

Joint Oversight Hearing on Managing Biomedical Research to Prevent and Cure Disease
in the 21st Century: Matching NIH Policy with Science

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Witness:

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Testimony:

Chairmen and Members, I am honored to appear before this joint hearing of two of the most distinguished Committees of the United States Congress. This hearing is especially timely. The five-year doubling of the NIH budget is completed. As the 21st century begins, the pace of discoveries in the life sciences is accelerating at an unprecedented rate. One of the most extraordinary scientific achievements of all time, the sequencing of the human genome, was accomplished ahead of schedule and under budget. The doubling of the NIH budget is fueling many scientific advances, but the extraordinary complexity of these new biological discoveries is creating daunting scientific and management challenges.

I have now been the Director of NIH for more than a year. I can tell you that the Agency deserves its reputation as the crown jewel of government. NIH is home to many brilliant and dedicated employees, who are united by the noble mission of finding cures and better treatments for disease and disability. NIH, together with our research partners – patients, scientists, and research institutions -- is leading the way in medical innovations that prolong life, reduce suffering, and improve the quality of life.

For example, the mortality of acute heart disease and stroke has been reduced by more than 50 percent. New cancer therapies have prolonged life to the point that over 9 million people are now cancer survivors in our country. Many of the important cancer treatment breakthroughs, including discovery of the molecular and genetic underpinnings of cancer, more effective drug treatments and cures for childhood leukemia, resulted from NIH-sponsored research.

The safety of the blood supply is vastly improved because of tests for Hepatitis B and C and HIV, developed through NIH-funded research. A pertussis vaccine was developed as the result of NIH research. Amazing breakthroughs in the treatment of heart disease arose from NIH research, including valve replacement surgery, the discovery of the role of high blood cholesterol as a major risk factor for heart disease, new drug treatments, and the knowledge about how to reduce risk factors. NIH research led to the identification of the virus that causes AIDS, the technique for detection of the virus, and most of the effective treatments for HIV/AIDS. The ability to quickly create candidate vaccines for emerging infectious diseases, such as the West Nile Virus, comes from NIH work.

These discoveries changed the landscape of disease as compared to the past, when acute and lethal conditions were the norm. Now we are seeing the influx of more chronic and manageable illnesses. People are living longer. Witness the aging of our population and the rise of chronic diseases.

NIH will play a major role in the next generation of medical breakthroughs. They include mining the sequence of the human genome for new strategies of preventing and treating

disease. The more we learn about human biology, in health and disease at the smallest levels of our cellular structure, the faster we will find much needed cures and treatments. Our past successes also force us to greatly expand our efforts, as we now face a larger spectrum of challenges. We still face persistent health disparities. We are hard at work developing comprehensive scientific-based responses to the new threats of bioterrorism and infectious diseases. It should be noted that were it not for the advances in genomics and other fields prompted by the doubling of the NIH budget, it is doubtful that we would have had the tools to identify the cause of SARS and help contain the disease as quickly as we did. As SARS demonstrated, in a world growing ever smaller, the dangers of existing and emerging infectious diseases loom large.

The number of research grants awarded by NIH has grown from 27,000 to 43,500 during the period of the doubling. We managed to increase this number while containing administrative and research support costs.

Also, we believe that the investment in NIH has had a leveraging effect in the private sector. For example, R&D spending by PhRMA members exceeded the NIH budget for the first time in 1991. The private sector now spends more for research than the public sector. And the investment by medical schools in research facilities and faculty has grown from \$3.2 billion from 1990 to 1997, to \$5.4 billion from 1998 through 2002, and is expected to rise to \$9.5 billion during the next five years.

Obviously, after a period of rapid growth, the challenges for a knowledge-driven organization as complex as the NIH can be daunting. As a scientist in charge of the largest publicly-funded medical research agency in the world, I have my own questions about the future direction of NIH. I believe that no outstanding organization can remain great without regularly reviewing its operating principles and plans and subjecting itself to critical reexamination.

I challenged the NIH leadership with the following questions:

- Are we creatively pushing the frontiers of science?
- Are we efficiently transforming that science into medical applications?
- Are we organized to insure a maximum return on the public investment?
- Are we allocating resources to all of the most critical priorities?
- Are we responding to emerging or exceptional opportunities?

This past year, I worked closely with the Institute and Center Directors in an intensive re-examination of NIH management processes. We agreed on significant changes that, I believe, will make us more responsive: to the changing landscape of science; to the demands of public accountability; and most importantly, to the patients who want and need to receive the results from research more quickly.

For example, we transformed the NIH governance structure by creating a smaller steering committee of 10 directors with rotating, 3-year memberships. I chair the new committee's twice-monthly meetings, which are convened to expedite consideration of issues of Agency-wide importance. This is one of the governance structure changes we are implementing in order to greatly streamline corporate decision making at NIH. Our intent is to create more open and transparent processes that will lead to greater administrative effectiveness and usher in a new culture of shared governance and collaborations across all Institutes and Centers at NIH.

Another example of how we will make NIH more responsive is the "NIH Roadmap," a blueprint we began implementing this month. Planning of the Roadmap started soon after

I became NIH Director in May 2002. I convened a series of meetings to explore whether there were obstacles to scientific progress or gaps in our system of research that could not be addressed by one Institute alone, but is the responsibility of NIH as a whole.

Developed with input from more than 300 nationally recognized leaders in academia, industry, government and the public, the NIH Roadmap provides a framework for what we see as the strategies necessary to optimize the entire NIH research portfolio and accelerate the translation of discoveries into cures and treatments.

After an intense process of discussion and scientific review, the directors of NIH's 27 Institutes and Centers have agreed on an approach that we have announced in the past few days. The NIH Roadmap identifies the most compelling opportunities in three main areas:

New pathways to scientific discovery;

Research teams of the future;

Re-engineering the national clinical research enterprise.

These NIH Roadmap initiatives will be funded through a common pool of resources comprised of voluntary contributions from Institutes and Centers beginning, along with the Director's discretionary fund, with a modest budget for these initiatives of about 130 million dollars in Fiscal Year 2004. In the future, we expect to continue this effort from available funds appropriated to the NIH.

Our new governance systems and the NIH Roadmap are coincidentally responsive to many of the concerns recently raised by the National Research Council/Institute of Medicine (NRC/IOM) report: Enhancing the Vitality of the National Institutes of Health: Organizational Change to Meet New Challenges. The NRC/IOM concluded that NIH continues to do an outstanding job of managing and leading the biomedical research enterprise in the United States. But this is not the time to rest on our laurels. We need to create new strategies to manage the Federal investment in biomedical research.

The historical method of managing the research portfolio at NIH has been to set priorities by the creation of new Offices, Centers and Institutes. This is what I would call the "structural" approach to the portfolio management of NIH. It is often done without full consideration of how structural changes impact the research portfolio.

We must now ask ourselves: Under the current state of science, is this approach sustainable? We lack a formal trans-NIH portfolio review and management process. The need to manage the total NIH portfolio in the context of 27 separate structures and several special purpose offices, each with their separate budgets, is much more challenging than when the agency was smaller.

Currently, the overall NIH system of research ensures that Federal dollars are used to support the best science, follow the greatest research opportunities, and respond to public health needs. As a matter of internal policy, the NIH intramural program comprising Federal laboratories and investigators is small, representing about 10 percent of our resources. More than 80 percent of our budget goes to the extramural community of researchers, private sector scientists and institutions. And most of those funds are given to unsolicited, investigator-initiated research ideas.

Grant applications are vetted by the premiere peer review process in the world.

Applications are reviewed by NIH staff as well as scientific experts from across the research community. The review process has multiple steps, including examination by

independent advisory councils consisting of non-government experts, including the lay public. Research involving human subjects is reviewed by Institutional Review Boards. Yes, NIH has served the cause of public health very well. We cannot, however, maintain the status quo. We must adapt. We must be innovative.

Consider the use of investment strategies in the financial community. In the financial arena, one wants to see a proper balance between ongoing performance, diversity of the company's investment portfolio, and the ability to pursue new opportunities that will maintain growth. Admittedly, scientific investment strategies are more difficult to predict because we do not know how or when progress and breakthroughs will come, but this kind of portfolio review and management, the kind of discipline used by the best financial strategists, has some value at NIH. Our challenge is to maintain a well-balanced research portfolio.

The current structure of NIH, with its separately-funded Institutes and Centers, does not facilitate trans-NIH initiatives. This is particularly true when a much needed investment is viewed as unrelated to the specific mission of an institute and as such, is not supported by the Institute's constituencies. For example, the Human Genome Project, was first launched not by the NIH, but at the Department of Energy. Initially, this project was resisted by various NIH constituencies because it was seen as a high-risk project with little direct relevance to the missions of existing Institutes and Centers. There were great fears that it would take away from the RO1 grant mechanism, the mainstay of NIH research. It required the strong and persistent leadership of a few visionary scientists, including Nobel laureates James Watson and Harold Varmus and James Wyngaarden, to create the Center and, eventually, the Institute, which successfully completed this enormously complex project.

Science is converging as the result of the discovery of unifying concepts, methods, and biological mechanisms that link apparently disparate diseases. The closer we are to the roots of biology, the more our definitions of what diseases are and how they affect us are changing. How will we adapt the structure of NIH to this new taxonomy of disease? In the past, because of the incomplete state of our knowledge, NIH institutes are currently organized around diseases, organ systems or stage of life. In the future, this will likely need to change and we should implement a regular process of review and propose, at appropriate intervals, modifications to the NIH structure.

The NRC/IOM report, although not proposing drastic changes in the structure of NIH, strongly recommends the establishment of a permanent NIH-led process by which any addition, elimination or consolidation of mission-specific structures is studied. I fully support this recommendation.

As we look into the future, I would urge the Congress not to alter the peer review system, which is the cornerstone of NIH's success. Peer-reviewed research earned our country over half of all Nobel prizes in the sciences, with 5 laureates at the NIH itself, and dozens more directly trained or supported by NIH. These discoveries have led to the development of a vibrant economy around the life sciences placing our country at a huge competitive advantage. We should all work to preserve and protect the peer review system from undue influence.

NIH continues to be successful, in part, because of the diversity of approaches to the conduct and support of research taken by the decentralized Institutes and Centers. This characteristic should be preserved, but better coordinated and constantly reviewed and

adjusted based on the emerging complexities of science. Often research done in one Institute eventually finds its greatest application in the mission of another, illustrating both the convergence of science and its unpredictability. As an example, the recently discovered cancer drug Gleevec was first developed as a potential drug for cardiac disease. Another successful cancer drug, Tamoxifen, was originally developed as an anti-hormonal drug. It failed, but then proved to be effective in the treatment of breast cancers that were responsive to hormones.

In looking at the independence of the Institutes and Centers, I agree with the position elucidated by the NRC/IOM, that we need to also address the appropriate authority of the NIH Director. In addressing this issue, we need to consider the serious responsibilities given to the NIH Director – coordinating, planning, and managing the entire portfolio. I also support the NRC/IOM recommendation that NIH standardize data management. This effort will require new administrative investments in information infrastructure -- more modern tools for portfolio analysis, reporting, and management. I understand that our advocates and Congress want appropriated funds to go to research. In large part, I agree with this, but good stewardship also requires modern information systems. I look forward to working with both Committees and the entire Congress in implementing improvements in NIH that will make research more efficient, and as a consequence, speed the pace of discovery – medical advances that will ease suffering and change the way we live.

I will be pleased to answer any questions that you have. Again, thank you for the opportunity to share my vision with you today.