"CANCER: CHALLENGES AND OPPORTUNITIES IN THE 21ST CENTURY"

WRITTEN TESTIMONY
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THE U.S. SENATE COMMITTEE ON HEALTH,
EDUCATION, LABOR, AND PENSIONS

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PRESENTED BY
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I. Introduction

I want to thank the Senate Committee on Health, Education, Labor, and Pensions (HELP) for the opportunity to present testimony today. My name is Greg Simon[1], and I am the President of *FasterCures/The Center for Accelerating Medical Solutions,* based in Washington, DC.

FasterCures is dedicated to saving lives by saving time. Our mission is to identify ways to accelerate the discovery and development of new therapies for the treatment of deadly and debilitating diseases both in the United States and around the globe. The organization was founded in 2003 under the auspices of the Milken Institute to aggressively catalyze systemic change in cure research and to make the complex machinery that drives breakthroughs in medicine work for all of us faster and more efficiently. During our relatively brief history, *FasterCures* has worked with a broad range of individuals and organizations to eliminate barriers to efficiency and effectiveness in our systems of disease prevention, treatment, research, and development.

FasterCures is independent and non-partisan. We do not accept funding from companies that develop pharmaceuticals, biotechnology drugs, or therapeutic medical devices. Our primary mission is to improve the lives of patients by improving the research environment, research resources, and research organizations.

[1] Throughout my own career, I have focused on efforts to advance medical and scientific discovery. Before joining *FasterCures*, I served as the Chief Domestic Policy Advisor to Vice President Al Gore from 1993 to 1997, specifically on economic, science, and technology issues. In that role, I oversaw a number of initiatives, including the programs of the National Institutes of Health, National Cancer Institute, Food and Drug Administration (FDA), the Human Genome Project, and the development of the regulatory framework for biotechnology products. I also had the honor of serving on the staff of a Congressional Committee. From 1985 to 1991, I was Staff Director of the Investigations and Oversight Subcommittee of the House of Representatives Committee on Science, Space, and Technology.

II. Are We in a War with Cancer?

Our nation incurs an enormous human and financial cost due to cancer every day. It is expected that cancer will claim over 565,000 Americans in 2008, more than 1,500 people each day. One in two men and one in three women are likely to develop cancer in their lifetime. The annual bill for cancer care in this country exceeds $200 billion. And the economic benefit our nation would enjoy with a one percent reduction in cancer mortality would be $500 billion (Murphy and Topel, 2006). Yet our national investment in cancer research is going *down* and is nowhere near commensurate with the costs we bear or the gains we could expect if we made progress in curing cancer.

With those harsh facts as background, no one can claim that our historical and current investments in cancer research or our cancer research strategy itself rise to a level that justifies claiming that we are at war with cancer.

We are not soldiers in a war against cancer; we are students majoring in cancer.

We are not investing the financial resources, human capital, and technological infrastructure needed to be "at war" with cancer, much less to win that war.

III. Reorienting the Cancer Research Enterprise

What is behind the slow momentum in clinical discovery and application? There are many factors, but among them are structural obstacles that have arisen from the ways in which the biomedical research enterprise has grown and evolved along with the nation's increasing investment in science over the past 50 years. Shortly after World War II, the National Institutes of Health (NIH) created a research enterprise system whose central organizing principle was the study of human biology. Without a doubt, the value of this basic research has revolutionized our understanding of diseases and opened doors of scientific promise beyond anyone's imagination. But it is not entirely sufficient to develop a therapy for a patient.

In addition to this system of *studying diseases*, we need to create a medical research enterprise whose central organizing principle is *curing diseases*. Cancer research can be the pathfinder for this new form of biomedical research enterprise. If we can address these problems for cancer, there will be enormous value to the rest of our disease research system.

IV. Breaking Down Barriers to Curing Cancer

The challenges in our current system may not allow us to realize the opportunities in cancer research. The past few decades have brought enormous breakthroughs in the fundamental knowledge necessary to understand, prevent, diagnose, and treat cancer. And yet it still takes an average of 17 years to translate these discoveries into effective treatments. To truly organize our research enterprise around curing cancer, we need to forge solutions to the barriers that stand in our way.

1) *Transform the existing fragmented, bureaucratic research infrastructure into a collaborative network*

Our research environment has created an entire bureaucracy that fuels a quest for research publications, a need for perpetual grant seeking, and an intellectual property protection system that has resulted in a lottery ticket approach to scientific findings. Changing the infrastructure and reward systems within academic research institutions is difficult. There is fierce competition for funds, publications, and patents which serve as a disincentive to institutionalized communication and data exchange between basic and clinical researchers. Scientists have inadequate opportunities for cross-disciplinary training and practice.

2) *Move toward a systems research approach*

Currently, we have a highly specialized, reductionist approach to scientific inquiry. There is little funding or reward available for high-risk research. The system tends to focus on individual organizational challenges instead of collaborative approaches to "big picture" problems.

But cancer is a systems problem. It requires the collaboration of multi-disciplinary teams from many institutions and perspectives. But at every turn this collaboration is discouraged. NIH grants are still primarily focused on principal investigators, not teams. Universities throw up legal and financial objections to collaborations with other universities. Major medical journals only give real credit to the first and last authors listed on a paper, thereby discouraging researchers from collaborating for fear they will not receive credit and therefore not move along the road to tenure – one more bad side effect of organizing the system to *study* disease rather than *cure* it.

3) *Ensure scientific research is more outcomes focused*

In funding deliberations at the NIH there is little emphasis on specific goals or milestones to cure disease or on achieving specific clinical results. Researchers often insist that science cannot be managed, and that the role of the NIH is to provide ever increasing funds and not to direct how those funds will be used. NIH program officers exercise little oversight over the use of NIH funds except to be sure that researchers are doing the work for which they were funded. As a result, the time from initial discovery to dissemination and commercialization is often measured in decades – an outcome simply unacceptable to the citizens who fund this research and expect to benefit from its fruits.

The NIH Director and the National Cancer Institute (NCI) Director have the authority to start using new goal-oriented funding methods that can accelerate medical research. The National Institutes of Health Research Reform Act of 2006 gave the NIH Director the authority to:

> *"…allocate funds for the national research institutes and centers to award grants, contracts, or engage in other transactions, for high-impact, cutting edge research that fosters scientific creativity and increases fundamental biological understanding leading to the prevention, diagnosis, and treatment of diseases and disorders."*

Institute Directors, including the head of NCI, have authority under the Act to use those allocated funds in novel and creative ways to spur innovation and cutting-edge research.

The obstacle to using this authority is a classic Catch-22. Critics argue against more money for NIH and NCI because of concerns that the budget doubling did not lead to breakthroughs. Using the same old mechanisms to fund low-risk research will not lead to breakthroughs. But no one will use the new authority to fund new high-risk research because there is so little money available for the traditional basic research.

We need not only to allow *but to require* the NIH to invest in cutting-edge technologies through goal-oriented, contract funding mechanisms. Intelligence agencies have the ability to invest in start-up companies through their venture capital firm, In-Q-Tel. The Defense Department and NASA have "other contracting authority" to do the same. Why shouldn't the NIH be allowed to, and directed to, invest in the best private sector research tools and approaches, and leverage private sector resources in the same way?

We should integrate, not segregate, translational and clinical research. The message must be clear to all those engaged in NIH-funded research, inside and outside the walls of the Institutes, that the ultimate goal of all research is to improve health and cure disease. Translational research, by definition, requires joining basic research to a therapy that will help a patient. This translation process requires that each researcher understand the source and the ultimate use of the knowledge they are part of creating.

4) *Clarify the purpose of and measures of success for clinical trials*

Human clinical trials are absolutely critical to medical progress. Recruiting volunteers to participate remains one of the costliest aspects of the drug development process. Reducing the length of a clinical trial by just one month by improving patient recruitment could not only save lives, but also generate additional revenue to reinvest in the research and discovery of new therapies.

The clinical trial challenges are especially acute in some cancers where clinical trials are viewed as the last hope and often viewed as the only therapeutic option. Staying on the current path is simply not an option if we want to accelerate the search for cancer cures. Some of the ways we can do this include:

- Creating a national Web-based registry of individuals willing to participate in clinical trials;
- Orchestrating a major public relations effort to highlight the critical role patients play in the search for cures and to give them the information they need to get involved;
- Partnering with community physicians to educate them about clinical trials, develop new incentives for their participation, and create "mini-CROs" to ease their administrative burden; and
- Institutionalizing methods for making research protocols more patient-centered such as revamping the informed consent process.

By enrolling in clinical trials to test potential new therapies—as well as by providing tissue samples, blood, or medical histories—patients can provide critical information and resources, without which the search for cures could slow to a halt. *FasterCures* has focused on all three of these tools for discovery under our Patients Helping Doctors (PHD) program.

5) *Establish standards for biospecimen collection*

We cannot develop therapies *for* us without first conducting research on tissues taken *from* us. The availability of high-quality biospecimens allows a researcher to conduct a wide range of analyses that not only allow for a better understanding of the genetic and molecular changes involved in the progression of diseases, but can also be used for assessing the effectiveness of novel drugs and therapeutics in a particular patient population.

Progress in cancer research will be impeded if we cannot create a network of biospecimen repositories and standardize the collection and storage process. The lack of standards for molecular-based biomedical research as well as standards for the collection of tissue samples, genomic data, and information exchange across private and public sectors curtails collection of much-needed biospecimens. It also means that many of the samples already collected are simply not useful.

We need to support private and public efforts to strengthen the network of biobanks. Biobanks are a critical resource for such molecular-based biomedical research. The data, biospecimens – such as tissue or blood – and molecular components that they collect, test for quality, and then distribute to researchers are absolute requirements in the pathway to developing modern diagnostics and cures for human disease.

The NCI needs to overcome the resistance of local cancer centers and create a unified system of tissue collection and preservation to accelerate medical research.

6) *Create platforms to address big scientific challenges*

The "knowledge economy" has affected all aspects of our lives – except for the most important, our health. In order to build a knowledge economy in health research, we need to find pragmatic models that link researchers and their knowledge into networks that can identify and solve the big problems in cancer research.

The NCI is beginning to address this reality through programs like the "HapMap," The Cancer Genome Atlas, the NCI Alliance for Nanotechnology in Cancer, the Cancer Bioinformatics Grid program (caBIG), and the Translational Research Working Group. These efforts are harbingers of the future direction cancer research must take to create the information infrastructure, databases, and standards necessary to progress.

7) *Transform the NIH Intramural Research Program to focus on translational research*

All of the research being funded by NIH and conducted at NIH needs to be as efficient as possible. Clearly, additional funds are needed and impact of declining NIH budgets is already sending a ripple effect across the research infrastructure. But we need to be sure that existing programs are maximizing their potential.

The NIH Intramural Research Program (IRP) is a unique national resource. It includes a large cadre of scientists, clinicians, and technicians, supported by long-term and stable funding, an expansive infrastructure, and close proximity to the NIH leadership. It was established over 50 years ago, at a time when there was only a small extramural biomedical research community, and

thus its function was unique: both to support multidisciplinary research and train the next generation of researchers. However, as the extramural biomedical research community has developed over time, the IRP's mission and activities are no longer clearly distinct from those of the extramural community.

There is broad consensus that, given its size, scope, and resources, the NIH IRP should not simply be a duplication or extension of the extramural biomedical research enterprise. Rather, it should take on distinctive and strategic research programs that respond to pressing needs and opportunities more in line with its special status. It should function more nimbly, be more responsive to change, and take better advantage of its long-term funding stability and low level of competing demands. Moreover, the juxtaposition of extensive basic and clinical research communities provides great opportunities both for multidisciplinary and translational research, and both should become more clearly central to the IRP's mission.

Moreover, the IRP should become more outcomes-focused, meaning it should strategically seek solutions to clinical problems through combining bench work, animal models, and human studies. Its focus on basic questions should be more clearly supportive of solving pressing medical problems. The ultimate success of the IRP should be measured both in terms of the quality of the science it conducts and its clear accomplishments contributing to improved health.

To achieve this vision, the culture, expectations, and paradigm of the IRP should be realigned. Such a transformation will require congressional and administrative action and leadership. The NIH Director must be supportive of reform and granted the authority to implement widespread change in the IRP. Leadership should be assessed on its ability to push a priority-setting and review strategy that is more strategic and consistent, coordinating and facilitating the collaboration of the various institutes and centers, and focused more on quality control, assurance, and accountability, as well as on basic, translational, and clinical research progress.

8) *Develop a responsive peer-review system*

Our current systems for reviewing and funding research, however, have become in many ways highly conservative, placing heavy emphasis on established researchers and high success rates in research outcomes, instead of clinical outcomes. Novel, high-risk proposals do not fare well in a system driven to maximize positive results to get scarce grant funds. The peer-review system is also oriented around evaluating individual proposals and identifying flawed ideas – not around prioritizing research projects for a particular purpose.

NIH is the largest pillar on which the academic peer-review system currently rests, and the impact of any effort at NIH to revamp the system would be wide-ranging. Even simple procedural changes could significantly improve the quality of proposal evaluation (and evaluators) and give more innovative research a better shot at competing for funds.

We believe that assumptions about the integrity and validity of NIH's peer-review system need to be tested to ensure that it is as responsive as possible to scientific and health priorities.

The review system should be designed to identify the most promising areas of scientific exploration in terms of their potential to contribute to improved human health and well-being.

This includes basic science studies of normal function and development in both humans and in animal models, translational research that develops drugs or other therapies, and clinical trials that test interventions in patients.

All types of research across this spectrum are critical to the nation's health. *FasterCures*, however, has concerns that despite incremental improvements to the system over the past few decades, some major challenges remain. These challenges will not be sufficiently addressed by simply re-reviewing the composition and organization of the current system.

9) *Encourage innovative research approaches and new models of research funding*

Together, the public and private sectors can transform our research and healthcare system from the current model to an integrated, information-based, high-quality, health-sustaining model that will extend and improve the quality of life for patients with cancer in the 21st Century.

Free of the imperatives of publication and career advancement in academia and the bottomline imperatives of the private sector, disease research organizations are ideally positioned to make relatively high-risk investments that could significantly move a field of disease research forward and increase the likelihood that other parties will invest as well. Venture philanthropy groups such as the Multiple Myeloma Research Foundation, Susan G. Komen for the Cure, Prostate Cancer Foundation, and the newly created Melanoma Research Alliance have been at the forefront of creating new models of collaboration and public-private partnerships that can "de-risk" the costly process of therapy development.

At *FasterCures*, we work with many of these groups both in the cancer and non-cancer arenas. They have a unique ability to move research forward by targeting research in areas that will help translate basic scientific discoveries into therapies, such as biomarkers, target and pathway validation, animal models, and small pilot clinical trials. They also:

- Bring a business mindset to the conduct of research;
- Create funding mechanisms that enable or even require academic researchers to work with industry partners;
- Provide access to a patient community and resources by creating patient registries, biorepositories, and networks of trained clinical trials sites;
- Explore new indications for existing drugs;
- Employ high-throughput screening to help industry identify better investment opportunities;
- Facilitate access to scientific experts and clinicians;
- Educate industry about the state of understanding of and research into a specific disease;
- Advocate with the Food and Drug Administration (FDA) for approval of new treatments; and
- Serve as a "Good Housekeeping Seal of Approval" validating particular researchers or paths of inquiry.

10) *Collaborate with, and support for, the FDA*

In the past 10 years, we have witnessed dramatic advances in science that impact the practice of medicine, including the mapping of the human genome, and advances in computational tools and broadband communications. Electronic health records will likely change the practice of medicine and hopefully clinical research in the coming decade, and offer substantial benefits to monitoring adverse events.

Despite these advances, the FDA's ability to harness these advances has been hampered because the budget has not kept pace. In fact, it is currently at a level that is the same in real dollars as in 1996. Each year, FDA receives minimal new dollars and yet their costs increase, missions evolve, scope of science expands, and inflation erodes this budget. In addition, new initiatives of the FDA such as the Critical Path Initiative have not been given full financial support. The budget is holding the FDA back and preventing the agency from maximizing the benefits of these historical advances in science for the American public.

The FDA plays a central role in American medicine – protecting and promoting the public's health. The agency must ensure that products are safe, but also effective. It must help speed lifesaving drugs to patients, yet ensure those same patients have the safest drugs possible. We ask a lot of the FDA and we expect a lot. But we don't support it a lot. The FDA, charged with protecting 300 million people, has a budget that mirrors that of the school budget in Montgomery County Maryland.

FDA needs increased appropriations from Congress and should not be forced to rely on industry user fees which the FDA is largely restricted from using on post-approval activities. Many of the improvements recommended by the recent Science Board Report, Institute of Medicine report, and included in several legislative proposals will simply not be possible without additional resources. New initiatives of the FDA such as the Critical Path Initiative and the Reagan-Udall Foundation have not been given full financial support—or in the case of the Reagan-Udall Foundation *any support*. We cannot fund the fight against cancer because we cannot end the fights about funds inside the Beltway.

V. Ensuring Access to Cancer Care

Our efforts to deliver good cancer care show the same mismatch to the challenge of defeating cancer that we find in our investments and our research strategy. We offer the best care at major cancer centers and academic health centers that are successful at getting federal grants. Unfortunately, most people do not receive their cancer care at such centers. Many people are treated at local oncology practices and community cancer centers, where resources and cancer doctors are scarce and, regrettably, cancer guidelines for best care are often even scarcer.

We must ensure that *where* people live does not determine *whether* they live. All cancer patients should have access to the best standards of care possible. One approach starts with the NCI Community Cancer Centers Program, a three-year pilot program to test the concept of a national network of community cancer centers to expand cancer research and deliver the latest, most advanced cancer care to a greater number of Americans in the communities in which they live.

The program brings more Americans into a system of high-quality cancer care, increases participation in clinical trials, reduces cancer healthcare disparities, and improves information sharing among community cancer centers. We should expand the pilot program to include community cancer centers beyond the NCI-designated cancer centers.

VI. Conclusion

The first and greatest challenge to curing cancer in the 21st Century is to believe it can be done. We have not given ourselves a chance to prove it is possible because our system is not focused on curing diseases like cancer. We have created an elaborate and complicated system of studying diseases that affects the way we make grants, give tenure, publish data, do clinical trials, create and use intellectual property and train young investigators. If we are to create a 21st Century system to cure diseases, we have to be willing to challenge long held assumptions about the nature and purpose of medical research and to show a renewed commitment to supporting medical research through meaningful investments of financial and human capital.

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