

DEPARTMENT OF HEALTH AND HUMAN SERVICES
NATIONAL INSTITUTES OF HEALTH

Fiscal Year 2012 Budget Request

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

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National Institute of Allergy and Infectious Diseases

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Mr. Chairman and Members of the Committee:

I am pleased to present the President's Fiscal Year (FY) 2012 budget request for the National Institute of Allergy and Infectious Diseases (NIAID), a component of the National Institutes of Health (NIH). The FY 2012 budget includes \$4,915,970,000, which is \$144,100,000 more than the comparable FY 2011 level of \$4,771,870,000.

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; autoimmune diseases; and the rejection of transplanted organs. NIAID makes a major investment in translational research, which seeks to accelerate the findings from basic research into healthcare practice. This decades-long commitment, together with NIAID's multidisciplinary collaborations with experienced as well as new investigators at academic centers, the private sector, and other governmental and non-governmental partners, continues to help improve domestic and global health through the development of diagnostics, therapeutics, and vaccines for infectious and immune-mediated diseases. I appreciate the opportunity to highlight just a few of our research successes and to describe some of our most promising research programs aimed at improving public health and quality of life.

GLOBAL HEALTH

NIAID has been a leader in both basic and clinical HIV/AIDS research ever since the disease emerged as a devastating public health crisis thirty years ago. In 2010, NIAID support for HIV/AIDS research resulted in landmark scientific advances in HIV prevention. The NIAID-supported iPrEx study demonstrated that a daily dose of an oral antiretroviral medication, a strategy known as pre-exposure prophylaxis or PrEP, was effective at reducing the risk of HIV acquisition among men who have sex with men. This finding was selected by the prestigious journal *The Lancet* as one of the top six medical discoveries in the world in 2010 and was named by *Time* magazine as the number-one medical breakthrough in 2010. A second important study, and another of *The Lancet's* selections, CAPRISA 004, showed that a vaginal microbicide gel of an antiretroviral drug could give women a measure of protection against HIV infection. This important trial was funded by the U.S. Agency for International Development and carried out using a research infrastructure developed with NIAID support. In the area of HIV vaccine development, researchers in NIAID's intramural Vaccine Research Center and NIAID-funded extramural investigators discovered human antibodies that can block a wide range of HIV strains from infecting human cells in the laboratory and are now zeroing in on their precise mechanisms of action. Coupled with last year's success from the RV 144 HIV vaccine clinical trial conducted in Thailand, which found a "prime-boost" vaccine candidate to be safe and modestly effective in preventing HIV infection, NIAID is making important strides in developing a robust package of prevention modalities that can be used in combination. In addition, research supported under NIAID's new initiative, the *Martin Delaney Collaboratory: Towards an HIV Cure*, will provide insights into how HIV hiding places in the body—so-called

“reservoirs”—are formed, where they are located, how they are maintained despite effective antiretroviral therapy, and how they might be eliminated.

NIAID makes a significant investment in research on the co-infections and co-morbidities that often accompany HIV infection. Tuberculosis (TB) occurs in about one-third of HIV-infected individuals and is the leading cause of death in this group. The NIAID-sponsored CAMELIA study demonstrated that survival of untreated HIV-infected adults with weak immune systems and newly diagnosed TB can be prolonged by starting antiretroviral therapy two weeks after beginning TB treatment, rather than waiting the standard eight weeks. This finding will help to optimize treatment strategies for people co-infected with HIV and TB and promises to save many lives in the developing world. A significant number of adults at risk for HIV infection are also at risk for hepatitis B and C infection. NIAID supports a robust research program to understand the pathogenesis of and immune response to hepatitis viruses and to develop novel therapeutics and vaccines against the diseases caused by these viruses.

In 2009, there were approximately 9.4 million TB cases and 1.7 million TB deaths globally according to the World Health Organization (WHO). NIAID has accelerated its TB research activities and is applying 21st century technology to a field that has lagged behind the study of other infectious diseases. NIAID supports the development of several promising TB vaccine candidates, and basic and clinical research has contributed to both new and repurposed therapeutic approaches and candidates. With NIAID support, researchers also have developed a tool for diagnosing TB that provides more specific, sensitive, and rapid results than currently available diagnostics.

In 2009, approximately 225 million cases of malaria resulted in more than 780,000 deaths, 90 percent of which occurred in Africa, according to WHO. More than a decade has passed since the newest class of antimalarial drugs, artemisinins, entered widespread use worldwide; unfortunately, malaria parasites are becoming increasingly resistant to these medications. There is a pressing need for new malaria therapies due to the constant threat of the emergence of drug resistance, which NIAID is addressing by supporting domestic and international research. For example, NIAID-supported researchers identified NITD609 as a promising antimalarial drug with a mode of action that differs from the current drugs used to treat malaria. NIAID-supported scientists also discovered a novel metabolic pathway of the malaria parasite *Plasmodium falciparum* that could lead to new drug targets. In 2010, NIAID established ten International Centers of Excellence for Malaria Research in malaria-endemic regions. In addition to research on HIV/AIDS, TB, and malaria, NIAID supports research devoted to better understanding, preventing, and treating other important diseases that cause a significant burden of illness and death globally, including neglected tropical diseases such as lymphatic filariasis, trachoma, and leishmaniasis.

EMERGING AND RE-EMERGING INFECTIOUS DISEASES

NIAID continues its critical focus on advancing drugs, vaccines, and diagnostics from concept to product development to fight emerging and re-emerging infectious

diseases. In response to the 2009 H1N1 influenza pandemic, NIAID played a key role in developing and testing the 2009 H1N1 influenza vaccines, and in assessing their safety and potential effectiveness in a variety of populations. NIAID researchers also made important strides in the development of broadly protective influenza vaccines. NIH intramural researchers in the Vaccine Research Center demonstrated that a “prime-boost” vaccine strategy could protect animals from infection with multiple strains of influenza. NIAID-supported scientists also determined that individuals infected with pandemic 2009 H1N1 influenza generated antibodies that neutralized many different influenza virus strains. This adds to the evidence base that a universal influenza vaccine may be possible, which would obviate the need to modify the influenza vaccine each season. NIAID-supported investigators also showed that vaccinating children against influenza protects the wider community, underscoring the public health importance of widespread vaccination with current and improved vaccines. *The Lancet* chose this study as its top scientific advance of 2010.

Building on the experience and challenges of the 2009 H1N1 influenza pandemic, the Department of Health and Human Services conducted a review of the Federal government’s efforts to develop medical countermeasures (MCMs) such as drugs and vaccines for public health emergencies, including bioterror attacks, culminating in a new vision for MCM development. As part of this vision, NIAID—in coordination with the Biomedical Advanced Research and Development Authority and the Department of Defense—will lead the Concept Acceleration Program to stimulate the translation of new scientific concepts and discoveries to the development of MCMs for biodefense and emerging infectious diseases.

The dengue epidemic in Puerto Rico and dengue cases in Florida and Hawaii, as well as the cholera outbreak in earthquake-ravaged Haiti, demonstrate the importance of understanding the factors that contribute to disease emergence and re-emergence. NIAID dengue research includes basic research, vector biology, translational research, as well as the development of research tools, resources, and services. With NIAID support, scientists are developing several vaccine approaches for dengue. NIAID research on cholera spans basic research, genomics, studies of environmental and climactic factors, and the development of vaccines and therapeutics. An NIAID-supported study pinpointed the genetic lineage of the cholera microbe that is causing the epidemic in Haiti.

NIAID continues to support a robust basic, translational, and clinical research portfolio to address the public health issue of antibiotic resistance for key pathogens, including methicillin-resistant *Staphylococcus aureus* (MRSA) and Gram-negative bacteria. For example, NIAID scientists recently identified a toxin from a community-acquired strain of MRSA that could be a factor in the severity of MRSA infections. NIAID also supports research to preserve the effectiveness of currently used antibiotics, including studies to examine optimal treatment of community-acquired pneumonia and infections caused by Gram-negative bacteria such as *Pseudomonas* and *Acinetobacter*. NIAID-supported researchers settled a medical controversy by recently showing that

antibiotics clearly reduce the severity and duration of acute middle-ear infections in toddlers that were diagnosed using consistent criteria.

IMMUNE-MEDIATED DISORDERS

NIAID is committed to furthering our understanding of the immunologic mechanisms underlying autoimmune diseases, asthma and allergic diseases, rejection of transplanted organs, and other immune-mediated disorders; and to translating this knowledge into new approaches for diagnosis, prevention, and treatment. In 2010, an NIAID-sponsored expert panel produced much-needed comprehensive guidelines for medical practitioners for the diagnosis and management of food allergy that will be helpful to clinicians across a range of medical specialties. NIAID also launched the Human Immunology Project Consortium to better understand the human immune system and how it reacts to infection or vaccination. The information gained from this effort will provide insights into the development of safer and more effective vaccines, including those for young children and the elderly. In addition, researchers in the NIAID Immune Tolerance Network demonstrated that Rituxan® is a safe and effective therapy for two forms of severe vasculitis, a rare and devastating disease of the blood vessels. These data were instrumental in the recent Food and Drug Administration-approval of Rituxan® for this indication, representing the first licensed treatment for this disorder in 40 years. Also, the NIAID Inner-City Asthma Consortium determined that the addition of Xolair® to NIH guidelines-based asthma therapy for young children and adolescents resulted in fewer asthma symptoms and severe asthma attacks.

CONCLUSION

For more than 60 years, NIAID has conducted and supported basic and clinical research on infectious and immune-mediated diseases leading to the development of vaccines, therapeutics, and diagnostics that have significantly improved the health and saved the lives of millions around the world. NIAID will continue to support the highest quality research with the aim of translating fundamental discoveries into improved public health.

Biography

Anthony S. Fauci, M.D.
NIAID Director

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 serves as one of the key advisors to the White House and Department of Health and Human Services on global AIDS issues, and on initiatives to bolster medical and public health preparedness against emerging infectious disease threats such as pandemic influenza.

As a biomedical researcher, 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 strategies 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.