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The Blue Ridge Academic Health Group

Synchronizing the Academic Health Center Clinical Enterprise and Education Mission in Changing Environments

Members and participants

(August 2015 meeting)

CO-CHAIRS

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Michael M.E. Johns, MD
Interim Executive VP for Health Affairs, Emory University, and President, CEO, Chairman of the Board, Emory Healthcare

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University of Pennsylvania School of Nursing

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Executive VP for Medical Affairs; Dean, Biological Sciences Division & School of Medicine, University of Chicago

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Dean, School of Medicine
Oregon Health & Science University

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President and CEO, University HealthSystem Consortium

Bruce C. Vladek, PhD
Senior Adviser, Nexera, Inc.

SENIOR MEMBERS

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Irwin Jacobs Presidential Chair
Salk Institute for Biological Studies

Don E. Detmer, MD, MA
Professor of Medical Education
University of Virginia

Arthur Rubenstein, MBBCh
Professor of Medicine, Perelman School of Medicine
University of Pennsylvania

FEATURED PRESENTERS

J. William Eley, MD/MPH
Executive Associate Dean
Emory School of Medicine

Maryellen Gusic, MD
Former Chief Medical Education Officer
Association of American Medical Colleges

Jonathan S. Lewin, MD
Senior VP, Integrated Healthcare Delivery, and Professor and Chair of Radiology, Johns Hopkins Medicine

Charles L. Rice, MD
President
Uniformed Services University of the Health Sciences

Mark Richardson, MD (see Members)

David A. Spahlinger, MD
Executive Vice Dean for Clinical Affairs and Executive Director, University of Michigan Medical Group

FACILITATOR

Steve Levin
Director, The Chartis Group

GUESTS

William N. Kelley, MD
Professor of Medicine, Perelman School of Medicine, University of Pennsylvania
Trustee Emeritus, Emory University

Charles H. (Pete) McTier
President, Emeritus, Woodruff Foundation
Trustee Emeritus, Emory University

Marschall Runge, MD
Executive VP for Medical Affairs, University of Michigan

Richard P. Shannon, MD
Executive VP for Health Affairs
University of Virginia

STAFF

Anita Bray
Project Coordinator, Woodruff Health Sciences Center, Emory University

Gary L. Teal
Chief Administrative Officer, Woodruff Health Sciences Center, Emory University

EDITOR

Ron Sauder
Communications Consultant

EDITORIAL AND DESIGN CONSULTANTS

Karon Schindler
Linda Dobson
Woodruff Health Sciences Center, Emory University

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Report 20. Synchronizing the Academic Health Center Clinical Enterprise and Education Mission in Changing Environments

Mission: The Blue Ridge Academic Health Group seeks to take a societal view of health and health care needs and to identify recommendations for academic health centers (AHCs) to help create greater value for society. The Blue Ridge Group also recommends public policies to enable AHCs to accomplish these ends.

Executive Summary

Academic health centers (AHCs) are undergoing a marked period of transformation as they migrate from fee-for-service reimbursement, which led to a focus on episodic care, to value-based payment methodologies that reward coordinated care and improvements in the population's health.[1-3] Payment models increasingly embrace the "triple aim"[4,5] of improving the experience of care for individuals, improving the health of defined populations as well as that of individual patients, and reducing per capita cost. In this new construct, it is hoped that payment changes will encourage providers to enhance the value of the community's investment in health care through continuous improvements in safety, quality, and service that lead to better outcomes for individual patients, groups of patients, and the entire community. The goal is for health care to be proactive rather than reactive, patient-centered rather than provider-centered, initiated by health systems actively engaging the patient, and delivered by interprofessional care teams in many settings other than the hospital. Taken together, the changes under way portend significant change for AHCs, which are responsible for a substantial volume of health care delivery, as well for as the education and training of the nation's future health care workforce and leadership.

The transformation in payment models, accelerated by the Affordable Care Act, is driving the growing size and consolidation of payers, pharmaceutical and device manufacturers, and providers, who are building the capabilities to improve value and gain access to a greater portion of premium dollars (notwithstanding cautions from industry analysts that sheer size alone will not be determinative of success).[6] *The Wall Street Journal* recently referred to a "health-care merger frenzy," as both insurers and providers seek greater scale and efficiencies, with pending acquisitions that would create three $100 billion insurance companies.[7] These changes in the size and scope of health care systems bring with them cultural changes and challenges to management and governance, as well as risks and opportunities for the education and training of health professionals, one of the defining missions of AHCs.

The Blue Ridge Academic Health Group believes it is time to focus specifically on the role of education in determining the optimal size, scope, and character of AHCs.

There is no single right answer to determining the ideal size for fulfilling an institution's mission for health professional education. However, one clearly wrong answer is to fail to address this question, since every institution needs to determine the AHC's required size and scale based on its distinctive mission, communities of interest, and rapidly changing environmental pressures. Mission—especially the commitment to the preparation of the next generation of clinicians—must be a driver of a system's size and scale.

A factor of particular impact in defining the desired size and configuration of the AHC's delivery system is the extent of its commitment to training in medical specialties. Specialty preparation demands access to millions of lives to ensure adequate experience for training of residents and fellows, including access to diverse low-incidence and complex diseases. Meeting this requirement is sometimes taken to mean that AHC's must control a sufficient number of lives through owned networks to ensure access to highly specialized training and experience. However, dependable access to the necessary number of patients with low-incidence diseases can also be accomplished through a variety of means other than assuming total responsibility for coverage. In fact, it is likely impossible for most AHCs to have control of a large enough population to meet training requirements.

However it is achieved, this imperative of access to teaching cases must be a key consideration as AHCs develop strategies and actions to compete in the changing environment.

Some AHCs have reacted reflexively to market pressures, rather than stepping back and reminding themselves that education is the primary reason they exist. Along with discovery-based science and providing innovative clinical care, health professional education is a critical and indispensable mission that AHCs perform uniquely well—and for which they must be held accountable by health care's various stakeholders.

The size of the patient population needed to produce enough patients to meet the various training requirements for medical students, nurses, and allied health professionals, as well as residents and fellows, should also consider the practice settings needed to support coordinated, team-based health professional training.

Population health approaches will be more prevalent, even if the rate of change proves as nonlinear and unpredictable as one might expect from a study of the history of health care. Recent headlines, for instance, reveal ongoing challenges in ACA enrollment, as even "insured" consumers are confronted with rising premiums, high deductibles and co-pays, and unwelcome limitations in their networks.[8] No matter what the pace and character of health reform may bring, our teaching hospitals will be expected to continue to offer the best and most innovative, science-based tertiary and quaternary care. The new emphasis on coordinated, team-based care, and population health has implications for undergraduate and graduate medical education, as well as the many other health professions, including the new cadre of clinicians who will provide health care, policy development, and leadership in the future. The impact of these changes will also affect the ability of AHCs to maintain centers of excellence for low-incidence disease and carry out clinical research that advances knowledge and produces new treatments and cures for these conditions. New opportunities to conduct population health and outcomes research are now present and necessary to pursue. Such research conducted by the AHC can materially affect the shape of what might be called the "New World" of health care which delivers dramatically improved value.

Recommendations

1. Clinical networks, however they are sized, must produce enough cases, and enough of the proper mix of cases, to support the education missions of their associated health professional schools. The sizes of clinical networks may and will vary enormously, while still being scaled appropriately to the needs and missions of their respective institutions. There is no one-size-fits-all solution.
2. AHCs' clinical delivery systems do not need to completely "control" or "cover" all of the hundreds of thousands or millions of lives that are required to produce enough cases every year for specialty and subspecialty training programs. A variety of clinical referral and business arrangements can be constructed to tailor the assumption of risk appropriately to the size, resources, and character of any given AHC.
3. Educators must be at the table in planning the size and characteristics of clinical delivery systems associated with AHCs. Education of health care professionals is one of three foundational and essential missions of the AHC, and it is the one critical thing it does that no other part of the health care system can emulate.
4. Education values and requirements must be key considerations in planning the size and character of AHCs' clinical delivery systems. It is especially critical to maintain access to a sufficient number and diversity of complex medical and surgical cases to sustain specialty and subspecialty training programs. The most impactful requirement may be the number of "rare" or low-incidence cases needed for subspecialty graduate medical education (GME) training.
5. AHCs' clinical delivery systems must find or create room for value-based health professional education to occur using team-based models of education in the population health care delivery settings of the future. Achieving this essential requirement will be difficult in an era of diminishing margins and commodity care, but it is critical to the proper education and training of the generations of health professionals our nation will depend on. While hospitals will continue to be important sites for training, they will not provide all of the appropriate settings for teaching continuity of care. Other settings include nursing homes, home care, and still others, which will be required to round out the training experience.

6. Academic health centers must make it clear by their mission statements and in their strategic plans just how they benefit from, and contribute to, the larger university communities to which they belong.
7. Educators and AHC leadership must articulate clearly and convincingly that the academic mission of the AHC requires support and access to patients, cases, and care settings from their affiliated clinical delivery systems and collaborating partners, including community-based organizations and other AHCs.
8. Not all education missions are or should be the same, despite the cookie-cutter feel of many mission statements; in fact, they should be even more differentiated by scope, character, community, and programmatic emphasis than they are now.
9. Not all AHCs need to have identical kinds of relationship to their parent universities—quite the contrary, successful models show a wide range of construction, from total ownership to arms' length affiliation, while still producing superb education and clinical care. The key commonalities are wise governance, strong leadership, and excellent management, guided by a shared understanding and commitment to mission and values.
10. Every health professional school should be engaged in some kind of research that is appropriate to its size and mission, and that research should be an integral part of its education program.
11. Education missions should provide clarity for all parts of the academic health enterprise, not just undergraduate and postgraduate medical education but also nursing, pharmacy, public health, and the allied health professions. Care delivery demands a team-based approach to achieve highest value and outcomes—all professions must be included in the planning and execution of health care education. Additionally, all settings in which the continuum of care is provided, such as long-term care facilities, rehab centers, and community care centers, must be a part of the education experience.
12. Academic health centers should consider realistically what kinds of training programs are available to them and make their plans accordingly. For instance, statistics show that many states will not produce enough "rare" or low-incidence cases to support multiple organ transplant centers or multiple rare neurological surgery programs, with adequate volumes to maintain excellence. There is significant opportunity for collaboration among AHCs and community training programs; there is significant threat to the quality of training if all compete for the same cohort of complex patients.
13. The Accreditation Council for Graduate Medical Education and its Residency Review Committees should continue to work on all residency areas to refine the milestone process and to quantify better how many and what kinds of cases are required over the course of a training program for all specialty and subspecialty training programs. This is done relatively well now for most surgery programs but not nearly as consistently for most medically based or hospital-based non-procedural programs.
14. Research must continue to validate the numbers, types, and outcomes of cases required for the acquisition of expert competency. The old saw of "see one/do one/teach one" needs to be mothballed forever and replaced with real science. We need the best insights of education psychologists, systems engineers, and health care faculty themselves, among others, to study the acquisition and assessment of expert competency in a systematic way. This approach must be applied to all specialty training, whether procedural or non-procedural.
15. As befitting a new era of value-based, population health, each AHC should continue to conduct research on the needs and desires of the communities and populations it serves in order to better understand matches and mismatches between what is being delivered and what is being expected or needed. This research should include not only its patients, community members, and stakeholders at a local, regional, and perhaps even national level, depending on its mission, but also its own faculty, staff, students, residents, and fellows. The assessment of health needs and the wants of the public are often surprisingly different from those developed by AHCs, revolving around macro trends such as violence control, obesity, nutrition, etc., rather than organ-specific diseases and conditions. Understanding the full scope of needs and opportunities can lead to important conclusions, reinforcing the importance of public health, community health, and socioeconomic researchers as valued contributors to the missions of AHCs. As we devise education strategic plans for a new era dominated by population health and value-based health care delivery, we should seek to understand the contrast between health needs as defined by the care delivery system vs. health needs as defined by the health status and stated needs of members of the populations to be served, including micro segments (subpopulations) of our communities.
16. The Center for Medicare and Medicaid Services should continue to include education needs in planning for Medicare and Medicaid, especially with respect to reimbursement levels. Private payers also should have a role to play in reimbursing their share of trainee costs.

I. Academic Health Centers (AHCs) in Transition

There are multiple dimensions of the rapidly changing landscape for academic health centers (AHCs). Two have particular relevance for health care education:

- Health profession education changes: Preparing clinicians to deliver comprehensive, longitudinal care across a population requires changes in curricular content, education settings, and expectations of graduates. Health professional schools are striving to produce graduates who will succeed in the delivery settings of the future. Health professional schools must maintain an education environment that generates and disseminates new knowledge, promotes professionalism, fosters an ethically informed approach to patients and colleagues, and assures clinical expertise. These are the hallmarks of health professional education. Yet these professionals will practice and lead in settings very different from those that exist today and in settings substantially different from those that their teachers were trained in as well.
- University perspectives: Furthermore, AHC's are a core part of the academic identity and mission of most universities. The potential benefits and risks of the changes in academic health care and health sciences must be considered in the context of the university's mission and strategic agenda. In many situations, the non-AHC components of the university, which are essential to its identity and mission, are eclipsed in size and budget by the AHC. That is particularly true when the clinical delivery system—the hospitals, clinics, and faculty practice settings—continue to be owned by the university. The attendant uncertainties regarding the future funding of health care often lead to questions that go beyond issues of financial risk, size, and budget to include those of academic fit and reputation, and the roles of medical staff as faculty in greatly expanded health care systems. AHCs can and do bring great value to the university. They are often the best-known and most-valued face of the university from the standpoint of many constituencies. The significant philanthropy often provided by grateful patients illustrates this point. AHC missions should be aligned with those of their parent universities, while their strategic plans should be particular to their own distinctive characters, cultures, histories, and communities, making clear the full magnitude of their unique contributions to the university's education, research, and community service missions. By the same token, AHCs should recognize the importance of other university schools and colleges in enriching their own academic culture and mission.

Meanwhile, the migration of American health care toward population health, increasingly organized through large, integrated delivery systems, changes the playing field, creating both new opportunities and new threats for AHCs in transition (see table 1).

With real and potential changes in both education and delivery models ("Disrupters of Academic Health Centers," page 14), it is obvious that strategic planning is mandatory. Key dimensions of that planning should include consideration of the optimal size, mission, historical and current strengths, and needs of each institution's immediate and extended communities. Potential clinical and education partners as well as competitors should be assessed. Access to sufficient cases and appropriate patient care settings for health care education should be at the forefront and a key driver for planning.

One of the key considerations must be selectivity—tailoring the decisions to the attributes of the AHC. As stressed in last year's Blue Ridge report, *Refocusing the Research Enterprise in a Changing Health Ecosystem,*[9] this is not a time in which every institution should seek to cover the waterfront. The high-functioning AHC will identify its niche, acknowledge its boundaries and limitations, and focus on its specific strengths and opportunities. This is not a time to "be all things to all people"; rather, it is a time for differentiated excellence and cooperation and collaboration with other institutions, in both traditional and innovative ways.

Table 1.
Opportunities and Risks for Academic Health Centers Posed by the Migration to Population Health

Opportunities	Risks
■ Educate health professionals to function in teams to manage care across the continuum and improve health status at lower cost ■ Improve the quality of research with access to large populations and more complete, integrated information ■ Deliver more effective care across the continuum for disease episodes and procedures ■ Improve health outcomes for defined populations, thus improving overall community health ■ Build the market's preferred delivery system with the best outcomes and access to the highest quality providers ■ Design and implement new models of care by creating teams that leverage capabilities of different professionals to improve outcomes, access, and patient satisfaction ■ Access to new education sites improves the diversity of the educational experience	■ Loss of patients reduces the capacity available for education and research and damages economics due to market consolidation: • Channeling of patients away from AHCs as competing health systems attempt to retain patients in-network • Shift of "commodity care" for routine/common cases to lower-cost settings • Difficulties competing on price for payer contracts, especially given high levels of cost shifting to cover constrained government reimbursement and growing research deficits • Challenges with competing for community physicians and hospitals seeking to join a larger health system

Courtesy of The Chartis Group

II. Academic Perspective: Educating for the Future in a Changing Health Care Context

Health professional education is undergoing a quiet revolution, or paradigm shift, driven by the recognition that students need to be better prepared to care for patients in very different ways and in different settings. As emphasized by the transformative work of Cooke and colleagues[10] on both undergraduate (UME) and graduate medical education (GME), an increasing number of educators and specialty bodies are seeking ways to make the learning process more individualized, efficient, and competency-based.[11] The new paradigm calls for developing habits of inquiry and innovation, the intentional formation of professional identity on the part of the learner, and close integration of classroom-based knowledge and clinical experiences. This new approach puts a premium on maintaining access to a large and diverse range of patients and settings, for both undergraduate and graduate medical students.[11]

Similar changes are occurring in the education of other health professionals, including nursing, public health, pharmacy, and others. Health professional educators and those who will employ their graduates, seek assurance that AHCs' graduates possess the skills needed to function as members of interprofessional care teams[12] and that they have certifiable competencies that correspond to the education and training programs from which they have been graduated. Increasingly, education programs and accreditation bodies define the quantity and quality of experience with different kinds of patients and settings. This underlines the imperative of sizing and designing AHC networks properly to make sure these experiences can be encountered in the type and volumes needed for health professional education at all levels.

Because of limitations in some clinical networks associated with AHCs, especially at newer and smaller AHCs, there is the risk that residents may finish their residency in particular clinical disciplines without having seen the requisite number and types of patients called for by the relevant specialty bodies and accrediting groups.

One approach has been to try to replace direct patient experience with other experiences, such as simulation. While simulation has demonstrated value, it cannot fully replace the unpredictability and particularity of a living case from a pedagogical standpoint. When used at the graduate level, it may be appropriate in the early stages of learning, but it is not so in the later stages when proficiency is being established.

In this context, the role of the AHC faculty must be steadily maintained and preserved. In almost every health care career of distinction, whether inside or outside academia, a professional can look back on a master teacher who set a standard of excellence that provided lifelong inspiration and vision. Just as there must be space and time for learning competencies to occur in the delivery systems we are now creating, there must be sufficient space and time for teaching faculty not only to inculcate specific clinical expertise but also the values and vision that have infused American health professions at their best. Making sure these conditions exist, at both the UME and GME levels, attests to the scope and culture of an AHC learning environment, apart from its given size.

At core, the new paradigm for both UME and GME is aimed at teaching and assessing competency in learners through individualized pathways and under direct observation from master teachers. This requirement makes the process of assessment even more critical. As part of the milestone process being promulgated by the Accreditation Council for Graduate Medical Education (ACGME) and its Residency Review Committees (RRCs), there are both qualitative and quantitative metrics—numbers and types of cases that will be required for the successful completion of a residency program. An important development in medical education is the recent integration of the American Osteopathic Association and the ACGME residency accreditation programs, with the goal of establishing a single set of high standards for both allopathic and osteopathic medical school graduates.[13]

In addition, many AHCs are responsible for training for a variety of health professions, and the patient volumes and settings needed for their education must be included in clinical enterprise strategic planning. For example, a provision of the Affordable Care Act (ACA) authorized

a $200 million Graduate Nursing Education Demonstration, with the objective of training advanced practice nurses who can treat Medicare beneficiaries in a wide range of primary care settings. In the demonstration, five traditional medical centers were funded to partner with multiple nursing schools and community organizations, with a requirement that at least 50% of the learning must occur in community settings.[14]

III. Delivery System Transition: Disruption and Consolidation Pressures

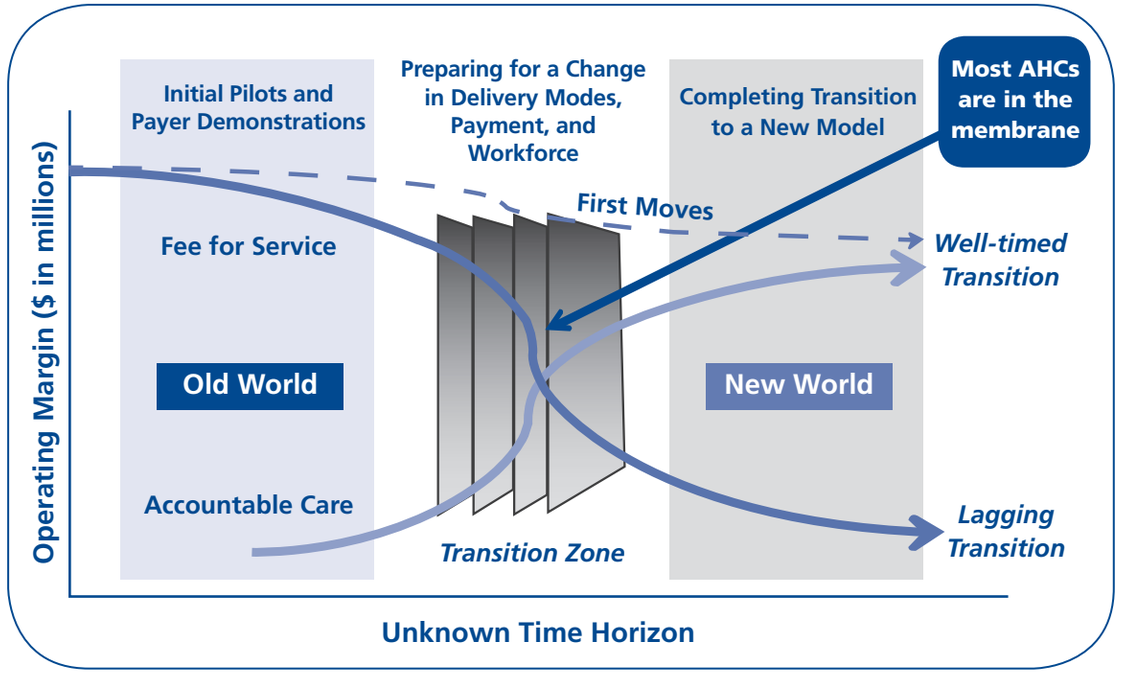
These forces for educational change are occurring in a rapidly changing environment for U.S. health care and in particular for the clinical enterprises of AHCs. AHCs, like all clinical care providers, are grappling with the likelihood of transitioning from fee-for-service to value-based, population health payment and patient care models. In essence, this means AHCs must plan for moving from a system where every procedure, examination, and provider touchpoint with the patient represents a fresh opportunity and occasion for billing to a system where payment is based on an entire course of treatment and its outcome, or on the basis of defined pools or populations of patients and their health outcomes over agreed-upon lengths of time. What has been in the "Old World" a source of greater revenue, such as imaging, is likely to become (over a variable and as-yet-undetermined pace) a source of costs, if the frequency and clinical appropriateness are not managed for overall value and patient outcome. It is important to note that most observers do not expect the total disappearance of fee-for-service payment models in the near term—perhaps not for decades. This uncertainty presents additional challenges as AHC providers must compete in the current world (which for many is already very different from only a few years ago) while preparing for the unknown changes ahead.

One immediate example of the change is the accountable care organization (ACO), a demonstration project created by the ACA, in which health systems assume responsibility for costs, processes of care, and some health outcomes of defined groups of patients. The heightened imperative for health systems to become more-expert at disease prevention, health promotion, improved quality and safety metrics, risk analysis, and financial projection is clear and obvious, yet the capacity, expense of infrastructure, and expertise needed to accomplish these new dimensions of health care are not common components of traditional health care delivery systems.

In figure 1, delivery systems are shown moving from the "Old World" (roughly, the familiar shore from which most AHCs are departing now), to "New Worlds" of value-based care. We believe this transition may well take 10 years and perhaps longer in many markets (longer than some health futurists and pundits would like us to believe). The pace of change will vary by geographic market, health system, and professional discipline. All markets will not be moving at the same rate, and thus local realities must be taken into account in managing the transition of a multitude of different but interconnected health services through the membrane. Going through too early will leave behind capital needed to invest in the new demands of infrastructure and competencies; going through too late could well compromise the effectiveness and relevance of the AHC health system in the new environment, including access to patients needed to support all elements of the AHC's mission.

In some health systems, we may find that procedure-based specialties, for instance orthopaedic surgery, remain on the left side of the membrane; while primary care, for instance, has already begun to migrate to the right side. Thus we are at a time of great change, in delivery modes and reimbursement, where there is variability from one institution to another and from one specialty to another, within institutions. These changes not only demand changes in the behavior of physicians, other health professionals, and health systems but also place significant demands on the curricula, settings, and behavioral expectations of the health professionals that AHCs are educating. It is our greatest responsibility as leaders of academic institutions that our students, residents, and fellows be educated for the health care delivery environments of today and tomorrow.

Figure 1.
The Move to Accountability in Health Care Delivery



Courtesy of The Chartis Group

In table 2[15] and figure 2,[15] the Center for Medicare & Medicaid Services (CMS) graphically depicts the migration of the Medicare system. All AHCs and all health systems in the country treating Medicare patients are somewhere along this continuum, but all of necessity must be migrating toward the right. And, as in the past, it is likely that Medicaid programs and private insurers will follow the same paths forged by Medicare.

Of course, the root of this change is our nation's effort to "bend the cost curve" through the ACA and reduce the rate of growth of health spending, which stands at approximately one-sixth of GDP.[16] Even with these changes, projected spending in Medicare is expected to increase by nearly 75% in the 10-year period from 2014 to 2024, from $500 billion per year to $866 billion per year.[17] Pursuant to the ACA, the ranks of the uninsured have been cut significantly, from 16.2% in 2013 to an estimated 10.7% in the first quarter of 2015, according to the Kaiser Family Foundation. About 14 million people were added to Medicaid rolls[18] at comparatively lower rates of reimbursement than traditional employer-based health insurance provides. Nonetheless, for those systems that traditionally were providing care to the uninsured, Medicaid expansion now provides revenue that previously was not being realized.

A related trend, as noted earlier, is that of insuring individuals and families with plans that are characterized by substantial co-payment requirements and extremely high deductible levels. A recent report by the Kaiser Family Foundation showed that high deductibles have increased six times faster than wage growth for working Americans since 2010, fueling consumer anxiety as well as decreased utilization of health care by many.[19] The combination of markedly higher premiums, deductibles, and co-pays is not only raising concerns about the direction and pace of health care reform,[20] it also reinforces a trend toward consumerism and consumer-directed health care that is characterized in part by discriminating,

demanding, and sometimes challenging "shoppers," as well as "lowest cost" health service buyers who have little reliable data on the quality of care being provided.

Implications for AHC Clinical Strategies

As part of the move to value-based population health, providers, including AHCs, are in an ongoing transition in caring for patients on a continuing, rather than episodic basis, with a much higher emphasis on prevention, wellness, and proactive diagnosis and management of chronic diseases and conditions, as opposed to episodic care of critical illnesses and injuries. The potential for cost savings, maintenance of health, and better outcomes in acute and chronic disease management is obvious, but perhaps equally obvious is that many traditional systems of care have not been organized to approach health care in this manner.

Adapting to the New World will require AHC clinical delivery systems to develop new capacities for dealing with risk. Many AHC delivery systems will be compelled to assume financial responsibility for the costs and outcomes of care.

Managing utilization risk at the patient or small population level will be an imperative to achieve cost savings, given the near-term changes in reimbursement. Actuarial (insurance) risk is a much bigger undertaking and will arguably be a much less common strategy for the nation's AHCs, even those with substantial reserves. The expertise required is not currently within the management structure of many AHCs or health systems. Many AHCs are finding they can best serve their missions by maintaining their size of "controlled" lives but growing the number of "influenced" or "attracted" lives that will be referred to them for tertiary or quaternary care.

An important strategy to ensure a sufficient number of cases is forming collaboratives and networks. See, for instance, the Oregon, Johns Hopkins, and Michigan case studies (pages 17-25), all of which use various versions of this approach. For instance, in Oregon, a single AHC has options to build its networks with health system partnerships of varying sizes as well as with coordinated care organizations and other emerging health care entities. In contrast, in highly competitive markets, such as Michigan, there are multiple academic and hospital system players that are all attempting to consolidate their respective markets.

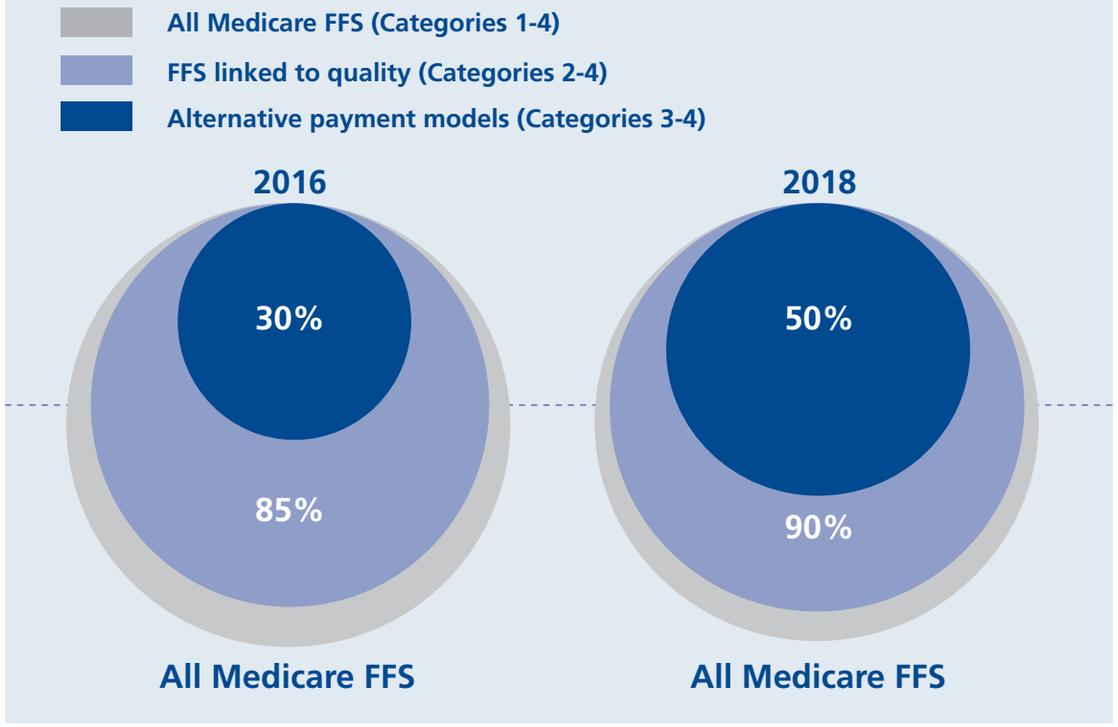
Underlining the advisability of growing through collaborations and partnerships, rather than necessarily through mergers and acquisitions, was a recent column published by The Advisory Board which cautioned: "In many cases, the best way to meet the market's demands is through strategic partnerships where the network expands but the health system, as defined by balance sheet assets, remains the same."[6]

Table 2.[15]
Payment Taxonomy Framework

	Category 1 Fee for Service—No Link to Quality	Category 2 Fee for Service—Link to Quality	Category 3 Alternate Payment Models Built on Fee-for-Service Architecture	Category 4 Population-Based Payment
Description	Payments are based on volume of services and not linked to quality or efficiency	At least a portion of payments vary based on the quality or efficiency of health care delivery	Some payment is linked to the effective management of a population or an episode of care. Payments still triggered by delivery of services, but opportunities for shared savings or two-sided risk	Payment is not directly triggered by service delivery so volume is not linked to payment. Clinicians and organizations are paid and responsible for the care of a beneficiary for a long period (e.g., ≥ 1 year).
Medicare Fee for Service	■ Increasingly limited number of Medicare fee-for-service payments have no link to quality.	■ Hospital value-based purchasing ■ Physician value-based modifier ■ Readmissions/ hospital-acquired condition reduction program	■ Accountable care organizations ■ Medical homes ■ Bundled payments ■ Comprehensive primary care initiative ■ Comprehensive ESRD model ■ Medicare-Medicaid financial alignment initiative fee-for-service model	■ Eligible Pioneer accountable care organizations in years 3-5

From Centers for Medicare & Medicaid Services[15]

Figure 2.[15]
Target Percentage of Medicare Fee-for-Service (FFS) Payments Linked to Quality and Alternative Payment Models in 2016 and 2018



From Centers for Medicare & Medicaid Services[15]

Implications for AHCs' Education Strategies

We need education and training systems that can "skate to the puck in 2025"—not to where the puck is now. Our AHC clinical care delivery systems are changing and will continue to change dramatically, and therefore our education and training of health care professionals—from medical doctors to nurses, pharmacists to dentists, therapists to nutritionists—need to be reconceptualized and reorganized in accordance with future models of care. The AMA-ACE Consortium on Accelerating Change in Medical Education, which recently expanded from 11 to 31 members with the shared goal of transforming medical education through innovation, represents an important initiative toward this end.[21]

The pressures to develop new approaches to manage risk and "control" populations through growth, acquisitions, and/or partnerships have myriad implications for the education responsibilities of AHCs. For example, for subspecialty services and training programs that require a steady flow of low-incidence cases, both to maintain excellence and to meet minimum targets for residency and fellow training, the size of the population necessary to meet these training needs will have to be considered as the clinical strategies are designed and implemented.

Situations such as these raise questions about whether some system-level control, at either the state or national basis, is required to guarantee the robustness of subspecialty clinical and training programs, such as neurosurgery and organ transplant surgery. There simply are not enough cases to support a multiplying number of referral centers. When demand is substantially less than supply, the quality of training programs and the costs to maintain those highly specialized services will be significantly negatively impacted.

IV. Sizing for Education

Sizing for Graduate Medical Education

As we consider how to size clinical networks to support GME programs, the numbers and types of cases specified in each program are the goalposts toward which the AHC has to advance. It is striking, however, that while the surgical RRCs specify minimum numbers of types of procedures and case logs, the numbers and types of medical conditions for non-procedural specialty training programs are much more general, or even absent. What's more, even though procedural specialties have established specific experience requirements, validation that prescribed numbers and types of cases ensures competency in that discipline is often lacking. Nevertheless, given existing requirements of procedural training, it is possible to define the minimum population size needed to support subspecialty surgical programs. The Johns Hopkins and Michigan case studies (pages 19-22) in this report show how those population requirements can be constructed.

Table 3, for example, according to the ACGME, shows the case log needed to meet the procedural requirements for Neurosurgery.[22]

Knowing the numbers of cases that are required, how many years a residency will last, on average, how many residents will be supported in a given program, and the incidence of given conditions in the population at large, it is possible to compute the minimum number of lives needed to meet the requirements of a given training program. This calculation should be one of the fundamental dynamics that drive the construction of AHC clinical networks.

However, several factors make network sizing to meet education requirements as much of an art as it is a science:

1. Clear metrics and case logs do not exist for many or most non-procedural specialties, whether ambulatory or hospital based.
2. The numbers and types of procedures given in table 3 represent the best professional judgment of RRCs, but it must be conceded that the science behind learning and competency assessment is not yet as mature as one might want. A number of residency program directors indicated that they expect their residents to do substantially more procedures than the RRC minimum guidelines to be considered competent in their field and successful graduates of their residency programs.
3. These cases can be shared between two or

Table 3.[22]

Neurological Surgery Case Log Defined Case Categories and Required Minimum Numbers

Defined Case Category		Required Minimum Number
Adult Cranial		
DC1	Craniotomy for brain tumor	60
DC2	Craniotomy for trauma	40
DC3a	Craniotomy for intracranial vascular lesion	40
DC3b	Endovascular therapy for tumor or vascular lesion	10
DC4	Craniotomy for pain	5
DC5	Trans-sphenoidal sellar/parasellar tumors (endoscopic and microsurgical)	15
DC6	Extracranial vascular procedures	5
DC7	Radiosurgery	10
DC8	Functional procedures	10
DC9	VP shunt	10
	Total adult cranial	**205**
Adult Spinal		
DC10	Anterior cervical approaches for decompression/stabilization	25
DC11	Posterior cervical approaches for decompression/stabilization	15
DC12	Lumbar discectomy	25
DC13	Thoracic/lumbar instrumentation fusion	20
DC14	Peripheral nerve procedures	10
	Total adult spinal	**95**
Pediatric		
DC15	Craniotomy for brain tumor	5
DC16	Craniotomy for trauma (uses adult trauma codes)	10
DC17	Spinal procedures	5
DC18	VP shunt	10
	Total pediatric	**30**
DC19	Adult and Pediatric Epilepsy	**10**
Critical Care		
DC20	ICP monitor placement	5
DC21	External ventricular drain	10
DC22	VP shunt tap/programming	10
DC23	Cervical spine traction	5
DC24	Stereotactic frame placement	5
DC25	CVP line placement	10
DC26	Airway management	10
DC27	Arterial line placement	10
DC28	Arteriography	25
	Total critical care	**90**
	Total all defined case categories	**430**
Reportable but non-tracked categories		
Craniofacial		
Spinal tumor/AVM		
Miscellaneous/Unclassified		

more residents, all of whom could be given credit for varying roles. For instance, three residents (assistant resident, senior resident, and lead resident) could scrub for any given case. Each of the three residents would be expected to assist the staff surgeon in some aspect of the case.[23]

4. Finally, the move toward training teams as providers means that the number of covered lives for neurosurgery must also consider the training needs of a variety of students—nurses, pharmacists, technicians, etc., all of whom will need exposure to neurosurgery case experiences to have a well-rounded education.

In addition to the sheer numbers, of course, there are many learning objectives that must be met in each training program. For GME, according to ACGME accreditation standards, "residents must be able to competently perform all medical, diagnostic, and surgical procedures considered essential for the area of practice," summarizes Maryellen Gusic, MD, former chief medical education officer for the AAMC. "Residents are expected to work effectively in various health care delivery settings and systems relevant to their clinical specialty."[11, 23]

Sizing for Undergraduate Medical Education

Students in UME must also be exposed to a wide range of clinical cases. This range of cases is defined by each medical school's faculty to meet their school's specific mission. Going beyond that, many medical schools recognize the need for development of qualities and characteristics that may be uncaptured in accreditation standards but are still desirable or essential in health care professionals. Emory University School of Medicine faculty, for instance, codified a list of Student Physician Activities for all students that would include such soft criteria as managing time, identifying personal limitations and seeking assistance when needed, and demonstrating trustworthiness to patients and colleagues.[25, 26]

Disrupters of Education

AHCs, like all of higher education, face varying categories of ongoing and potential disruption:

- For some years now, new and offshore medical schools have reduced the capacity available for U.S. medical student clinical experience by paying hospitals, private practices, and groups for placement of their medical students.
- Health systems are creating their own GME programs apart from medical schools.
- The menu of online education offerings continues to grow for varying types of health professions—though not, to date, for UME in the United States, so far as we are aware.

Another disrupter is the increasing commoditization of primary care in both AHCs and community health systems due to inadequate reimbursement and insufficient numbers of primary care providers. As practices are required to become more efficient, there is less "space" for medical students, residents, and other health profession trainees, since their presence in the ambulatory clinic may reduce the efficiency of the practice, particularly for less experienced trainees. A recent review article by Ellis and Alweis noted that several studies have found a decrease in billing productivity when medical students or residents are incorporated in the clinical setting; however, they also observed that "learning requires that clinical skills be attained through supervised provision of clinical care. Clinical teachers today are under intensifying pressure to increase clinical productivity and have less time allotted to academic responsibilities."[27]

Given both certification and experiential requirements, student and trainee slots in the ambulatory setting are critical for appropriate education at both the UME and GME levels. In addition to the question of how medical students, residents, and other health profession trainees fit into the ambulatory work flow, there is increased questioning about the role and status of the faculty providers who staff these clinical settings and how much time and attention they can devote to supervising, teaching, and evaluating the trainees. Some AHCs are consciously reducing patient flow through certain clinics in order to make space and time for instruction. One such example is the Aliki Initiative at Johns Hopkins Bayview, a donor-funded curriculum to promote patient-centered care by residents and medical students.[28]

Given the shift toward individual and population care in the ambulatory care setting, new care models should deliberately plan for the participation of all levels and types of learners in these new care environments. Students, residents, and attending physicians should work together to improve health care effectiveness, quality, and safety. Creative and thoughtful adjustment will be required to preserve our education missions and the production of a new generation of health professionals, in the midst of dramatically increased price competition. There is the consequent imperative that the education mission must be adequately supported financially and throughout the leadership of the AHC.

Summary: Education as a Driver of Clinical Enterprise Strategy

If AHCs are to have coordinated, integrated systems that accomplish the tripartite mission of clinical care, research, and teaching, education must be a driver of change, not just a passenger. Only if education is part of the change process in health care delivery will the changes take hold in the manner society demands. Competent, dedicated, and sufficiently supported educators are thus the critical factor in producing the health care professionals of tomorrow. The education and training for achieving success for tomorrow's care delivery requires that the appropriate education environment puts a premium on lifelong learning for faculty as well as redesigned pathways of learning for UME and GME students and all other health profession students and trainees. Thus the success or failure of education curricula will be determined by the excellence of educators' performance in new roles, with new expectations, practice settings, and technology environments.

An issue of particular interest is whether and to what extent the nation may be creating a two-tier system of medical education. A recent article by Arthur Feldman and colleagues[29] notes the founding of 17 allopathic and 19 osteopathic medical schools in the past decade. Many of these have no relation to research universities, place their students in community hospitals rather than traditional quaternary institutions, and have small basic science departments. While these schools undoubtedly are responding to local and regional needs, we share the authors' concerns that such schools, like all medical schools, should ensure that trainees are fluent in the types of expertise that will be required in the clinical settings of the future, including bioinformatics and outcomes research.

It is also important to keep in mind that one size does not fit all. Mission, communities served, and financial realities all have to determine size and strategy for any given AHC. Figure 3 illustrates one way to think about the core issues.

It is clearly the case that there are subpopulations of patients who must be treated in larger AHCs—both to ensure quality and to ensure enough cases for education. These subpopulations should be directed to centers possessing the necessary expertise. Compelling models for this approach already exist in the form of NCI-designated cancer centers, the national trauma standards of the American College of Surgeons, and burn centers.

Numerous studies have linked the maintenance of adequate volumes with surgical proficiency and good outcomes in referral centers. A 2013 study at the University of Michigan by John Birkmeyer and colleagues[30] showed that surgical skill of bariatric surgeons on videotape varied widely, as graded by peer reviewers, and that these peer ratings of surgical skill could be correlated meaningfully with surgical complications and patient outcomes. Such research serves to underscore the importance of training that happens under the supervision of master surgeons, thus constituting a major reason to concentrate rare and complex procedures to a few select places, rather than dispersing them more widely at the risk of mediocrity in both surgical outcomes and training. Population analyses suggest that in order to have centers with appropriate expertise, low-incidence diseases requiring specialized care should be channeled to one or two centers serving a large population, e.g., one or two centers for each 5 million people served in the region (as illustrated by the case studies in this report).

As the case studies show, there are many ways for AHCs that treat and train at the quaternary level to achieve the requisite number of cases to maintain their surgical excellence other than directly controlling or covering 5 million lives. While these

approaches have worked well for most AHCs in the past, current pressures will require reassessment of which approaches will suffice to meet AHC needs, including clinical quality, financial sustainability, and education/training requirements.

These means include

- Core networks, in which AHCs do indeed assume responsibility for assigned lives, including in ACOs and closed insurance products
- Clinically integrated networks of providers and hospitals
- Formal and informal partnerships with other institutions, including hospitals, nursing homes, social services agencies, and the like.
- Affiliation agreements that facilitate referrals
- Informal relationships that facilitate referrals
- Relations with VA and Department of Defense hospitals

Of course, there may well be times when AHCs should voluntarily close clinical and/or education programs that do not meet their goals. As required by the Liaison Committee on Medical Education, every medical school must demonstrate sufficient resources to sustain education quality.

V. How AHCs Organize and Plan for Education Needs

An old maxim with regard to AHCs stresses the high degree of local variation in how they are organized, governed, and financed: "If you've seen one, you've seen one" (see figure 4).[31] Governance and leadership—the fundamental requirements for success—are the essential commonalities in any and all models of organization. Then one must tailor to mission and needs of those served. Any of a variety of models can work—and a large variety are well established and are being developed. In addition, experimentation is ongoing. This is not a static universe.

Case Studies

Following are five case studies of strategic planning undertaken by AHCs to create clinical networks that are capable of meeting and sustaining their education requirements.

Figure 3.
Academic Health Center (AHC) Models Imply Certain Strategies

AHC strategies are a key input in framing the challenge. Each AHC's aspirations for the three historical AHC clinical roles should be a key determinant of the numbers of patients to support education programs.

Comprehensive Population Health Manager for Local Community
- Core provider of hospital and physician services
- Critical resources for underserved populations

Regional Referral Center for Complex Care
- Key provider of high-end specialty care
- Reliant on referrals from independent physicians and community hospitals

National/ International Referral Center
- Leading national/international provider in select subspecialties
- Low-volume business

Implications:

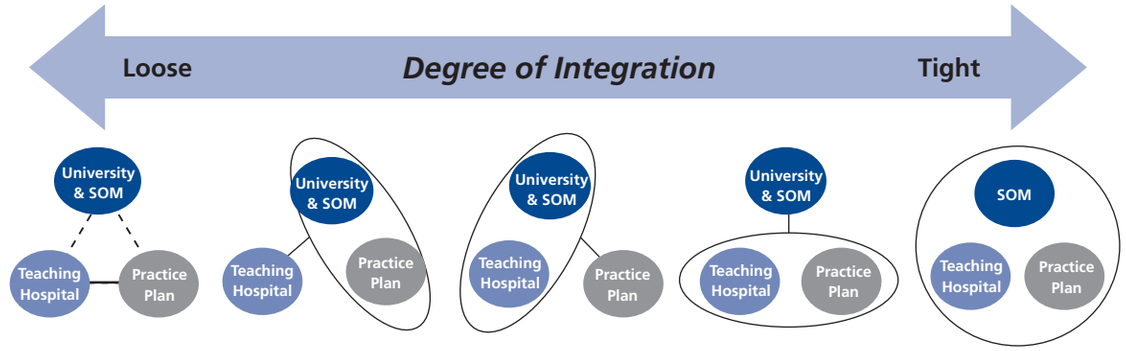
Large enough population needed to support undergraduate medical education, primary care, other core residency programs, and other health profession education programs

Significant patient volumes needed to sustain fellowships and specialized residency programs, e.g., neurosurgery, cardiothoracic surgery, pharmacists, advanced practice providers, etc

Courtesy of The Chartis Group

Figure 4.[31]
How Academic Health Centers (AHCs) Are Organized

AHCs take many organizational forms. Consolidation and growth of health systems and primary focus on system financial performance will put substantial stress on support of AHC education and research missions, support of which are critical to AHC success.



Independent
- University of Colorado School of Medicine
- University of Kansas Medical Center

Academic Enterprise Model
- Columbia University
- Washington University School of Medicine
- Weill Cornell Medical College
- Yale School of Medicine

Separate Practice Plan
- University of Alabama Medicine
- Duke Medicine
- University of Virginia Health System

Clinical Enterprise
- Indiana University Health
- Northwestern Medicine
- Partners Healthcare
- University of Pittsburgh Medical Center
- Stanford Health Care

Fully Integrated
- UCLA Health
- Emory | Woodruff Health Sciences Center
- Johns Hopkins Medicine
- University of Michigan Health System
- Oregon Health & Science University
- Penn Medicine

Adapted by The Chartis Group from Levine[31]

Oregon Health & Science University: State-driven Strategies[32]

The best planning begins with research and a specific understanding of the communities to be served and their particular needs and goals. Just as one size does not fit all, one format does not serve the needs of every community or mission.

As reported by Mark Richardson, MD,[32] dean of the Oregon Health & Science University (OHSU) School of Medicine, long-range strategic planning there has resulted in a finely tuned plan to produce the volume and mix of graduates in medicine and other health professional fields who will meet the expressed needs of that state and its communities.

Along the way, OHSU has cultivated and added important partnerships of both private and public entities and has gained access to new practice settings that could serve as training sites for students and residents.

As Oregon's academic health center, OHSU has a unique role in the state's public university system, as it is focused on health care delivery and education and serves as an "essential pipeline" for the state's health care workforce. The road to OHSU's current plan and configuration began in the 1990s, when the state approved the right for it to become a public corporation. This allowed OHSU to issue its own bonds and set its own compensation, among other things, while maintaining its mission responsibilities to the state, including health care workforce development. OHSU has a public Board of Directors appointed by the Governor. This change gave OHSU the flexibility to respond to the competitive managed care marketplace and to partner with public and private entities, maintaining tort protection as any state entity would.

With this decision, the medical school continued to be integrated with the clinical delivery system, along with the dental school, the nursing school, and other affiliated entities. OHSU was understood to have a unique role in the state's public university system, as it focused on health care delivery and education and served as an "essential pipeline" for the state's health care workforce.

In 2012, OHSU adopted a new clinical enterprise strategic plan. Key elements of that plan called for its clinical delivery enterprise to reduce the cost of care, even while becoming a nationally recognized provider of choice and developing the capacity to deliver population health in different geographic settings and throughout the full course of care. This plan reflected efforts by the state of Oregon, which was then beginning to move aggressively forward with its health care transformation plan. The plan included the implementation of a new delivery and reimbursement model focused on both individual and population health.

The state set up 16 coordinated care organizations (CCOs—a modified version of ACOs), each with defined patient populations (initially Medicaid enrollees only) and per-capita based global budgets. The CCOs are charged with managing, in an integrated manner, the physical, behavioral, and dental health of all Medicaid patients, a group that was then newly expanded under the Affordable Care Act provisions to more than 1 million individuals. The CCO mode, once demonstrated as successful, may be applied to other patient populations in the public sector, such as state employees, eventually covering up to one-third of all Oregonians.

The CCOs have the flexibility to manage a global budget to maximize population health, and this may include expenditures on non-traditional items, such as gym memberships and nutritional counseling. Each CCO must meet quality and access metrics. OHSU helped to form one of the CCOs, serving on its Board of Directors, and is a partner in several others.

Oregon's health care transformation presents a "pivotal moment," says Richardson, and consolidation among payers and providers is now under way, a scenario which supports OHSU's goal to form new partnerships that help ensure its own stability while supporting the state's health care transformation goals and enhancing its ability to meet its education and research missions.

OHSU is essential to the supply of Oregon's health care workforce, producing one-third of all physicians and one-half of all dentists practicing in the state. About one-half of OHSU's MD graduates and one-half of its medical residents remain in Oregon to practice. In response to Oregon's health care transformation and shifting workforce needs, the university is both increasing the number of its graduates to meet state forecasts and redesigning its curriculum.

As for numbers of physicians that will still be needed, current forecasts by the state and OHSU analysts say that Oregon will need an additional 1,726 physicians, 332 nurse practitioners, and 168 physician assistants by 2020, although these forecasts have some challenges due to limitations of underlying data. The forecasts include multiple scenarios, says Richardson, including ones in which MD requirements are attenuated by team-based care and/or in which enhanced utilization of electronic health records and other technologies slows the rate of health workforce growth.

In response to these forecasts, OHSU is increasing medical school class size from 125 to 160 students, as well as expanding GME numbers and sites. The assumption continues to be that half of all graduates will stay in the state. This increase is on track to meet the stated physician demand.

OHSU has also redesigned its MD curriculum, educating MDs to work in the new, team-based settings that will characterize the future of population-based health care. "We need to meet the demand from transformation of our state's health care system, but we must also help lead the transformation," says Richardson.

Plans for the new curriculum were built on nearly two years of survey work and consultation with a large number of stakeholders. While everyone assumed OHSU graduates would be "intelligent" and well educated in science and medicine, what was surprising but critically important was how highly OHSU stakeholders valued other qualities, including collaborative ability, leadership potential, communication skills, and the ability to use data and apply new discoveries for the good of the community.

A major goal in meeting Oregon's needs will be producing primary care health professionals and also encouraging OHSU's trainees to practice in rural and underserved areas. OHSU is addressing that goal through forming partnerships in rural areas of the state, providing care settings where medical students and allied health professionals can work in teams and where residents can train. Experience says many of them will be inclined to stay there after completing their programs.

Johns Hopkins Medicine: Sizing the Clinical Enterprise to Support the Academic Mission[33]

About three years ago, Johns Hopkins Medicine adopted a strategic plan that led to the formation of the Office of Integrated Healthcare Delivery. Working with an Integrated Healthcare Delivery Council, with representatives drawn from across the system, the office strives to align quality, value, and financial performance to support the institution's tripartite mission of research, education, and patient care.

Jonathan Lewin, MD, senior VP for integrated healthcare delivery and chair of radiology,[33] says one of the most fundamental questions Johns Hopkins faces in building its networks is, "How big is big enough?"

To answer that question, he says, it is critical to "start with the end in mind." To support the education mission, Hopkins needs a robust clinical delivery system that will provide a diversity of experiences and patients for its undergraduate medical students. Those experiences need to include settings that will prepare them to practice in the new population health model.

For GME, in specialty and subspecialty training in "luminary" programs like organ transplant and rare neurological procedures, you need much larger networks that provide access to the required number of rare and complex diseases. The institution needs enough volume to maintain its proficiency, and trainees need to be able to see enough cases to become expert in the rare interventions and procedures required to treat them. In keeping with the tripartite mission, other, equivalently important objectives that must be balanced include maintaining robust clinical trials and maintaining enough programs with positive funds flow to support education and research.

Hopkins divides its clinical population into three tiers: Its primary population, providing the majority of its volume, is the basis for UME and primary care training. Second, its expanded populations, which are region-wide, reaching into several adjoining states, provide enough rare and complex cases for subspecialty training. And then a third tier, consisting of international and "fly-in" patients from distant areas out of state, enhances both its renown for quaternary care and its positive financial margins.

Hopkins' planning model showed that it needs about 1 million lives in its primary (core) market by 2020 to meet all of its objectives, including fulfilling its education mission in UME and primary care. However, for specialty and subspecialty care and training, the clinical networks of influenced lives in its expanded market must be much, much larger.

For instance, only about 2,655 heart transplants are done per year in the country. Based on those incidence rates and on typical transplant center volumes of 15 to 40 cases per year, Hopkins calculates that it needs to have access to 1.7 to 4.4 million "influenced" lives per year to maintain

clinical proficiency and a training program capable of producing expert graduates.

The same kinds of calculations for kidney and liver transplants show that the institution needs expanded networks of 1.4 to 2.8 million for these programs.

With a core network projected at only 1 million by 2020—and in the face of rapid consolidation in the market—how can such large networks be created and maintained?

Lewin says Hopkins is working on many fronts:

- Physician networks
- Affiliations and partnerships: for instance, in exchange for providing pediatric surgery coverage for a community hospital, create a linkage that facilitates access to future transplant and other quaternary referrals
- Fully integrated partnerships: for instance, acquisitions and mergers
- Employer/payer relationships: for instance, making agreements with large corporations that the institution will provide all of a certain type of procedure, such as joint replacements, for their covered lives

All of this is taking place against a background of "shifting sands," says Lewin, with rapid consolidation in the provider market place, growth of consumerism linked to the increasing prevalence of high-deductible insurance policies, and all kinds of disruptive forces and technologies. Furthermore, each micro-market has a distinctive mix of needs and preferences. The north side of Baltimore may be very different from suburban Washington D.C., and networks need to be constructed accordingly in each place.

However they may be achieved, Lewin concludes, "'hardwired' relationships with patient populations are increasingly necessary to support the education and research missions and to remain financially strong."

University of Michigan: Sizing the Clinical Enterprise for GME[34]

When the University of Michigan (UM) Health System began revisiting its strategy for network sizing a year ago, the leaders of the project were given a memorable challenge by the university's president: "Don't tell me how you are going to get bigger; tell me how big you need to be to support your mission."

David A. Spahlinger, MD, the senior associate dean for medical affairs and executive director of the University of Michigan Medical Group,[34] said he came to appreciate the force of that challenge over the course of planning. "That question was much more difficult than I thought when we started. I was naïve."

But it turned out that the question was answerable, and the answers pose a challenge that now will shape the many directions in which Michigan will grow and develop, both by itself and in conjunction with other partners and affiliates.

The strategic planning in Michigan, like virtually everywhere else, is driven by fundamental forces of change in the state health care marketplace:

- The rise of consumerism, bringing with it a new degree of transparency into real costs of procedures: For example, a company called Castlight Health has a contract with Blue Cross/Blue Shield. Enrollees contemplating a colonoscopy can compare real costs (based on actual BC/BS contracts) and see in advance what they will owe in out-of-pocket costs, co-pays, and deductibles across the available range of providers.
- New forms of payment, in the form of bundled payments for an entire course of care: For instance, hip replacements are now bundled in 75 markets in Michigan, in a trend that is moving with surprising speed. Overall, the market is moving from group to individual purchasing of coverage, with narrow networks, high-deductible plans (thus allocating more cost-sharing to the consumer), reference pricing, and transparency.
- Multiple medical schools in the state (and local political or economic issues that favor still more), with a finite number of rare cases and lives to provide the necessary volume for top-tier clinical and subspecialty care and education programs

In calculating the number of cases needed to support UM's specialty training programs, Spahlinger consulted the case minimums established by RRC's for the ACGME. Clear numbers of minimum cases were available for virtually all the surgical programs of interest but not for most of the medical programs. He also talked to program directors throughout his school to determine the numbers of cases they believed UM's networks needed to generate to meet training needs. By and large, they reported that their programs' training volumes were in the 75th percentile nationally and that was where they wished to stay.

Spahlinger then used patient data provided by the Health Care Cost and Utilization Project of the Agency for Healthcare Research and Quality and the Michigan Health & Hospital Association to determine the rates at which relevant cases occur per 100,000 lives.[34] Based on the number of residents in each program, he was then able to compute how many lives per resident would be needed to produce the required number of cases in each specialty and subspecialty area. That also gave the number of lives needed overall to maintain each training program. (See table 4.)

Having large-enough networks to maintain

Table 4. [34]

Population Needs for Selected Residency Programs at University of Michigan Medical School[34]

Department	Index Procedure	ACGME Minimum	Per Resident National Average	Rate per 100,000	LIves Per Resident	Number of Residents	Lives Needed
Obstetrics & Gynecology	Normal deliveries	200	273.0	667.5	29,963	6	179,775
	Cesarean deliveries	145	228.0	400.1	36,239		217,436
	Hysterectomy	70	117.0	214.1	54,647		327,884
Orthopaedic Surgery	Hip replacement	30	93.2	193.1	48,265	8	289,590
	Fractures/ dislocation hip/femur	--	66.7	108.5	61,474		491,797
General Surgery	Mastectomy & lumpectomy	--	35.2	169.5	20,649	6	123,894
	Colon resection	--	57.9	123.4	46,172		277,033
	Cholecystec-tomy	--	122.7	131.4	35,190		211,141
	Pancreatec-tomy	--	10.0	2.32	448,430		2,690,580
Neuro-surgery	Peripheral nerve decom-pression	10	72.0	128.6	56,250	2	112,500
	Craniotomy, adult	145	292.0	41.3	707,021		1,414,044
	Spinal procedure	5	35.0	292.0	13,687		27,375
Urology	Transurethral	100	205.0	172.0	119,186	4	476,744
	Nephrectomy	30	99.0	22.0	450,000		1,800,000

Data sources: ACGME 2014, HCUP 2012, MHA

proficiency and training programs in organ transplant is a particular concern, given the limited number of organs and procedures nationally. Table 5 shows the national rate per 1,000 lives, the volume needed, and the lives needed, accordingly, to produce the volume. The numbers needed in the top four transplant areas range from 3 to 6 million lives.

UM's strategy calls for it to remain both a comprehensive provider of care in the state and a national referral center in a number of specialty areas. Accordingly, it projects that it needs about 400,000 covered lives in its primary service area, and 3 to 4 million covered lives overall to ensure enough specialty cases to meet both its clinical enterprise and education needs.

To accomplish this, it is working across a wide range of channels, including partnering with two large, Roman Catholic systems, Ascension and Trinity; affiliating with a number of independent hospitals; taking an equity position in the 14-county, nonprofit MidMichigan Health System; and creating a network within physician organizations.

The UM health system is also embracing some of the potential disrupters; for instance, partnering with CVS Minute Clinics and developing "virtual care" capabilities through telemedicine, patient portals, and smart phone apps, as it seeks to improve access on nights and weekends and increase price transparency to patients.

According to Spahlinger, "the most critical thing is to connect to the mission of the university." And, he said, the UM health system succeeded in building understanding and support for its clinical enterprise plan and objectives from the university's leadership as it walked through the process of matching size and scope to mission.

Uniformed Services University of the Health Sciences: Workforce Planning for Societal Need[36]

Based in Bethesda, Maryland, the Uniformed Services University of the Health Sciences (USUHS) embodies perhaps the clearest, most emphatic example of rationalized planning, from the top down, to produce health professionals in specific specialty and subspecialty areas to meet defined societal needs. The university has a school of medicine, graduate schools of nursing and dental science, and graduate programs in biomedical science that are of military significance, including psychology, emerging infectious diseases, neuroscience, and molecular and cell biology.

As Charles L. Rice, MD,[36] president of USUHS, puts it, in comparison with many aspirational and abstract mission statements expressing the tripartite objectives of civilian academic health centers, the USUHS is more sharply focused.

> "The mission of the Uniformed Services University of the Health Sciences is to educate, train, and prepare uniformed services health professionals, officers, and leaders to directly support the Military Health System [MHS], the National Security and National Defense Strategies of the United States and the readiness of our Armed Forces."[36]

Table 5.[34]
Complex Care Mission and Population Needs

Procedures	Use Rate per 1,000	Volume	Lives Needed (millions)
Liver transplant	0.02	50-75	3-5
Kidney transplant	0.05	150-200	3-4
Bone marrow transplant	0.05	200-300	4-6
Cardiac transplant	0.02	45-60	3-4

University of Michigan Medical School

Planning to support the mission is comprehensive and driven by complex algorithms that define the parameters of expected need. MHS plans are written to support Defense Department plans, which in turn are derived from the Quadrennial National Defense Review. Every requirement for staffing grows out of a particular "driver," which has been vetted by a higher order of command.

For instance, staffing for wartime medical requirements grows out of standard assumptions about the population at risk, anticipated casualty rates, and other planning factors. A more recent dimension of operational planning involves readiness to undertake humanitarian missions, since long-term instability in developing countries can destabilize indigenous governments and health care systems and foster the breeding grounds for terrorism.

MHS planning is based on a series of equations and projections that encompass both the peacetime requirements of attending to the medical needs of 9.6 million active military and military retirees and their families. (The MHS, however, is separate from the Veterans Administration.) Working from a Medical Operational Support Requirement, which is the total number of medical personnel needed on active duty, the MHS then calculates the annual "sustainment" numbers that are needed to maintain full strength given annual attrition rates. (See table 6.[36])

The result is a grid of requirements broken down by surgical and medical specialties and subspecialties, along with the number of postgraduate training years required for each specialty. The military maintains its own internships as well as residencies at Walter Reed; Portsmouth, Virginia; San Antonio (Texas) Military Medical Center; and elsewhere. Currently, MHS has 182 residency programs representing 2,889 residents, with a first-time board pass rate of 98%. In addition to the military's own sites, residents are currently doing rotations in the National Capital Consortium institutions in the greater Washington D.C.-Baltimore region and in medical schools and VA medical centers in North Carolina, Georgia, Florida, California, and Texas, among others.

Reaching out to other partners to place residents is the best way to make sure the they see the required volume and mix of cases for their various programs.

Despite its complexity, granularity, and meticulous detail, "this is at best imperfect," says Rice. "Nobody can anticipate every circumstance." Because of those unpredictable elements of life, he says, it is an important advantage to have trained medical personnel in the Ready Reserve, who can be called on if needed in a crisis. Still, year in and year out, MHS represents an outstanding example of getting the right numbers of students and trainees in the pipeline, by specialty and subspecialty, using historically based assumptions and projected needs.

University of Virginia Health System: Population Health—A New View of Community Partners[38]

The transformation associated with payment reform is having significant impact on both academic and community care providers. The dynamics differ based on diverse geographic considerations. Strategies that may be effective for large urban based AHCs may be less available to AHCs serving statewide and rural geographies where distance compounds the universal issues of access, affordability, and quality.

All AHCs support the construct of the triple aim, but the most potent of the three imperatives in the early days of payment reform is the pressure to reduce costs. These forces have disproportionately affected community and rural hospitals, where scale is limited and reduced occupancy driven by a move to more ambulatory-based care is eroding economic fundamentals. Yet a vibrant community hospital network is essential not only to access and affordability but to the health of the regional AHCs that serve as tertiary and quaternary providers. The University of Virginia (UVA) Health System has adopted a strategy of partnering with payers and community providers to create regional systems of rational community based care. The partnership, while driven by efforts to create affordable access at reduced costs, can be aligned with the education and research missions of the AHC.

In sweeping discussions with all community hospital systems throughout Virginia, UVA deter-

Table 6.[36]

Calculating GME Trainees Needed by Specialty to Meet Medical Readiness Needs of US Military

Sustainment—Basic Training Equations

DESIG	NOBC	PSUB	SPEC	MOSR	TPPH	SPEC#	LRATE	DEMAND	TLEN	GOAL	PGY1	PGY2+	GME
GMO													
2100	0102	15F0	GMO	292	9	301	0.38	115	1.00	1.00	115		
2100	0107	16U0	UM	92	3	95	0.30	29	1.00	1.00	29		
2100	0110	15A0	FS	296	9	305	0.31	95	1.00	1.00	95		
			GMO TOTALS	680	21	701					239		
SURGICAL													
2100	0214	15C0	SURGERY	245	7	252	0.23	58	4.00	0.80	46	140	186
2100	0118	18B0	ANEST	199	6	205	0.22	46	3.00	0.80	37	74	111
2100	0150	15M0	PATH	34	1	35	0.20	7	4.00	0.80	6	17	23
2100	0224	15D0	NEURO	21	1	22	0.26	6	7.00	0.80	5	29	34
2100	0229	15E0	OBGYN	79	2	81	0.27	22	3.00	0.80	18	35	53
2100	0234	15G0	OPHTHAL	22	1	23	0.24	6	3.00	0.80	5	10	15
2100	0244	15H0	ORTHO	143	4	147	0.29	43	4.00	0.80	34	104	138
2100	0249	15I0	ENT	31	1	32	0.27	9	5.00	0.80	7	29	36
2100	0269	15J0	UROL	33	1	34	0.23	8	4.00	0.80	6	20	26
			SURGICAL SUBTOTAL	807	24	831					164	458	622
MEDICINE													
2100	0101	16R0	IM	223	7	230	0.26	60	2.00	0.80	48	48	96
2100	0105	16V0	PEDS	78	2	80	0.20	16	2.00	0.80	13	13	26
2100	0108	16Q0	FP	252	8	260	0.18	47	2.00	0.80	38	38	76
2100	0109	16P0	ER	113	3	116	0.20	24	3.00	0.80	19	39	58
2100	0110	15A1	FS	36	1	37	0.29	11	3.00	0.80	9	18	27
2100	0111	16N0	DERM	21	1	22	0.19	5	3.00	0.80	4	8	12
2100	0115	16X0	PSYCH	80	2	82	0.18	15	3.00	0.80	12	24	36
2100	0121	16T0	NEUROL	16	0	16	0.20	4	3.00	0.80	3	7	10
2100	0131	16Y0	RAD	40	1	41	0.24	10	4.00	0.80	8	24	32
2100	0160	15K0	PREV MED	39	1	40	0.12	5	2.00	0.80	4	4	8
2100	0166	15K2	OCC HLTH	9	0	9	0.18	2	2.00	0.80	2	2	4
			MEDICINE SUBTOTAL	907	26	933					160	225	385
2100	00XX	0000	EXEC MED	223	7	230	0.22	51	3.00	0.80	41	82	123
TOTALS				2617	78	2695					365	765	1130
												THCSRR	3825

Uniformed Services University of the Health Sciences

mined that creating a system of regional community hospital care has the greatest potential of providing quality care at reduced costs as close to where the patient lives as possible. UVA has catalyzed a discussion with three community hospitals (40 to 100 beds in size) and a regional cancer center to create a new joint operating company (JOC) designed to deliver efficient community services. The UVA Health system will back the entity and contribute expertise in information technology, safety and quality platforms, and importantly a health care workforce focused on community needs.

A consequence of declining activity in the community setting is the inability to recruit and retain skilled providers. UVA plans to assist in building a community health workforce by channeling UVA trained physicians and other health professionals into the community network. Key to the success of this effort is a critical assessment of patient needs and consideration of the regional and not just the local marketplace. Providing a workforce for the region, as opposed to exclusively for the local community, is critical to economies of scale. In addition, it is important that these community providers be UVA faculty in order to maintain ties to the regional center and to afford regular opportunities for these providers to return to the AHC to build and maintain competencies. In turn, the clinical department at the AHC can provide backup in the community. Importantly, the concept of partnership, not ownership, allows control to remain locally governed by an agreed-on set of operating principles derived from regional care needs. Therefore, UVA's education mission has become a fundamental currency in the creation of the JOC.

The model creates an opportunity for the AHC to consider these regional community partners as training sites using UVA clinical faculty assigned to those settings. It allows patients to remain close to home and yet have access to the expertise of the AHC. Finally, it affords the AHC with a high-quality, low-cost community setting that facilitates the focus of the AHC on tertiary and quaternary care mission.

VI. CONCLUSION

Medical education in the future must evolve to reflect fundamental changes in science, medical knowledge, information management, patient/consumer requirements, medical sector dynamics, and most fundamentally, the notion of what it means to be a healer. Education and its evolving needs must be drivers of AHC strategic planning for its clinical enterprise. AHCs also must ensure training for teams of providers to coordinate clinical services for individual patients across the care continuum, while also improving outcomes for specific populations of patients under their care. These will include a range of populations, such as diabetics and more narrowly, those requiring complex interventions such as transplantation.

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The Blue Ridge Academic Health Group studies and reports on issues of fundamental importance to improving the health of the nation and our health care system and enhancing the ability of the academic health center (AHC) to sustain progress in health and health care through research—both basic and applied—and health professional education. In 19 previous reports, the Blue Ridge Group has sought to provide guidance to AHCs on a range of critical issues. (See titles, opposite page.)

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