

**REMARKS**

**OPENING REMARKS TO THE GLOBAL VACCINE AND IMMUNIZATION  
RESEARCH FORUM (GVIRF)**

**JOHANNESBURG, SOUTH AFRICA, MARCH 15-17, 2016**

Greetings to you all. My name is Tony Fauci, director of the National Institute of Allergy and Infectious Diseases at the U.S. National Institutes of Health.

Let me begin by telling you how delighted I am to have the opportunity to address the 2016 Global Vaccine and Immunization Research Forum. I wish I could be there with you in person; however, pressing commitments here in Washington, D.C., notably those related to the emerging Zika virus epidemic in the Americas and the Caribbean, make it impossible for me to join you in person.

Over the past several weeks I have testified multiple times to the U.S. Congress, and will be doing more of the same as the Zika situation unfolds and as Congress considers the fiscal year 2017 budget appropriation for the NIH.

In these hearings, I always cite the example of vaccine development as our greatest biomedical success story. As you all know, safe and effective vaccines, coupled with the operational expertise and political commitment needed to deliver them, have led to some of the greatest triumphs in public health. These include the eradication of naturally occurring smallpox and the near-eradication of polio, the marked decrease in classic childhood diseases such as measles, and more recently, many successes with newer vaccines such as those that prevent disease due to *Haemophilus influenzae* and pneumococci, rotavirus, meningitis A and human papillomavirus.

Of course, in addition to the human suffering that vaccines avert, they also have significant economic value that far exceeds their original cost.

Last month in the journal *Health Affairs*, the economic benefits of vaccines in 94 low- and middle-income countries were assessed using projected vaccination rates from 2011 to 2020, namely, the Decade of Vaccines. When looking only at costs associated with illness, the return was \$16 for every dollar spent on vaccines. However, taking into account the broader economic impact of illness, vaccinations save \$44 for every dollar spent. This extraordinary return on investment is a compelling story that needs to be told in our interactions with funders and donors.

Despite many successes with vaccines, all of us are aware of the many challenges that remain. Notably, we need to reach the nearly 19 million children who are still not vaccinated against common and life threatening diseases. More than 1.5 million children under age 5 still lose their lives every year to diseases that could be prevented by vaccination. Clearly, we have our work cut out for us with regard to implementation.

In addition to implementation challenges, we face significant research challenges in developing vaccines against important diseases for which vaccines are still lacking. In 2014, approximately 1.2 million deaths were attributed to HIV and another 500,000 to hepatitis C, diseases for which we have no vaccines. Vaccines also are lacking or are suboptimal for many other serious infectious diseases that exact an enormous toll worldwide, such as tuberculosis, sexually transmitted diseases (other than hepatitis B), malaria and many other parasitic diseases, respiratory pathogens such as respiratory syncytial virus (RSV), as well as a host of enteric diseases that contribute to hundreds of thousands of diarrhea-related deaths each year.

In addition to endemic diseases, we must address the ongoing threat of new and re-emerging diseases.

Over the past 2 years I have spent much of my time dealing with four major disease emergencies: Ebola virus in West Africa, and the explosive spread of dengue, Chikungunya and most recently, Zika viruses in Latin American and the Caribbean.

Progress against all of these challenges is now possible to an extent we never could have anticipated, even a few years ago. Classically, vaccinology relied on the recapitulation of one of nature's infection models: If infection with a pathogen produces lifelong protection, then administration—for example, by injection—of an inactivated or attenuated whole pathogen or a component thereof could induce a similar immune response. However, when natural infection produces less effective responses—whether because of strain diversity, rapid mutation, masking of epitopes, or infection of cells that are poorly accessible to the systemic immune system—new approaches must be applied.

Many enabling technologies in vaccinology have matured over the past few years and that will help us tackle important challenges facing us. Among many tools now available to us, structure-based vaccine design is propelling vaccine development for influenza, HIV, RSV and many other diseases. Diverse vaccine platforms, ranging from viral vectors expressing the genes coding for relevant pathogen proteins, to nanoparticles that markedly enhance immunogenicity, as well as novel adjuvants, offer us new ways to present antigens to the host immune system and to boost the immune response both qualitatively and quantitatively.

Clearly, this is an extremely exciting time in the history of vaccinology, and the scientific opportunities are almost limitless. The successes of vaccines have been breath-taking and stand

alone in the enormity of impact that they have had on global health. However, important challenges remain, particularly with some of the most recalcitrant microbial killers. We now have at our disposal the scientific toolkit to meet these challenges and to elevate the field of vaccinology to unprecedented heights.

I am very pleased that the Global Vaccine and Immunization Research Forum has once again brought together the best and brightest minds to solve the multiple and diverse challenges we are facing. I wish you the best in your discussions and look forward to hearing about the outcomes of the forum.

Thank you very much.