
Strategic Planning at Harvard Medical School

Phase I: September 2007-September 2008

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The Emerging Priorities

Several major themes became apparent during the initial phase of our strategic planning as areas in which HMS should focus if we are to fully capitalize on our enormous talents and resources. These areas continued to enjoy strong support after extensive deliberations. Below I discuss the five priorities: revitalizing the educational mission of the School; seizing rapidly expanding opportunities in biomedical research to increase human well-being; lowering institutional barriers to collaboration; creating a more unified, supportive, and inclusive community; and increasing and coordinating strategic investments in tools and technologies. I also note several other areas of importance identified by the advisory groups.

Revitalize the educational mission of the School

As our mission states, HMS is, at its core, an educational institution, dedicated to creating and nurturing a diverse community of leaders. The strategic planning process generated enormous enthusiasm for renewing our commitment to education in a variety of important ways. A major asset is our world-class research enterprise, which allows us to involve our medical students in the process of scholarly inquiry, benefiting not only those hoping to be physician-scientists, but also those who will be practitioners and leaders in the clinical arena. The Education advisory group identified areas in which the School could better leverage and integrate our strengths—outstanding students, innovative curricula, brilliant faculty, and deep partnerships with elite academic health care centers—to ensure excellence in the continuum of biomedical education, from undergraduate courses to continuing medical education.

One of the Education team's recommendations focused on increasing the opportunities for scholarly activity

during medical training. Two important ideas emerged: requiring medical students to complete a “scholarly project” of four to six months, and adding an MMSc degree track for medical students. The group also recommended increasing opportunities for education in global health—an area of significant student interest and one in which we can collaborate with our colleagues at the School of Public Health and elsewhere.

A second recommendation was to increase the number of MD/PhD students at HMS. Our MD/PhD program is preeminent in the world, and we receive hundreds of outstanding applications each year. Yet we are able to provide support for only 10 or 11 new students annually, and those outstanding applicants whom we do not have the means to support at HMS typically end up going elsewhere to pursue a fully funded MD/PhD, even if we have accepted them into the medical program alone.

Medical training is only one part of the HMS educational mission, however. Our faculty also have major interests in and responsibilities for teaching graduate students and increasingly have become involved in undergraduate education as well. The Education advisory group recommended reorganizing the support structure for graduate teaching and providing better ways to identify synergies and gaps in the various curricula. Improving support for postdoctoral clinical and research fellows, including assistance with career and professional development, is also an important goal, as is revitalizing the educational opportunities available to clinical fellows and residents and improving our use of modern technology to enhance the effectiveness of our medical and graduate student training.

Even with our broad focus on education, HMS's large research enterprise—a major and vital part of the

School's identity—often overshadows the importance the institution places on pedagogy and teaching. Thus, a major priority in the area of education is creating and fostering a culture of excellence in teaching. Recommendations from the Education advisory group include rigorously implementing the new criteria for academic promotion and engaging senior leadership at HMS (both Quad- and hospital-based department chairs) in valuing and rewarding teaching through direct connection to academic promotion and compensation. The Education group recommendations are closely tied to the educational initiatives that Harvard Catalyst is supporting as well.

Finally, and perhaps most critically, an area to which I have been committed since becoming dean is reducing student indebtedness. It is important that the School not be out of reach to a broad segment of undergraduate students and their families. It is equally imperative to avoid burdening families with a new round of debt shortly after a child has finished college.

Reducing indebtedness for our medical students is also essential in light of the recent trend that starting salaries in medicine are lagging behind increases in educational debt. If borrowing continues to grow, medical students will feel rising pressure to choose the most lucrative specialties. Minimizing their debt, on the other hand, will ease this distorting pressure on their career decisions and leverage their ability to become the leaders that they can, should, and desire to be.

Seize rapidly expanding opportunities in biomedical research to increase human well-being

The field of biomedical research is exploding, and advances in fundamental biological science are occurring at an unprecedented rate. Researchers have made tremendous progress in tracing the basic mechanisms of biology through the tools of biochemistry, genetics, structural biology, and cell and developmental biology. Three technological revolutions in recent years have accelerated these advances still further: genomics, computing, and imaging. Innovations in these fields have affected almost every area of biology and hold enormous promise for the future. Although major

areas of basic understanding still elude researchers—notably in neuroscience, aging, and the science of therapeutics—the medical community has a sense that biomedical science is poised on the verge of unprecedented discoveries.

HMS itself is at a tipping point with regard to human-centered research. We benefit from the talents, energy, and momentum of some of the world's most brilliant scholars, whose research efforts are pushing the frontiers of knowledge. We have extraordinary disease-oriented investigators and clinicians. This breadth of talent and expertise means that we are extremely well positioned to take decisive leadership in moving this revolution in science toward advances in human health, provided we have adequate investment in the engines of discovery and the connections to medical innovations that they might bring.

Our preclinical departments are at the core of the HMS biomedical enterprise, nurturing many leaders of this revolution and serving as vitally important centers for scientific innovation, education, and faculty development. The guidance of the department chairs in shaping the vision of HMS, attracting world-class faculty, and supporting and cultivating exceptional smaller groups within the larger HMS community is critically important to the health and vitality of the School. The wisdom and energies of the Quad chairs will be invaluable as we move forward in implementing our strategic initiatives.

I believe that in the future, the impact of our Quad faculty and departments can be even greater if they are connected more effectively and synergistically to the broader vision of the School—including both the new initiatives discussed in this report and deeper connections with clinical faculty and medical education. I am confident that the coming decades will bring great progress in medicine, founded substantially in fundamental discovery, and that our leadership will shine only through the partnership of our basic science and clinical faculty. This achievement will require the highest-quality Quad faculty, strong support for the departments individually and collectively, and new ways of engaging the combined faculty on the Quad

and in our academic health care centers with the aim of supporting the overall mission of HMS.

The Biomedical Research Areas advisory group identified a number of key areas that have the potential to connect fundamental science with clinical applications, that are at crucial junctures in their development, and in which HMS has the expertise to lead. Specifically, the committee recommended several cross-cutting fields as high priorities—human genetics, therapeutic discovery, neuroscience, bio-engineering, and immunology and microbial sciences—in addition to our existing commitments to stem cell and regenerative biology and systems biology.

Human genetics. Scientists have long recognized that all aspects of health and disease are influenced by inheritance. Discovery of the genes responsible for health and disease provides a direct connection between fundamental biology and the clinic, with great potential to inform therapeutic discovery and the practice of medicine. Until recently, however, the complex genetic causes of common diseases eluded discovery. Following the sequencing of the human genome, rapid advances in research tools have transformed the study of human genetics, and the next decade promises a revolution in our understanding of the inherited basis of human disease. Thus, we believe that it is imperative to ensure the continuing development of the field (including training the next generation of leaders), the translation of genetic discoveries into medical applications, and the responsible use of genetics in areas connected with law, business, public policy, and society.

Human genetics is an area in which HMS already leads, but also one in which we have not yet realized our full potential. Although the School's community is strong, and its distribution across several institutions provides many important advantages, no centralized leadership, mission, or resources exist for the study of human genetics. This lack of a focal point has meant no natural organizational home for education and research in this crucially important area, and we feel strongly that we should create one.

Therapeutic discovery. Therapeutics is the ultimate objective of a large majority of biomedical research. Many in the field believe that current approaches to this broad area are severely lacking, and that at this moment an opportunity exists to make a dramatic impact. I feel strongly—as does the subcommittee that analyzed this area—that the School must mount a focused effort to bring the enormous expertise of our community to bear on new ways to understand, identify, target, test, and deliver therapeutics, as well as new ways to understand how they affect individuals and populations. We are in a particularly good position to undertake such an effort, thanks to our extraordinary strength in basic and clinical research, our expanding efforts in translational research (now, happily, augmented by Harvard Catalyst), and the continuing efforts of our entire faculty. Recent investments in systems biology, chemical biology, and structural biology have also strengthened our understanding of drug mechanisms and the linkage of genomic information to treatment outcomes.

Making a decisive impact on the field of therapeutic discovery will be a significant intellectual challenge. I am convinced, however, that we must aggressively explore this opportunity further. We have established the needs and the general outline of an approach, but we must now provide a clear road map for moving forward. A remarkable amount of therapeutically relevant research is being carried out in our community, but all agree that the opportunity to do more, and to do it better, is huge at this moment, and we intend to make Harvard the world leader in this critical area.

Neuroscience. Neuroscience may well be the area in which the largest breakthroughs are made in this century. Advances in understanding the working of the nervous system and neurological diseases, ranging from Alzheimer's to depression, have enormous potential to be translated into new and important therapeutics. As with human genetics, this is an area in which the University and its faculty already excel but in which we may need to make additional investments in order for the community to thrive. Distinct departments or units of neurobiology, neuroscience, and neurology exist at HMS, in the Faculty of Arts and

Sciences, and at our academic health care centers, yet such dispersion brings many missed opportunities for synergy, collaboration, and impact. The white paper on neuroscience recommends that, because of the specialized nature and highly interdependent character of current approaches, research in this area could be greatly accelerated by the creation of a research institute with geographical colocation and explicit clinical connections. I do not believe that we have yet addressed this question in sufficient depth to make a decision regarding creation of such an institute, but I do believe that significant new investments in neuroscience, and consideration of new organizational structures for achieving them, will be a priority.

Immunology and microbial sciences. Research on the linked areas of the immune system, mechanisms and dysregulation of inflammation, and microbial science and infectious diseases is of enormous consequence for human health. Harvard has a very strong immunology program, structured as the Committee on Immunology, which has been functioning as a collaborative endeavor for more than 10 years. This interdisciplinary, interinstitutional entity involves nearly 90 highly regarded faculty members from throughout the Harvard community, including HMS, our academic health care centers, the Faculty of Arts and Sciences, and the Broad Institute. Harvard also boasts strong programs focusing on infectious diseases that threaten human health. In addition, the growing University-wide Microbial Sciences Initiative, officially launched in 2004, is providing an avenue for collaborative research and the creation of interdisciplinary courses, and the new Allston campus promises to add even more opportunities for making great strides in this area. Finally, although it was not formally a part of our strategic planning efforts, this summer the Harvard community joined with our sister institutions across the state and New England to work on a proposal for an important initiative in global health and vaccine development. We look forward to continuing to work on this major project.

Bioengineering. Bioengineering is a rapidly growing and exciting field that promises to be critical to the translation of biomedical science into a wide variety

of applications. Although many Harvard faculty work in this area, including in our academic health care centers and in the Harvard-MIT Division of Health Sciences and Technology (HST), these numbers are not sufficient for the breadth of the field, and organization and focus in this area are lacking. An outstanding effort in bioengineering will require deep collaboration between HMS and the Harvard School of Engineering and Applied Sciences. In a first step, the two schools established a joint committee to address ways of moving forward, and the committee recently submitted a report to me and former SEAS Dean Venkatesh Narayanamurti recommending substantial new investments in bioengineering. A proposal for a Harvard Institute for Biologically Inspired Engineering—in which the educational and research opportunities are truly extraordinary—has also been under discussion for some time and appears to be close to becoming a reality.

A major bioengineering program is currently slated to be housed in Allston First Science, along with the Systems Biology Department and the new Department of Stem Cell and Regenerative Biology, which links HMS and the Faculty of Arts and Sciences. The colocation of these three entities is particularly synergistic in terms of possible shared cores, cross-departmental faculty collaboration, and an orientation toward applied and translational research. Allston planning continues to be very challenging, however, and these three groups are already predicting a lack of expansion space soon after Allston First Science opens. Ideally, the next science building will both accommodate their needs and bring them into proximity with other departments and initiatives that will provide further synergies.

Stem cell and regenerative biology. Over the past several years, Harvard has recognized the importance of research in this area, creating both a Harvard Stem Cell Institute and the cross-school Department of Stem Cell and Regenerative Biology. This effort already includes many of the features that we recognize as important for other programs going forward: meaningful cooperation and joint programs that reach across schools and our academic health care centers;

linkage of cutting-edge fundamental science and translational aspirations; and joint investment and fundraising. Research in this field is a significant priority for HMS, but since the investment and planning for this effort were already set in motion before our strategic planning began—and we do not anticipate significant revision of these plans—we do not address this topic further in this report.

Lower institutional barriers to collaboration

The breadth and depth of biomedical expertise in the Harvard medical community is, I believe, unparalleled anywhere in the world. But our community is spread across many different institutions both in the Longwood area and beyond, each with separate organizational and financial structures. Unfortunately, this situation has created unintended barriers that fragment our faculty. It is sometimes said of HMS that the whole is less than the sum of its parts; although our many productive collaborations and joint efforts belie this notion, I do believe that the whole is less than it could or should be. When scientists working at different institutions within the Harvard system in similar or complementary areas have potentially ground-breaking ideas, but because of regulatory barriers are limited in their ability to walk across the street to work together, we block crucial avenues for innovation and squander major opportunities for advancing our goals. One of our priorities is thus to rethink our institutional structures to release the full power of our community by lowering barriers to collaboration.

A coordinated approach may be particularly important for animal and human research. The complex regulatory requirements for animal studies and clinical trials in our multi-institutional environment have led to a situation in which innovative mouse models of disease cannot be easily transferred from one researcher to another, and researchers in clinical trials who wish to make use of technology centers at multiple institutions must go through an extended process of obtaining approvals from multiple IRBs with conflicting priorities. Although much of this complexity is imposed by government regulations, I am convinced that improvements are possible, and I am committed to working with my colleagues throughout the HMS

community to identify and implement simplifications to the current system. We also identified this area as a major priority in the clinical and translational sciences center application.

The issue of barriers surfaced repeatedly during our planning process, notably in the report from the Organizational Structures subcommittee of the Biomedical Research Areas advisory group and in the section of the Tools and Technologies report that deals with animal research. The problems arising from existing barriers will be even more acute for science initiatives that cross the boundaries of institutional walls, including therapeutics, stem cell and regenerative biology, neuroscience, human genetics, bioengineering, and systems biology. This issue will be of critical importance in the planning and construction of a science community in Allston. As a long-standing member of the Harvard Medical School community, I have a keen appreciation of the various barriers, and dismantling them will be a key goal of my tenure as dean. I pledge to work with my counterparts in the other institutions that make up our community to change our institutional attitude to collaboration and sharing.

Create a more unified, supportive, and inclusive community

Barriers to collaboration at HMS are not only institutional. Perhaps one of the most difficult challenges identified in the planning process, voiced in meeting after meeting, was the need for several shifts in the culture of HMS, which in broad terms means becoming less insular and more inclusive. We must give special attention to improving the diversity and gender balance of our faculty, make a stronger commitment to mentoring and actively supporting our junior faculty of all backgrounds, and create an environment in which people can identify with a larger community than just their own particular niche.

I have heard from many quarters—faculty, staff, postdoctoral fellows, and students—that rectifying our shortcomings in this area is imperative, and it has emerged for me as a personal priority. Achieving this goal is essential to the future of the School and to the success of the goals in education and research that we

have articulated during the planning process. We must work together, across boundaries, to promote the spirit of inclusiveness, collaboration, and excitement about our joint future that has been such an inspiring part of this period of strategic planning.

Increase and coordinate strategic investments in tools and technology

If we are to retain our leadership position in biomedical research and education, recruit the highest-quality scientists, and support the wide range of research that we are planning, we must invest in cutting-edge technologies and computational support and innovation. Our faculty repeatedly cite new investments and new strength in computational biology and advanced imaging—ranging from atoms to human beings—as critical to their ability to effectively carry out their discovery research. The report of the Tools and Technologies advisory group also makes a compelling case for more systematic investments in frontier research in the technologies that eventually enable discoveries across many fields. This is an area in which the whole School must come together to plan and identify new directions. Central to this challenge is the development of core facilities to make established technologies available to the wider community. Also critical is tackling questions regarding recruiting, evaluating, and rewarding technology innovators, both at the faculty level and at the increasingly important research staff level.

Perhaps the most important insight in the Tools and Technologies group's report is that we must divide technology development into three main stages: innovation, development and dissemination; service; and training. Each of these areas is essential to a healthy and integrated research community, and each offers distinct types of benefits. It is not usually possible for the individuals who are working on developing a technology to also offer a broadly available service center, for example. Steering Committee members strongly reinforced this point, as well as the fact that exceptional service and training centers cannot be maintained in the absence of groups working at the levels of innovation and development.

Although we all recognize the importance of technology in driving biomedical research forward, and we have many outstanding faculty working in important technological areas, HMS has no coordinated approach to identifying and addressing important technology opportunities. It is a tribute to the strength of our diverse community that we have strong technology efforts in most fields despite this situation, but several major areas could benefit considerably from a coordinated approach, including areas relevant to therapeutic discovery, imaging technologies—from the molecular level to whole-body scanning—and computational methods.

Other important areas

Although the above represent the major priorities that emerged from the strategic planning process, I hope that we will be able to direct resources toward several other priorities as well, including those listed below:

Aging. HMS has a significant emerging community focused on aging, in the areas of both basic science and the social sciences. The School enjoys particular strengths in the biology of aging and in the arenas of policy and quality of care for the elderly population. Research on aging is becoming increasingly important given the demographics in this country and in many parts of the world, and HMS is poised to become a leader in this field.

Social sciences and global health. HMS is taking a leading role in cross-University efforts to improve health through better understanding of social, economic, and delivery-systems factors that affect health care, both in the United States and abroad. Research by HMS social sciences faculty focuses on issues related to health care financing and delivery, quality, disparities, and access, including for the elderly, children, and special and disadvantaged populations. In the educational arena, HMS requires all medical students to take a course in health care policy and one in social medicine. The School offers elective courses to Harvard College undergraduates, mentoring for pre- and postdoctoral trainees, and multiple educational experiences for students in the combined

MD/MBA program with Harvard Business School. HMS social sciences faculty are also active in Harvard Catalyst in the areas of community engagement and research, biostatistics, and health disparities research.

Of course, the issues studied by our social scientists cannot be addressed in isolation at HMS—although we must engage in them here—so we hope to work on a University-wide approach to studying these areas. We look forward to actively participating in a cross-University planning activity in social sciences, akin to the role HUSEC now plays for the basic sciences—a recommendation that emerged from the Social Sciences and Global Health advisory group.

With its strengths in global health delivery research, health policy and health services research, and basic science research in microbiology, immunology, and novel therapeutics, HMS can make great contributions at the nexus between social sciences and improved health care delivery and drug discovery. Our hope is that by merging our strengths in both social science and biomedicine, HMS can engage members of both communities to make the bench researchers' discoveries more

effective through the knowledge of health care delivery systems—in the United States and in the developing world—that the social scientists can provide.

We began this discussion during the strategic planning process through the Social Sciences and Global Health Advisory Group, but specific recommendations in this area have so far focused mainly in the educational arena. The arrival of Julio Frenk as the new dean of the School of Public Health and an expected revitalization of the Harvard Initiative on Global Health will help elevate this topic and promote the synergy between these fields that must take place if we are to carry out work that will truly lead to the alleviation of human suffering caused by disease.

Disease-specific efforts. We expect that many disease-related areas of research will accelerate and grow as collaboration across Harvard increases, but we will not attempt to speculate on these, nor on future investments, at this time. It is in the nature of science that new opportunities will emerge unexpectedly, and we have every intention of being appropriately opportunistic as these are identified.