding of these immune disorders. For example, NIAID-supported clinical trials are demonstrating the potential for immunotherapy to reverse established food allergies in children. The Institute also has led a collaborative effort to develop clinical guidelines for medical practitioners for the diagnosis, management, and treatment of food allergies. With regard to asthma, researchers from the NIAID-supported Inner-City Asthma Consortium have demonstrated that the addition of omalizumab, an antibody that blocks Immunoglobulin E, significantly improved the management of asthma symptoms in children compared to standard therapy based on

the clinical practice guidelines of the National Asthma Education and Prevention Program.

CONCLUSION

For more than 60 years, NIAID has conducted and supported basic research on infectious and immune-mediated diseases leading to the development of vaccines, therapeutics, and diagnostics that have improved health and saved millions of lives in the United States and around the world. The Institute will continue to leverage these fundamental discoveries into the tools needed to achieve a healthier world.

Biography of Anthony S. Fauci, M.D.

Dr. Fauci was appointed Director of NIAID in 1984. He oversees an extensive research portfolio of basic and applied research to prevent, diagnose, and treat infectious diseases such as HIV/AIDS and other sexually transmitted infections, influenza, tuberculosis, malaria and illness from potential agents of bioterrorism. NIAID also supports research on transplantation and immune-related illnesses, including autoimmune disorders, asthma and allergies.

Dr. Fauci has made many contributions to basic and clinical research on the pathogenesis and treatment of immune-mediated and infectious diseases. He has pioneered the field of human immunoregulation by making a number of basic scientific observations that serve as the basis for current understanding of the regulation of the human immune response. In addition, Dr. Fauci is widely recognized for delineating the precise mechanisms whereby immunosuppressive agents modulate the human immune response. He has developed effective therapies for formerly fatal inflammatory and immune-mediated diseases such as polyarteritis nodosa, Wegener's granulomatosis, and lymphomatoid granulomatosis. A 1985 Stanford University Arthritis Center Survey of the American Rheumatism Association membership ranked the work of Dr. Fauci on the treatment of polyarteritis nodosa and Wegener's granulomatosis as one of the most important advances in patient management in rheumatology over the previous 20 years.

Dr. Fauci has made seminal contributions to the understanding of how the AIDS virus destroys the body's defenses leading to its susceptibility to deadly infections. He also has delineated the mechanisms of induction of HIV expression by endogenous cytokines. Furthermore, he has been instrumental in developing highly effective strategies for the therapy of patients with this serious disease, as well as for a vaccine to prevent HIV infection. He continues to devote much of his research time to identifying the nature of the immunopathogenic mechanisms of HIV infection and the scope of the body's immune responses to the AIDS retrovirus.

In 2003, an Institute for Scientific Information study indicated that in the twenty year period from 1983 to 2002, Dr. Fauci was the 13th most-cited scientist among the 2.5 to 3 million authors in all disciplines throughout the world who published articles in scientific journals during that time frame. Dr. Fauci was the world's 10th most-cited HIV/AIDS researcher in the period 1996-2006.

Through the years, Dr. Fauci has served as Visiting Professor at major medical centers throughout the country. He has delivered many major lectureships all over the world and is the recipient of numerous prestigious awards for his scientific accomplishments, including the Presidential Medal of Freedom, the National Medal of Science, the

George M. Kober Medal of the Association of American Physicians, the Mary Woodard Lasker Award for Public Service, the Albany Medical Center Prize in Medicine and Biomedical Research, and 35 honorary doctoral degrees from universities in the United States and abroad.

Dr. Fauci is a member of the National Academy of Sciences, the American Academy of Arts and Sciences, the Institute of Medicine (Council Member), the American Philosophical Society, and the Royal Danish Academy of Science and Letters, as well as a number of other professional societies including the American College of Physicians, the American Society for Clinical Investigation, the Association of American Physicians, the Infectious Diseases Society of America, the American Association of Immunologists, and the American Academy of Allergy Asthma and Immunology. He serves on the editorial boards of many scientific journals; as an editor of Harrison's Principles of Internal Medicine; and as author, coauthor, or editor of more than 1,100 scientific publications, including several textbooks.