

The Transformation of Research in the Health Professions at the University of South Carolina

Andrew A. Sorensen, MPH, PhD

Abstract

During the past six years, there has been a remarkable transformation of research, faculty, and interdepartmental, interinstitutional collaboration in the health professions at the University of South Carolina (USC). The author describes the context in which this transformation has occurred and the factors that caused the USC medical school to move from a position of relative insularity from the other colleges within the university—conducting little extramural research, and regarding its

relationship with its teaching hospitals as distal, associated institutions—to a position of full integration into the Division of Health Sciences with very significant growth in externally funded research and closer-than-ever-before working relationships with its two teaching hospitals. The author hopes that the model of interinstitutional collaboration USC is developing throughout the region will be thought worthy of emulation elsewhere.

In this article, the author reviews the transformation of research in the school of medicine and the other health professions schools—specifically, nursing, pharmacy, public health, and social work—at USC during the past six years. He explains how these changes were effected while the school continued to support its original mission.

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In the years after World War II, the American Medical Association successfully restricted the supply of physicians, but a relaxation of those policies in the mid-1960s allowed “both federal and state government” to enact “funding programs to encourage expansion of existing medical schools and the creation of new ones.”¹ In response to this accommodation, “twenty-five new medical schools were funded during the decade of the 1970s.”² One of these schools, the University of South Carolina (USC) School of Medicine (SOM), is one of five created under the aegis of the Teague–Cranston Act.³ The passage of the Teague–Cranston Act reflected a desire to present a corrective to the evolution of academic medical centers (AMCs) in the post-World War II era. Previously, “research and the practice of the medical and surgical specialties had been built upon the translation of research into patient care.” However, these eventually transformed instead into “complex enterprises that became institutions unto themselves, increasingly removed from the patients and the communities in which they lived.”⁴ Generally, the five Teague–Cranston Act schools founded during the 1970s espoused the importance not only of training physicians for “family practice” but

also of addressing the “medical care needs of the community as a whole.”⁵

The Context in Which the USC SOM Was Founded

All five Teague–Cranston Act schools were built on Veterans Administration hospital campuses in conjunction with public universities in order to train physicians for medically underserved areas and to benefit “veterans and their families.”⁶ The faculty recruited for these schools contended that because their primary purpose was to prepare doctors for general medical practice, basic and clinical research were marginal to their mission. They reasoned that the combination of federal largesse and support from their respective state legislatures did not require them to secure substantial external support for their research, and they assumed that a modicum of scholarly activity was adequate.

When the USC SOM was founded, another publicly funded medical school, the Medical University of South Carolina (MUSC), was thriving in the state. MUSC, descended from The Medical College of South Carolina, which was founded in 1824, was a large academic health center (AHC) with its own teaching hospital and a robust program of externally funded research. There was considerable political opposition within the state regarding the creation of a second publicly funded medical school,

but USC—like the other Teague–Cranston schools—appealed to the need for more primary care practitioners in a heavily rural state, and it won the day.

The Need for Creating a Division of Health Sciences

When I was appointed president of USC in 2002, the dean of the SOM also held the title of vice president (VP) for clinical affairs and reported to the president. All of the other health professions deans still reported to the provost even though the board of trustees—on the basis of advice from a committee, faculty, and administrators, as well as external consultants—had finalized a proposal in 2000 to amalgamate these five colleges (SOM and the Schools of Nursing, Pharmacy, Public Health, and Social Work) into a Division of Health Sciences that reported directly to one person. The hope was that the creation of such an office would stimulate collaboration across these entities and enhance their academic stature. But, in the intervening two years, no progress had been made in implementing this recommendation.

Especially in recent years, virtually every AHC professes a strong commitment to scientific collaboration and shared teaching responsibility among the health professions schools, although the rhetoric is usually stronger than the reality. The encouragement by the National Institutes of Health (NIH) and National Science

Dr. Sorensen is president, University of South Carolina, Columbia, South Carolina.

Correspondence should be addressed to Dr. Sorensen, 206 Osborne Administration Building, Columbia, SC 29208; telephone: (803) 777-2931; fax: (803) 777-3264; e-mail: (sorensen@gwm.sc.edu).

Foundation (NSF) for transdisciplinary research, as well as the demonstrable and substantial benefits of such scholarship and pedagogy, certainly warranted the creation of such a Division of Health Sciences. USC's health professions schools desperately needed, in the words of Henry Rosovsky, the "lowering [of] internal barriers."⁷ However, if substantial change was to occur in the relations among the member schools, it was imperative that all the deans and at least a high proportion of faculty buy into the process. Given the meager evidence of scientific collaboration among the health professions schools on USC's campus, meeting with both a representative faculty group and the deans of the respective entities to explore the proposal for a Division of Health Sciences seemed prudent. These conversations began in earnest in the late fall of 2002. There were many spirited discussions, but there was no serious opposition, and the Division of Health Sciences was officially established in the spring of 2003.

Ramping Up the Infrastructure for Information Technology and the Office of Sponsored Research

As discussions progressed about the need for elevating the academic reputation of the university in general and the health sciences in particular, it was abundantly obvious to all participants that one critical element was a substantial surge in grant and contract activity. However, a survey of USC's information technology (IT) systems and Office of Sponsored Research (OSR) functions indicated that these units were not geared up to handle such an increase. In 2002, faculty completed 100% of all OSR forms manually, with paper sent from one office to another. This archaic process not only consumed a lot of time (and trees), but presented needless hurdles whose obsolescence dampened the entrepreneurial instincts of the faculty. The faculty pointed out that if the health professions schools were to achieve the lofty goals for academic excellence that had been articulated, they needed what an NSF Advisory Panel on Cyberinfrastructure described as a layer on which "scientific and engineering research and education environments could be built."⁸ The survey uncovered a hodgepodge of decentralized and uncoordinated computing systems resulting from the

propensity of technology-savvy faculty to adopt the latest software and hardware without consulting university administrators. The faculty generally agreed that USC needed a university-wide computer platform and, therefore, coordinated systems across the institution. The NSF later corroborated these sentiments in its "first-ever analysis of academe's information technology infrastructure," which concluded that more extensive and ever-faster computer networks are essential to doctoral institutions.⁹ USC's SOM had accumulated a reserve of indirect cost (IDC) funds in its OSR, and it decided to provide several million dollars from this fund not only to enhance the university's IT capability but also to increase the size of its OSR staff and facilitate the latter's capacity to submit and track all research proposals as well as awarded grants and contracts electronically. The assumption was that this would stimulate a marked escalation of grants and contract proposals, and the resultant increase in IDC recoveries would enable the university to recoup this investment. The prediction proved to be warranted.

To get the Division of Health Sciences up and running and, at the same time, improve the OSR infrastructure, the USC administration created the position of VP for research and health sciences in the spring of 2003. Having all five health sciences deans report to this VP seemed wise, but because USC did not then own a teaching hospital, this person could concomitantly guide the needed improvement of the OSR—at least in the near term. A national search that summer and fall resulted in the appointment of a new VP in December 2003. Within a few months, the electronic system was launched, and, by the spring of 2005, it was fully operational.

Investing in Faculty Expansion

Two faculty hiring plans also abetted the drive to expand USC's research enterprise. The first, launched by the provost in the fall of 2003, is the Faculty Excellence Initiative (FEI), stimulated by his calculation that during the next five years, about one third of USC's full-time faculty (N = 350) would be retiring. Given the university's plans to foster the gradual growth of the student body and, at the same time, reduce the student-faculty ratio, the provost recommended that the university add 150

tenure/tenure-track positions during the next six years—an average of 25 per year. That plus replacing the retirees would mean recruiting 500 new faculty during a period of several years. USC dedicated \$2 million from tuition revenues for each of the first two years (FY04 and FY05) for this program. Then, in the spring of 2005, USC persuaded the state legislature to appropriate 4 million recurring dollars in FY06, and another \$4.8 million in FY07, for a total of \$8.8 million. As competition for admission rose—average SAT scores for incoming freshmen went from 1,109 to nearly 1,200 in six years with more than 17,000 applicants for 3,600 seats, whereas the number of in-state students rose by 1,000—the legislature in South Carolina concurred that they needed to increase the funds.

Also, in the fall of 2003, USC launched a quite different initiative, the Centenary Plan (CP), so named because, during a six-year period, USC would add 100 full-time research faculty. The university does not offer these faculty tenure/tenure-track positions; rather, the CP faculty receive three-year contracts with the following terms: for the first two years, the VP for research pays 50% of their salary, which is reduced to 25% in the third year. The balance of their salary support comes from their respective units and/or extramural funding. The program is designed to establish clearly defined economic incentives to secure external research support. From the fourth year onward, the university expects that the grant and contract revenues and support from the respective units will cover 100% of the salary, or the faculty will leave. All the new faculty—under both the FEI and CP initiatives—have been recruited from universities in which the expectation for an entrepreneurial spirit and a high level of scholarly productivity as well as dedication to teaching is universal. An aggressive marketing program to increase national awareness of the university's commitment to excellence, including full-page advertisements in the *Chronicle of Higher Education* and sponsorship of programs on National Public Radio, brought excellent results, but most of the credit for the remarkably successful nation-wide faculty recruitment goes to the newly recruited deans (only 1 of the 16 current deans was here in 2002), for whom an equally wide net had been cast and whose commitment to scholarly excellence and fund-raising were immediately apparent.

The Return on the Investment

The gamble was more effective than USC dared to dream, and the results greatly exceeded everyone's expectations. Before 2002, external grant and contract awards (not counting any portion of the annual state legislative appropriation as research funding) totaled \$109 million. At the end of the first year of the FEI and CP programs, the increased budget for the OSR and the electronic grant submission and tracing system (FY03), external grant, and contract awards totaled \$131 million (still exclusive of annual state legislative appropriations). The next year, the total was \$149 million; a year later, it was \$166 million; at the end of the fourth year, it was \$173 million; and at the end of the fifth year (FY07), it was more than \$185 million—an increase of 70%. USC has data only for the first 11 months of FY08, but the year-over-year comparisons show that USC is up 11% in extramural awards for the first 11 months. Even if the university were to experience a year-over-year decline in the last two months of FY08, extramural funding at USC is very likely to exceed \$200 million—nearly doubling extramural funding in six years.

For the health professions schools, the growth has been even more impressive than for the university as a whole: NIH awards grew from \$7.4 million in FY02 to \$21.9 million for FY07, very nearly a threefold increase. Awards from all other sources went from \$35.8 million in FY02 to \$55.3 million in FY07, a nearly 54% increase. The extraordinary success of the faculty in the Division of Health Sciences resulted in a total five-year growth from \$43.2 million to \$77.2 million (more than 78%), nearly doubling during a period of intense competition and gradual plateauing of NIH funding.

The substantial improvements in the functioning of the research infrastructure—to say nothing of the early and widespread success in securing grants and contracts, to which the newly recruited deans and faculty contributed substantially—palpably lifted morale throughout the university. Many professors who have been at USC for more than 25 years have commented that the surge in scholarly productivity has been unparalleled in their experience.

The Integration of Pharmacy Schools

As USC's research portfolio grew, the university launched, through the Division of Health Sciences, two ambitious initiatives—both designed to increase collective efforts by a quantum leap, principally by collaborating closely with other institutions. The president of MUSC and I had been friends for decades. From the very outset, we began exploring ways in which our two institutions might work together more closely, and, toward the end of 2002, we observed that the deans of the colleges of pharmacy at both USC and MUSC were retiring, so exploring the possibility of integrating these two colleges seemed propitious. In the fall of 2003, administrators of the two institutions launched discussions on the respective campuses. A committee composed of faculty from each school met to design a common curriculum, a centralized admissions process, and a mutually acceptable governance structure. After extensive discussions and thoughtful analysis of how synergies across the institutional boundaries would enable the two institutions to achieve more together than separately, the USC and MUSC boards of trustees in the fall of 2004 approved the creation of a new entity, the South Carolina College of Pharmacy (SCCP).

The plan presented to the respective schools included the establishment of three SCCP campuses: one on the MUSC campus in Charleston; one on the USC campus in Columbia, 100 miles north; and the third on the campus of the Greenville Hospital System (GHS), yet another 100 miles north. In January 2005, the GHS pledged \$5 million to support pharmacy education on its campus, in addition to building an education building to accommodate classrooms and offices for the faculty. That building will open this fall (2008). An executive dean of SCCP was hired in May 2005, and each of the campuses has a local dean who reports to him. In June 2006, the American Council of Pharmacy Education (ACPE) granted precandidate status to SCCP, the first college of pharmacy in the United States to emerge from previously separate accredited colleges of pharmacy. In August 2006, SCCP admitted 190 students as its first class, and in June 2007 SCCP achieved full candidate status from ACPE. This

merger has been extremely successful: in FY03, the USC pharmacy school ranked 47th in NIH funding among schools of pharmacy, and MUSC ranked 43rd. In FY07, SCCP ranked 19th. The schools' funding went from \$1.395 million in FY03 to \$5.461 million in FY07, increasing nearly fourfold. And, as an example of how each school benefits from this integration, faculty who are more experienced in clinical research at one school and basic research at another can offer online courses in their respective areas of expertise and, thus, use faculty resources more judiciously.

The Formation of Health Sciences South Carolina

In parallel with the emergence of SCCP, USC joined forces with MUSC, its teaching hospital, and the two USC affiliate hospitals (neither of which previously had university medical center [UMC] status) to organize another initiative. If USC and MUSC wished to enlarge their clinical research capability, they felt that cultivating a more formal, structured relationship with the largest teaching hospitals in the state was imperative. But, rather than focusing exclusively on what would benefit only USC, in the spring of 2003, the university began exploring ways in which all of South Carolina's research universities could collaborate with these hospitals. As Wartman¹⁰ has pointed out, there is heightened sensitivity among university leaders to the fact that the "highly competitive national and international environment . . . renders internal dissonance within an institution a drag on resources, spirit, and intellectual creativity. Simply put, most institutions are finding it increasingly difficult and costly to have some of their key components working at cross purposes." The appropriateness of this observation was apparent to USC administrators as they surveyed other universities and witnessed the inhibiting effect of competition among medical centers on their ability to reach their full potential. Further, my experience on medical school faculties in two urban centers, each with multiple medical schools, is that they expend enormous amounts of institutional energies in competing with sister institutions for state and federal resources as well as competing for faculty, residents, fellows, and paying patients.

As the benefits of synergy among all entities became increasingly evident, in the spring of 2004, USC expanded its consortium and created a 501(c)(3) (tax-exempt, not-for-profit, educational) corporation, Health Sciences South Carolina (HSSC), which consists of the only two medical schools in the state, all three research universities (i.e., USC, MUSC, and Clemson), and the four largest teaching hospitals (i.e., GHS, Palmetto Health System, Spartanburg Regional Hospital, and the University Hospital at MUSC). The mission of HSSC is to conduct health sciences research to improve health status, education, workforce development, and economic well-being for all South Carolinians. The fact that the CEOs of the respective entities are the only members of the board of directors has greatly enhanced USC's ability to collaborate across institutional boundaries because HSSC members do not have to go to the boards of trustees of their respective institutions to secure approval of initiatives and expenditures. Rather, together, HSSC members can decide among themselves what is in their own collective best interest.

To facilitate the development of HSSC programs (e.g., funding of endowed chairs across institutional boundaries), each of the three nonuniversity hospitals agreed to contribute \$2 million per year to the collective budget, and each university agreed to contribute \$1 million in cash per year from discretionary funds, for a total of \$9 million annually. In addition, each university contributes another \$1 million per year dedicated to faculty and facility infrastructure, making a grand total of \$12 million annually. To the best of my knowledge, this is the only entity in the United States to pool the resources of all research universities and teaching hospitals statewide, each contributing substantial fiscal support from their respective budgets *exclusive of* revenues from grants and contracts as well as state support.

In September 2007, HSSC hired a new president who also serves as director of the Center for Health Care Quality and occupies an endowed chair at USC with joint appointments at MUSC and Clemson. Although it is premature to predict fully the success of HSSC, HSSC administrators believe that, given its collective ability to secure research funds (which currently total over \$500 million annually) and,

additionally, to establish a multimillion-dollar annual operating budget, these accomplishments are truly harbingers of increasingly productive research and the improved health status of South Carolinians in the years to come.

Shortly after the establishment of HSSC, its administrators submitted a proposal to The Duke Endowment (an endowment established by the Duke family to support religious, social, and health programs in North and South Carolina) to launch research initiatives addressing patient safety, clinical effectiveness, and health care quality—goals that are highly congruent with the HSSC mission. With respect to the latter two initiatives, clinical effectiveness and health care quality, HSSC is developing outreach programs targeting communities that are adjacent to HSSC AMCs.¹¹ Commenting on the Duke Endowment's \$21 million grant enabling HSSC to advance research in these areas, Institutes of Medicine President Fineberg said, "This pacesetting gift from The Duke Endowment will help propel South Carolina into the forefront of research on patient safety, clinical effectiveness, and quality of health care. . . . I salute the leaders of The Duke Endowment and in the State of South Carolina for an enterprise that can improve the lives of millions and become a model for the nation."¹² At the announcement of this award, a former dean of the Duke University Medical School (who is also a member of The Duke Endowment Board of Directors) noted the uniqueness of having 100% of the medical schools and teaching hospitals in one state creating an entity such as HSSC dedicated to such systemic coherence.

In parallel with expanding the IT infrastructure at USC (described above), HSSC has been developing an IT network linking all three research universities. It will eventually connect all HSSC institutions and provide a functional electronic clinical trials network and a universal IRB. Even now, institutional human subjects review for a project conducted at each partner site requires only one review. This is tangible evidence of an individual institution's willingness to cede local authority for the benefit of statewide clinical research. If HSSC can achieve a fully integrated IT network, the opportunities for clinical and epidemiological research (as well as other types of research) are greatly enhanced.

Given the huge cost of establishing such a network, HSSC requested and received \$4.5 million per year from the state legislature to seed the integration of these IT systems. HSSC is now tied into the National LambdaRail, one of the nation's preeminent optical networks designed to meet the most advanced needs of the clinical and scientific communities. With colleagues elsewhere, HSSC is laying the "foundation for the next-generation networks needed to support large-scale research, education outreach, public/private partnerships, and new models of collaboration while providing the requisite IT infrastructure vital to economic development."¹³ Although HSSC is grateful that the South Carolina state legislature approved the request for funds, its administrators are acutely aware that each of its member institutions will have to provide substantial supplements to that appropriation to achieve such an ambitious goal.

The Importance of Remaining True to the USC Mission While Transforming Health Care Research

In sum, during the past six years, the USC medical school has moved from a position of relative insularity from the other colleges within the university—conducting little extramural research and regarding its relationship with its teaching hospitals as distal, associated institutions—to a position of full integration into the Division of Health Sciences with very significant growth in externally funded research and with closer-than-ever-before working relationships with its two teaching hospitals. One of them, GHS, recently secured designation as a UMC, greatly enhancing its ability to attract residents, fellows, and clinical faculty desirous of obtaining a medical school affiliation. These results are particularly noteworthy, given the inherent propensity of organizations to resist change. A survey of 127 U.S. AHCs (to which 65 [51%] responded) indicated that "most organizations did not wish to change the fundamental nature of their identities."¹⁴ Thus, the modification of USC's and its affiliates' academic cultures is particularly noteworthy. HSSC persuaded its participating institutions that given, for example, the increasingly intense competition for NIH funds, if they

continued to go their separate ways, they would be far less successful than if they married their resources. Thus, HSSC affords its affiliates manifold opportunities for synergy as well as pockets of talent that no single institution has.

However, as USC has elevated considerably its commitment to biomedical and health care research, the university has not neglected the family medicine and community-based model on which it was founded. Indeed, USC opened a family medicine clinic in a rural community in the 1990s and a similar clinic in yet another rural community four years ago. These two rural programs build on the aspirations of the founding faculty not only by serving the health care needs of local residents but also by providing settings through which USC's medical and nursing students as well as its residents may rotate as they consider practicing in underserved communities. USC has also continued to remain true to the purpose of preparing graduates for practice in primary care. During the past 10 years, an average of 75% of each graduating class has entered primary care, and, of those, 60% remain in South Carolina.

The opportunities before the academic medicine community are truly extraordinary. I hope that the model of interinstitutional collaboration USC and its affiliates are developing throughout the state will be thought worthy of emulation

elsewhere. Nearly a decade ago, Thier and Keohane¹⁵ observed, "The future of academic health centers rests on all of us." The urgency of their admonition is timeless, even though such institutions have continued to evolve in the years since then. Unless we are more creative and tenacious in transcending university and hospital organizational structures, we run the risk of jeopardizing our collective future.

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Did You Know?

In the 1970s, researchers at the University of Florida College of Medicine developed the sports drink Gatorade to rehydrate the Gator football team after grueling practices in the Florida heat.

For other important milestones in medical knowledge and practice credited to academic medical centers, visit the "Discoveries and Innovations in Patient Care and Research Database" at (www.aamc.org/innovations).