The Academic Medical System
Reinvention to Survive the Revolution in Health Care

Marvin A. Konstam, MD,a Joseph A. Hill, MD, PhD,b Richard J. Kovacs, MD,c Robert A. Harrington, MD,d James A. Arrighi, MD,e Amit Khera, MD, MSc,b for the Academic Cardiology Section Leadership Council of the American College of Cardiology

ABSTRACT

Academic medical centers (AMCs) are presently facing enormous challenges arising from a prospective decline in government funding for research and education, shifting payment models emphasizing efficiency and value, and increasing competition. Left unabated, these challenges will drive many AMCs to de-emphasize or forsake their core missions in an effort to survive. Stemming from a symposium held at the 2015 Scientific Sessions of the American College of Cardiology titled, “The Academic Medical Center of the Future,” we propose a series of changes, including internal restructuring, system-wide partnership, and novel approaches to support research and education, that are designed to better position AMCs to compete and face their growing challenges in a manner that preserves their essential missions. In aggregate, these changes will facilitate establishing the academic medical system of the future. (J Am Coll Cardiol 2017;69:1305–12) © 2017 by the American College of Cardiology Foundation.

Unprecedented pressures are building rapidly on health care providers and provider systems. Efforts to curtail rising costs are driving down both health care payment and utilization (particularly hospitalization rates) (1–4). Payment models are evolving, with fee structures increasingly emphasizing quality and value, rather than service alone. Rising requirements for documentation and data collection are driving increased financial strain on individual providers and provider systems. Procedural volumes are generally declining, and are migrating from the inpatient to the outpatient environment (3,4). Competition for patients and fees is generating “winners” and “losers” among practices, hospitals, and systems. There is growing provider consolidation, with previously independent practices dissolving or linking to hospitals, while some hospitals close and others consolidate into systems. In many instances, 2 or 3 health systems compete within a given marketplace, functioning as risk-bearing entities, such as accountable care organizations, for which the key commodity is shifting from unit services to covered lives and bundles of care (5,6).

Within this volatile health care market, traditional academic medical centers (AMCs) offer some competitive advantages (Table 1). AMCs tend to have greater physician–hospital integration than non-AMCs. They often enjoy high stature in their communities, due to a perception that they deliver high-quality, advanced care. Graduate medical education (GME) programs attract highly talented faculty, often with unique expertise, and can provide a natural pipeline of community relationships. Academic
leadership may afford early access to new drugs and technologies.

However, there are major competitive disadvantages associated with the traditional AMC culture and structure (Table 1). The traditional departmental structure may act as a barrier to interdisciplinary program development. Requirements of affiliated medical schools may hamper competitiveness. Arrogance and the “town-grown” mentality may impair community relationships. The academic culture might hinder business-oriented leadership and personnel decision-making. Compared with non-AMCs, AMCs are more vulnerable to financial and political changes within government payment programs, generally deriving a greater proportion of payments from Medicare and Medicaid, which also provide the majority of funds for GME (7).

If left unchanged, these impediments threaten the competitiveness and survival of the AMC. Shrinking extramural funding for research and GME may magnify that threat. However, blunt efforts (with purely financial motivation) to remove these impediments may improve survivability, but threaten the organization’s commitment to the academic mission (i.e., threaten the reason for the AMC’s existence). AMCs are at risk of their lay boards purposely or inadvertently losing the “baby” of the academic mission, while discarding the “bathwater” of inefficient structures and excess research and teaching costs. One “solution” for struggling AMCs has been their sale to for-profit systems. Although such transactions may work in the short-term, they shift the ultimate fiduciary responsibility of board members and officers from the missions of patient care, teaching, and research to the stockholders’ financial interest.

AMCs are worth saving. They are the primary places where both clinicians and researchers are developed and flourish. A recent report of the Association of American Medical Colleges estimates, on the basis of projections of population need and current training rates, that by 2025, there will be between 46,000 and 90,000 too few physicians to meet the U.S. public health need (8). If individual AMCs fail or begin to abandon their academic mission, the existing, inadequate physician pipeline will be threatened, jeopardizing access to health care in the United States. Major teaching hospitals also provide a disproportionate degree of charity care and the majority of certain critical care services, such as pediatric intensive care, critical burn care, and level 1 trauma care. Furthermore, beyond an immediate decline in academic research, there is risk of forfeiting a generation of clinician-scientists, creating a gap from which the public health may never fully recover. Last, but certainly not least, it is increasingly recognized that AMCs and the research they generate have a strongly favorable effect on the economy (9).

This report, following a symposium at the 2015 annual Scientific Sessions of the American College of Cardiology (ACC) on “The Academic Medical Center of the Future,” organized by the Academic Cardiology Section Leadership Council, provides a series of recommendations, some disruptive, for structural and functional changes designed to better position AMCs to compete and face their growing challenges in a manner that preserves their current missions. Many of these changes are beginning to take place around the country. It is now time for a nationwide effort toward building what may be called the academic medical system (AMS) of the future. The Central Illustration displays the characteristics of the successful AMS.

<table>
<thead>
<tr>
<th>TABLE 1 Competitive Advantages and Disadvantages of AMCs</th>
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<td><strong>Advantages</strong></td>
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<td>Greater physician-hospital integration</td>
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<td>Strong community stature</td>
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<td>Clinical trainees may represent a pipeline for community relationships</td>
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<td>Access to new drugs and technologies through clinical trials</td>
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<td>Greater proportion of government payments</td>
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AMC = academic medical center.
boards are asking questions such as, “What is the minimal amount of teaching and research that can be done while still being viewed as an AMC?” Sustaining and growing these activities requires redoubling efforts to generate a robust financial margin.

Engineering a successful AMS requires harmonization of the goals of all constituent parts toward sustaining the unified financial vision as a means to fulfill its academic and clinical missions. First and foremost, this goal requires the AMS to shatter barriers and align incentives across academic and clinical champions; across the community and the academic center; across facilities and clinicians; and across all clinician groupings, spanning traditional academic departments and divisions, as well as the various disciplines of the clinical team.

**INTERNAL RESTRUCTURING: THE EXAMPLE OF THE CARDIOVASCULAR CENTER.** A major obstacle to growth and efficiency within the AMC is malaligned financial incentives across hospitals and physician groups, across academic departments and divisions, and even across individual physicians within a given department or division. Although AMC-based physician organizations have generally been more aligned with their medical centers than have physician groups within nonacademic centers, that paradigm is changing with increasing practice acquisition and physician employment by hospitals. Despite a degree of natural alignment between the AMC and its academic physicians, that alignment is usually flawed.

Semiautonomous academic physician organizations, which are often, but not always, subsidiaries of the affiliated university or medical school, generally focus on their own professional revenue, expense, and bottom line. They are disincentivized from investing in clinical programs or participating in organization-based quality and efficiency initiatives, unless those investments and efforts yield direct financial value to the physicians. Within physician organizations, academic departments or divisions are financially in it for themselves, often in competition for the same patients and procedures (e.g., medicine, surgery, and radiology competing for the peripheral vascular intervention business). And, compensation incentives structured around physician relative value units overemphasize individual “productivity” at the expense of team-building and physician group collaboration in driving organizational quality, efficiency, and network development.

The concept of the clinical center or institute, bringing together hospital and physician resources across traditional dividing lines, to deliver aligned interdisciplinary care to all patients with a particular group of disease states, has the potential to cut through the silos that impair integrated program development, care delivery, and growth. Such structures represent the basis for an attractive AMC design. Their success depends on: 1) organizational buy-in at the highest level; 2) a collaborative approach, to assuage territorial concerns of deans and
department chairs; 3) strong individual leadership focusing on improving deliverable value to the entire enterprise, including patients and physicians; and 4) financial integration, allowing for shared success or loss among participants.

The cardiovascular center (CVC) represents a prime example of such a structural innovation. The most successful CVCs have the following characteristics:

- **Strong, singular overall leadership**, reporting directly to the senior leadership of the organization (e.g., the chief executive officer or the chief operating officer) and accountable for growth, efficiency, quality, and financial strength [professional and technical] in the delivery of cardiovascular care.
- **Financial and operational integration** of cardiology, cardiovascular surgery, vascular surgery, and interventional radiology, sometimes with the addition of thoracic surgery, pediatric cardiology, and/or cardiac anesthesiology.
- **De facto financial and operational integration** between the cardiovascular providers (professional fees) and the care-delivery and technical services (technical fees), with full transparency.
- **Creation of interdisciplinary programs** (Figure 1), some of which cross divisional and departmental lines (e.g., vascular medicine/surgery, advanced heart failure), each with its own program director who reports to the CVC director and is accountable for growth, efficiency, quality, and financial strength of that program.

- An incentive plan (Table 2) that primarily emphasizes financial success [professional and technical] and quality of the overall CVC and its subsidiary programs, while also incentivizing individual clinical, academic, and administrative performance.

A number of characteristics of the modern-day AMC can facilitate overcoming obstacles to building a CVC with the previously-mentioned features. These changes require strong support from the organization’s senior leadership. Although department chairs must not represent obstacles to CVC leadership, there are multiple ways in which they can be incorporated into CVC decision making, including participation in a governance committee and retention of prerogatives over physician credentialing and academic affairs, including appointment and promotion. In this way, personnel decision making may be conducted with collaboration between the CVC director and the chairs.

**SYSTEM-WIDE PARTNERSHIP: AMBULATORY CARE AND POPULATION MANAGEMENT.** Care delivery is projected to continue to shift away from the inpatient setting toward the ambulatory setting, and away from fee-for-service toward fee-for-value and population management with shared financial risk. For the AMC to survive in this changing environment, it will need to evolve into an AMS, truly partnering with other institutions and physicians throughout a broad geography. Although achieving such partnerships may mandate a degree of autonomy for the various participants, the connections must be strong enough to ensure operational and financial alignment across the network, and integrated, seamless, longitudinal care delivery. Furthermore, there is no room for “town-gown” hostility or competition. A functional system requires mutual respect, true partnership, and humility, valuing and embracing the distinctive contributions of the various components. These transitions also mandate shifts in current approaches to education and clinical research (see the following text).

**STRENGTHENING THE AMS CLINICAL VALUE PROPOSITION**

The traditional AMC value proposition derived from its perception as the gold standard for clinical care. The AMC was presumed to have the smartest and most knowledgeable physicians and to deliver the most advanced care. Efficiency, cost, and patient satisfaction were not even in the vocabulary. Few, if any, standardized quality metrics existed. Now, every aspect of this model has been challenged or negated. AMCs have succeeded in producing well-trained
The AMS can leverage its core assets to drive patients toward providers delivering appropriate, lower-cost and, sometimes, higher-quality care. Nonacademic clinicians who are capable of practicing excellent care outside of the academic environment. Nonacademic or partially academic hospitals and systems, both for-profit and not-for-profit, have arisen in almost every marketplace, often delivering up-to-date tertiary and even quaternary care. For patients, the allure of an academic institution has become less important than personable, satisfying, convenient, efficient, longitudinal, and communicative care. And, most health plans are providing financial incentives and disincentives to drive patients toward providers delivering lower-cost and, sometimes, higher-quality care.

The AMS value proposition must, at a minimum, match that of its competitors in each of the attributes sought after by patients and payers: appropriate, high-quality care, excellent outcomes, patient satisfaction, efficiency, convenience, and low cost. Preferably, the AMS should leverage its core assets to become even more attractive to its customers:

- The AMS can draw upon the relationships it has developed through training numerous clinicians who now practice in the community. In addition to collaboratively partnering around patient care, both within the AMS and the community, the AMS can provide a steady source of low-burden/high-yield educational activities, adding value to the community practitioner and creating part of the rationale for his/her joining the system.
- The AMS can leverage its technological, translational, and clinical investigation through offering participation in clinical research to both patients and community practices, and using novel, more cost-effective technologies throughout its system and in advance of others.
- The AMS can communicate the expertise, prominence, and guideline committee membership of its clinicians in a way that revitalizes their attractiveness to patients and even payers. To succeed, their activities must be linked to delivery of more advanced care, as long as they are also excellent, compassionate, efficient clinicians.
- Achievement of internal and external alignment can facilitate an AMS implementing novel approaches for improving quality, efficiency, appropriateness, and even patient satisfaction throughout its broad system. These contributions and their publication should be recognized and rewarded as academic achievements for both faculty and trainees. Improvement across these domains will reward the AMS within evolving performance-based payment structures.
- The AMS is expected to present a well-integrated, multispecialty clinical practice. As such, it is positioned to be more efficient than medical systems that are more fragmented in terms of activity and incentive.

**ADAPTING RESEARCH AND EDUCATION TO THE NEW REALITIES**

Multiple obstacles threaten current research and training approaches within the AMC. These include: 1) declining margins and system consolidation across academic and nonacademic providers, who may challenge the continued subsidy of academic activities; 2) threats to federal and other extramural sources of funding for research and training; and 3) research and educational process inefficiencies, which are magnified in an era of shifting goals and metrics.

The previously discussed approaches to improving the overall margin through internal restructuring, system integration, and enhancing the clinical value proposition will go a long way toward allowing the AMS to support its academic mission. But the focus of research and training will need to partially shift in response to changing societal goals for health care advancement and to adapt itself to the “new look” of the AMS. The AMS will also need to find new sources

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<td>Financial</td>
<td>CVC contribution margin</td>
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<td>Quality</td>
<td>• CVC key quality metrics</td>
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<td>Individual P&amp;L RVUs</td>
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The CVC is an integration of all physician divisions delivering CV services and associated hospital administrative, technical, and nursing services. Program denotes multidisciplinary clinical programs, such as advanced heart failure and vascular medicine and surgery, crossing conventional divisional and departmental lines. Note that CVC and program financial contributions derive from integrated professional and hospital/technical financial performance. Adapted from the Tufts Medical Center CVC’s physician incentive plan.

CV = cardiovascular; CVC = cardiovascular center; P&L = profit and loss; RVUs = relative value units.
of revenue to support academic activities, as well as new operational efficiencies.

**Research.** There has been a recent and welcome transition in Congress toward greater National Institutes of Health (NIH) support. For 2016, NIH funding has been increased by $2 billion. However, such largess should be expected to vacillate with future shifts in budgetary realities and in the political wind. Furthermore, there is an ongoing demand for near-term results, discouraging investigators from following a sequence of novel findings that lack short-term clinical translation, but carry the potential for a major breakthrough over a longer time horizon. Allocation of research funds has not always matched the health care need. For example, current NIH funding for research into ischemic heart disease and stroke runs well behind that of several other disease states, when expressed as annual research support per year of life lost (10). Although the AMS must try to harmonize with the directions of federal funding, the health care community must also advocate for an appropriate distribution of the research dollars, and the AMS must seek a greater degree of independence from the vagaries of government funding.

One approach is to increase academic-industry partnership in basic, translational, and clinical research. Although such an approach may not solve the problem of liberating the scientist to follow his or her own lead and instinct without the burden of generating a big short-term payoff, such entrepreneurial partnerships can drive great gains toward newer diagnostics and treatments, while supporting AMS financial health. A number of AMCs have already formed highly successful relationships with industry partners (11,12). These may be centered on individual products or may represent broader technology platforms, with multiple scientists working in concert.

The future AMS will have treasure troves of assets to deploy in the pursuit of newer imperatives in clinical research. These include “big data” repositories from across large clinical networks, including diverse populations with broad ranges of disease states and severity (13). Particularly in collaboration across health systems, these databanks can generate hypotheses for precision medicine, which can be tested within large-scale outcomes research projects across these diverse populations. Community sites can be positioned to perform clinical research, possibly building a different specialty competence at each site, or possibly coalescing into an effective clinical trial network. In addition to traditional lines of research, an AMS can be well-positioned to lead innovation in such areas as quality improvement, patient satisfaction, efficiency, and integration in care delivery, and these discoveries can feed clinical advancements in the AMS itself.

**Education and Training.** As with research, funding for education, particularly for GME, is at risk. Along with the threat of budget shortfalls (in government, in medical schools, and in provider organizations), the very role of government in supporting GME has been challenged (14). A decrease in government GME support would drive a net decline in GME positions available, because most AMCs are ill-equipped to shoulder the burden of a substantial funding decrease. The various proposals for continued or expanded government funding have generally come with strings attached. The Institute of Medicine (IOM) recently published recommendations for restructuring GME and indirect medical education funding (15), with establishment of a GME Center within the Centers for Medicare and Medicaid Services, focused on strategic fund allocation on the basis of perceived geographic, societal, and specialty-based need. It proposes maintaining GME support at the current level, while “modernizing” payment, with a portion allocated to operational funds for approved positions, likely with “performance-based” adjustments, and the remainder allocated as “transformational funds” for innovative initiatives. Such required innovation may include cost reduction, directing training toward areas of need, or greater emphasis on quality improvement. The IOM report projects that implementation of its recommendations will result in as much as a 35% reduction in indirect medical education payments to AMCs (15). At the same time that these challenges to academic institutions are emerging, the Association of American Medical Colleges projects substantial physician shortages over the coming decade (see earlier discussion), with a greater than expected need for specialists (8). Clearly, the AMS must identify innovative solutions to the combined immovable object of GME funding challenges and the irrepressible force of greater demand for providers. Although the IOM report’s goals of modernizing GME funding paradigms and directing resources toward areas of highest public need are laudable, these efforts must be balanced and preserve the unique aspects of the AMC that have resulted in U.S. GME programs being among the best in the world.

In particular, new pathways in education and training should align with the future direction of care delivery. A training program offering predominant exposure to inpatient tertiary care will inadequately prepare the trainee for practice within the evolving new reality. The structures of GME programs will need to conform to the “modernized” federal and
state payment models. The future AMS has the potential to offer students and trainees a broad experience distributed across community and ambulatory care, in addition to inpatient tertiary and quaternary services. It will require new and stronger curricula in quality improvement and population management, and will need to educate trainees about the nature and implication of emerging health care delivery and payment models. The trainees, in turn, can provide greater value to the AMS in the form of quality improvement and care innovation projects, serving as bridges across various care delivery sites and practitioners to harmonize care, and spurring educational discourse and programmatic activities throughout the system. In this manner, GME training programs can continue to provide exceptional value to the health care system, in terms of both current health care delivery and a pipeline of future physicians and leaders.

As new models are explored for funding GME programs, there will be ongoing consideration of apportioning resources between primary care and specialty training. Given the projected shortage of both primary care and specialty physicians, it would be prudent to preserve funding in both areas. However, it is also prudent for the specialty communities to seek greater training efficiencies. For example, the need for the current requisite 8 years to train an electrophysiologist (3 years of internal medicine, 3 years of cardiology, and 2 years of electrophysiology training) is questionable. Other specialties, such as cardiothoracic surgery and interventional radiology, have moved toward integration of primary and specialty training within a continuum. In constructing such programs, care must be taken to avoid detracting from the breadth of the specialist’s skills. But, as the clinical model of the CVC is adopted, consideration should be given to streamlining training paradigms, which may include integrated training pathways for general cardiology (combining internal medicine and cardiology) and cardiology subspecialties (combining general cardiology with secondary subspecialties, such as interventional cardiology, electrophysiology, advanced heart failure, and transplant cardiology). Although the concepts are not new (16,17), the timing may be right to re-explore cardiovascular medicine as a primary specialty.

**THE ROLE OF FACULTY AND MEDICAL SOCIETIES**

The traditional vision of the “clinician-scientist” and “clinician-educator” must change. Clearly, the AMS must train and employ outstanding clinicians, scientists, and educators, and these individuals must be given sufficient flexibility to follow their instincts toward advancing, perfecting, and innovating their own practices. However, the clinician must be committed to the practices of quality improvement and population management. He or she must integrate within the larger health system, creating alignment with clinicians across the system and partnering with the entire clinical team, including nurses, advanced care providers, technicians, pharmacists, therapists, and others. Scientists must be innovative at identifying novel funding sources and be conscious that their survival depends on the fiscal health of the institution. Some must focus on the challenges of health care quality and efficiency. Educators must measure the effectiveness of their teaching and work to continually improve it. They must expand their practice to prepare trainees to succeed in the new health care environment (see earlier discussion). The most valued faculty will continue to be those who integrate a combination of clinical practice, teaching, and/or research. These individuals will serve as the most effective role models and can “connect the dots” among the various AMS offerings, driving toward elimination of silos and aligning all essential components of the organization. Efforts must be made to develop interest and skill in teaching and research across all practice sites within the AMS. Innovative financial incentive and payment models, as described earlier, are essential in this new faculty paradigm to account for and reward the various contributions to the AMS.

The AMS must help its faculty develop the most under-rated and scarce skill among its faculty: leadership. Physician training at all levels has been remarkably devoid of leadership training. Physicians must stand alongside other members of the health care team and reinvigorate their diminished leadership role within the AMS. The success of the AMS will depend heavily on establishing accountability and responsibility among physician leaders, who must align themselves with the overall goals of the organization, not merely the academic success of individual divisions and departments.

Finally, medical societies, such as the ACC, should play a leadership role in helping the AMS to survive and thrive. The conventionally-defined academician cannot be the sole champion of this goal. All health care providers have an obligation to help sustain the number and quality of clinicians needed to meet the future public health need. They are also obliged to ensure continued advancement in diagnostic and treatment modalities for their patients. As health care evolves, many community-based physicians will find themselves part of an AMS and must align themselves
with the entirety of its mission. It has been gratifying to observe the ACC embrace research and GME funding as high priorities for its advocacy platform. The recent increase in NIH funding can be credited, at least in part, to the chorus of voices of academic and medical societies on this issue, the ACC being particularly vocal among them. The ACC and similar organizations should collaborate to foster the academic mission through raising funds to support research and training and by providing tools to aid the AMS, its clinicians, and its administrators in building the competencies needed to navigate emerging challenges.

CONCLUSIONS

It is easy to become discouraged as challenges to the current AMC continue to mount. These organizations have much work to do to restructure and realign, both internally and externally, to sustain their core mission. To retain this mission, they must re-establish their value proposition to meet the evolving demands of patients and payers. They must also assume a cost-effective approach to training and research, seek innovative sources of funding, and shift their focus to include training curricula and research portfolios linked to ambulatory and community-based integrated care, quality, efficiency, and patient satisfaction. Faculty members must re-engineer their roles and develop exceptional leadership skills. Organizations such as the ACC, in collaboration with others, should play a major role in driving academic funding through government advocacy, and development of alternative funding pipelines and tools to help academic organizations to succeed. A new organizational model is required to sustain the vital roles of robust research and training, while offering the highest level of clinical care: the newly designed AMS.

ADDRESS FOR CORRESPONDENCE: Dr. Marvin A. Konstam, The CardioVascular Center, Tufts Medical Center, 800 Washington Street, Box 108, Boston, Massachusetts 02111. E-mail: mkonstam@tuftsmedicalcenter.org.

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KEY WORDS

academic medical center, health care system, medical economics, medical education, research funding