The Blue Ridge Academic Health Group

Report 7

Reforming Medical Education: **Urgent Priority for the Academic Health Center in the New Century**

May 2003

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.

Report 7 • May 2003

The Blue Ridge Academic Health Group

Reforming Medical Education: **Urgent Priority for the Academic Health Center in the New Century**

Members and participants

Members

David Blumenthal, MD, Professor of Medicine and Healthcare Policy, Harvard Medical School; Director, Institute for Health Policy, The Massachusetts General Hospital

Enriqueta C. Bond, PhD, President, Burroughs Wellcome Fund

Robert W. Cantrell, MD, Director, Virginia Health Policy Center, University of Virginia Health System

Haile T. Debas, MD, Dean, School of Medicine; Vice Chancellor for Medical Affairs, University of California, San Francisco

***Don E. Detmer, MD,** Dennis Gillings Professor of Health Management, Judge Institute of Management Studies, University of Cambridge; Professor Emeritus and Professor of Medical Education, Department of Health Evaluation Sciences, University of Virginia

Michael A. Geheb, MD, Senior Vice President for Clinical Programs, Oregon Health Sciences University

***Michael M.E. Johns, MD,** Executive Vice President for Health Affairs; Director, The Robert W. Woodruff Health Sciences Center, Emory University

Peter O. Kohler, MD, President, Oregon Health Sciences University

Steven Lipstein, President and CEO, BJC HealthCare

George F. Sheldon, MD, Chairman and Professor, Department of Surgery, School of Medicine, University of North Carolina at Chapel Hill; Scholar in Residence, Burroughs Wellcome Fund

Invited Participants

Catherine DeAngelis, MD, Editor in Chief, *Journal of the American Medical Association*

Jeffrey Koplan, MD, MPH, Vice President for Academic Health Affairs, Emory University

Larry Lewin, Executive Consultant

Arthur Rubenstein, MBBCH, Dean and Executive Vice President, University of Pennsylvania School of Medicine

Michael Whitcomb, PhD, Senior Vice President, Division of Medical Education, Association of American Medical Colleges

LuAnn Wilkerson, EdD, Senior Associate Dean for Medical Education, David Geffen School of Medicine at UCLA

Staff

Janet Waidner, Executive Administrative Assistant, Woodruff Health Sciences Center, Emory University

Editors

Jon Saxton, JD, Policy Analyst

Ron Sauder, Director, Media Relations, Woodruff Health Sciences Center, Emory University

Copy Editor

Karon Schindler, Director, Publications, Woodruff Health Sciences Center, Emory University

Designer

Peta Westmaas

**Co-Chairs*

Contents

The Blue Ridge Academic Health Group Report 7

The Blue Ridge Academic Health Group (Blue Ridge Group) studies and reports on issues of fundamental importance to improve our health care system and enhance the ability of the academic health center (AHC) to sustain optimal progress in health and health care through sound research—both basic and applied—and health professional education. Six previous reports have described opportunities to improve AHC performance in a changed health care environment and to leverage AHC resources in achieving threshold improvements in health system access, quality, and cost. The Blue Ridge Group has sought to provide guidance to AHCs that can enhance leadership and knowledge management capabilities; aid in the adoption and development of Internet-based capabilities; contribute to the development of a more rational, comprehensive, and affordable health care system; improve management, including financial performance; and address the cultural and organizational barriers to professional, staff, and institutional success in a value-driven health system (Blue Ridge Academic Health Group 1998a, 1998b, 2000a, 2000b, 2001a, 2001b). In this, its seventh report, the Blue Ridge Group considers the need for academic health centers to reassess and improve the education of health professionals, with a special focus on physicians.

Exhibit 1: **Summary of Recommendations**

I. The art and science of education must become an explicit, manifest priority of the leadership of academic health centers (AHCs).

- Making education an explicit, manifest priority of leaders in academic health centers means that each AHC must create a strategy with identified resource needs (budget and personnel), a structure for management, and performance rewards.
- AHCs should devote more and better resources to teaching the clinical transaction as the core of the clinical relationship, integrating social and humanistic skills with appropriate technology, interdisciplinary education (MD, RN), team-based models of health care delivery, and evaluation of processes and outcomes.
- Within two years each AHC should identify its educational costs. This includes the educational infrastructure budget (technology, simulation, standardized patients, teacher education, training facilities, communications technology, faculty development, and personnel).
- AHCs must also identify new sources of funding, whether philanthropic, clinical, or public subsidy, so that they can substantially increase their investment in education within five years.

II. Health professional schools must pioneer and use advances in knowledge concerning cognitive development, styles of learning, and education theory and practice.

- AHCs must each develop a core of faculty with education expertise in the form of scholars who can serve in curriculum development and teacher education.
- Funding from institutional and external sources should support
  > faculty research in education,
  > the design and implementation of new models of human cognition, and
  > learning applied to the healing professions.

III. Health professional schools must improve support for faculty, resident, and volunteer educators.

- AHCs should make teacher development a primary focus of the institution by developing formal clinical educator training and support programs. These programs should prepare faculty members and senior residents for the education of medical students and residents and to meet the MSOP and ACGME core competencies. This should include skill enhancement for faculty, core educational curricula for residents, involvement of residents in

quality and process improvement initiatives, research capability in pedagogy, and regularly scheduled educational grand rounds in multiple departments. The McGill program serves as an excellent model. AHCs should also look to establishing formal training leading to a masters degree for those wishing to pursue scholarship and leadership in medical education.

- AHCs must protect time for teaching and for teacher development, including clinical onsite workshops.
- AHCs must work aggressively to develop better metrics for evidence of teaching quality and for faculty development in education for the promotion and tenure process.

IV. AHCs must structure appropriate and consistent learning environments.

- AHCs should systematically review and renew their roles as academic centers to ensure that their educational and service units operate within and are consistent with their university traditions of seeking evidence, truth, and technical competence within a humanistic environment.
- AHCs should modify their health professional curricula to incorporate humanistic and social science disciplines.
- AHCs should evaluate whether training can be made less lengthy and expensive, while improving productivity, quality, and patient satisfaction.
- AHCs should bring their facilities and technologies into line with their curricular goals, including provision for team medicine and team learning.

V. The regulatory framework must be streamlined and rationalized.

- AHC leadership must redefine and reassert the role of health professional schools as centers of responsibility, authority, and leadership for the lifelong education and training of health professionals.
- AHCs should work with all professionally related boards to ensure that proficiency and certification standards are consistent with competence and newly emerging educational strategies and goals. One example would be to change the AMA Category I CME certification process so that it rewards only high-quality, evidence-based, cost-effective CME experiences.
- AHCs should participate in a national strategy to create a national education initiative. As a piece of that strategy, multiple components must be developed and AHCs must offer their fair share of leadership and resources to this key challenge.
  a. An IOM initiative or Presidential/HHS Secretary/Congressionally mandated commission is needed to review the historic roles of professional societies in standard setting, evaluation, and regulation of UME, GME, and CME. This should entail a process that includes all key leaders of relevant organizations, including specialty boards, specialty societies, residency review committees, ACGME, USMLE, LCME, ACCME, and JCAHO, and their equivalents in nursing and other health professions.
  b. The charge to the IOM committee and/or commission would be to identify a rational system for the future, including a coordinating body and a strategy for moving from the present to the recommended model. The IOM committee should be asked to identify and assess a variety of models to assure oversight, responsibility, and accountability in medical and other health professional education. Funding for the initiative should be sought from AHCs, the US government, and philanthropic foundations.
  c. The IOM commission in particular should consider the creation of a National Institute of Health Education, which could logically find its home within the National Institutes of Health or the National Library of Medicine. This new institute should define its mandate broadly, including not only health professional education but also public health and patient information.
  d. AHCs need to work with others to develop and lead a campaign to ensure implementation of these recommendations. Research!America is one successful model of such a comprehensive coalition effort.

Introduction

Improving health and health care are among the most widely supported and important goals for our nation and the world today. Vitally important to progress in health is the proper education and training of the health professional workforce. Yet there is evidence of increasing dissatisfaction with the predominant models of health professional education, especially with the education of physicians. There is a growing consensus among scholars, policy makers, and health professionals that long-accepted education and training programs—from preprofessional preparation through continuing, lifelong learning—must be substantially redesigned and modernized to meet the projected health care needs of the 21st century (eg, Ludmerer 1999; AAMC 1998, 2000; IOM 2001, 2003).

This report is primarily concerned with needed reform in the education of physicians, the area where the Blue Ridge Group members have the greatest experience and expertise. Nevertheless, issues and recommendations identified here are applicable to training in nursing, public health, and other health professions as well. The Blue Ridge Group believes that the continuing shortcomings in medical education are predominantly the result of the failure of AHCs and others with educational and certification responsibility to address a number of critical and persistent underlying factors. Only by addressing these underlying issues will educational reform succeed.

Context

From early in the 20th century, education in the health professions, especially in medicine, has been founded upon the recommendations of the 1910 report by Abraham Flexner, *Medical Education in the United States and Canada,* sponsored by the Carnegie Endowment for the Advancement of Teaching. (It is worth mentioning here that seminal as Flexner's report proved to be, it reflected rather than instigated a movement toward scientifically oriented teaching hospitals that had been under way at least since the founding of Johns Hopkins Hospital in 1892. The model for this new system was to be found in Germany, which drew an estimated 15,000 American medical students overseas from the end of the Civil War to the beginning of World War I.) Nevertheless, Flexner found that most medical education was of poor quality, largely because it was not grounded in scientific knowledge or method. Among the few exceptions were the programs at the University of Michigan and Johns Hopkins. Ignited by Flexner's report to the Carnegie Foundation, a revolution in medical education took place. The structure and process of medical education became a focus of some of the century's greatest physicians and educators, including Victor Vaughn at the University of Michigan and the "Four Horsemen" who comprised the founding medical faculty at Johns Hopkins (Osler, Halsted, Welch, and Kelly, who became known as the father of the residency system).

Medical education moved toward the almost universal adoption of what became known as the "Hopkins Model." As the new standard for medical education, the Hopkins model featured a two-part program consisting of intensive immersion in biomedical and related science followed by prescribed years of mentored clinical learning. Educational curricula became rigorous, standardized, and based in the fast-developing biomedical sciences. Medicine itself focused on understanding, diagnosing, and treating the biological and organic bases of disease. Clinical training centered on hospitalized patients at a time when medical costs were relatively low and the average patient spent anywhere from one to two weeks in the hospital. Graduate medical students could be immersed in multiple and complex cases and follow the entire course of diseases and their treatment. By 1924, when Flexner surveyed the medical school landscape, he found that the science-based education of students had become the core purpose of the medical school (Duffy 1993:210). At Michigan, for instance, a medical school known for its research intensity as well as its teaching, the average faculty member spent 60% of his time in teaching and teaching preparation (Ludmerer 1999:28). At the same time, Flexner warned that medicine could lose its way if it over-compensated and adopted rigid standards that did not allow for student reflection and humane interaction. One arguably

deleterious consequence of this focus on disease treatment, however, was the relative neglect of health promotion and disease prevention. The closure of many medical schools following the Flexner report included not only institutions representing unscientific approaches, such as homeopathy, but also those serving under-represented minorities. During this era, all but one women's medical school and all but two black medical schools were shuttered. Nevertheless, the Hopkins model enabled the development of a highly rigorous, specialized, and meritocratic system of professional education that has changed little in almost a century.

During and after World War II, our nation developed a strong national interest in accelerating progress in the sciences and in rapidly boosting the supply of physicians. The shortened B-12 training program during the war produced many more doctors for service, while after the war the GI Bill supported an upsurge in the number of specialists. By the end of the 1950s, the nation had spawned no fewer than 723 surgical residencies (a number since reduced by nearly two-thirds). The federal government also made unprecedented commitments to the support of scientific research, through the establishment, for example, of the National Institutes of Health and the National Science Foundation. Schools competed to build the infrastructure and train (or acquire) the investigators through which they could grow their research portfolios. By the 1970s, the clinical mission also was enjoying a surge in focus and funding support. Employer-sponsored health insurance was well established and widely available. And with the establishment of Medicare and Medicaid in the mid 1960s, the government also had become a driver of health care financing and policy.

It is during this period that many began to express concern that the surge in funding support for research and clinical care was causing the teaching mission to recede as a priority. The Carnegie Foundation for the Advancement of Teaching continued to work in this area, led by Ernest L. Boyer, reporting that the "scholarship of teaching" was undervalued by universities in the past quarter-century. A special theme issue of *Academic Medicine* published in 2000, "Expanding the View of Scholarship," found that measures of the scholarship of teaching were "elusive" but important and insufficiently recognized in prevailing academic reward systems (see, eg, Beattie 2000). In the meantime, there was steady recognition within academic medicine of the need to maintain teaching as a priority, and likewise, there were regular expressions of anxiety that this focus was slipping. For example, a 1989 survey by the Robert Wood Johnson Foundation of more than 1,300 medical school educators, including deans and associate deans, found widespread agreement that "fundamental changes" were needed, including a better system to recognize and reward faculty for excellence in teaching (Cantor, et al 1991).

Exhibit 2: **The Value-Driven Health System**

A value-driven health system is grounded in the principle that a healthy population is a paramount social good. It is a health system that promotes the health of individuals and the population by providing incentives to health care providers, payers, communities, and states to improve population health status and reward cost-effective health management. Two kinds of incentives exist within a value-driven health system. First, there are incentives for individual citizens and/or patients, health care professionals, health delivery organizations, payers, and communities to seek and maintain health. Health insurance premiums, reimbursement rates, and grants to communities all can be structured to reward behaviors and strategies that advance health. Second, the system relies on competition among providers for populations to manage to reward safety, quality, and efficiency (where quality is defined in terms of the health of the community or region as well as health of individuals). To do this best requires a fully insured population (universal coverage) so that population health management strategies can be implemented and savings realized.

Medical Education: A Patchwork

Leadership in educating health professionals and biomedical and behavioral scientists since Flexner has been provided by university-based schools of medicine, nursing, public health, dentistry, and allied health. Most medical schools anchor a university's academic health center (AHC), which normally consists of at least a medical school, one other health professions school, and one or more university allied or owned hospitals. Within the AHC, the professional schools exercise leadership primarily over the first two or three years of largely preclinical undergraduate medical education (UME). The early years of UME are taught in relatively standardized curricula primarily by basic science faculty who, on a rotating basis, teach specific material through a lecture or participation in a seminar course. The challenge in this part of the curriculum is to provide students with a coherent exposure to the fundamentals of bioscience necessary to becoming a proficient clinical and/or scientific learner. Often, however, the basic science lectures fail to connect to clinical medicine, leaving the student uncertain of the relevance of the body of knowledge that has been presented. Ludmerer, among others, has observed that, increasingly, basic science departments in medical schools resemble science departments in the university, with the result that "in the era of molecular medicine, the separation of research from education and practice (that is, the 'bench-bedside gap') became more pronounced than ever before" (Ludmerer 1999:292).

The UME clinical experience (primarily in the third and fourth UME years) and graduate medical education and training (GME) are largely conducted and overseen by community preceptors and by clinical faculty within university owned or affiliated teaching hospitals and clinics. The many years of clinical exposure and training, from internship through residency and fellowship, are taught and supervised largely by faculty and residents who have little or no formal training or skill development as educators. While "resident as teacher" programs have become popular in the past decade (one such program at the University of North Carolina–Chapel Hill is now in its 15th year), mentoring is often based on local traditions, standards, and methods promulgated by particular professional societies or on the ad hoc style of the faculty member. Training is further heavily affected by the service demands of each clinical facility, whether hospital or outpatient clinic. Teaching content is too often anecdotal, not evidence-based, with too little attention to teaching statistical discernment skills. Educational policy and practice is also formulated and regulated by the dozens of professional societies and their certification boards as well as by UME, GME, and CME accrediting organizations.

After completion of formal training, physicians increasingly are expected to participate regularly in continuing medical education. CME is often sponsored by the pharmaceutical and medical device industries and professional societies, according to varying standards. CME is conducted largely outside the purview of AHCs.

The health professions' continued organization and development within traditional associations and specialty societies contribute to the maintenance of a diffuse patchwork of leadership and oversight in medical education. In a characteristically American adaptation of the traditional guild system in Great Britain, some degree of separation of powers has been achieved, with both the American Board of Medical Specialties (ABMS) and American Council of Graduate Medical Education (ACGME) exercising significant powers of oversight. The purpose of board certification, of course, is to certify a high level of competence in specialty training based upon performance on examinations. As yet, there is no assessment of actual clinical performance including data on patient outcomes. Today, the standard of board examination certification remains the magnetic pole toward which clinical departments and, by default, both undergraduate and postgraduate medicine are oriented.

The New Medical Marketplace

The collapse of the 20th century's last substantial effort at government-sponsored health care reform—the Clinton Administration's Health System Reform Act of 1993—resulted in the forces of the marketplace being unleashed with the mandate to improve health care services while lowering costs. Managed care organizations, the health care insurance industry, and a

rapidly consolidating hospital industry combined to introduce and enforce rigorous cost control and utilization and/or productivity standards for health care providers. Health care spending and resources were further constrained by new federal initiatives. The most far-reaching was the Congressional Balanced Budget Act (BBA) of 1997, which mandated substantial cuts in health care spending. The BBA alone will have diverted an estimated $1 trillion from health care spending by the year 2007.

These new forces and policies have had a major impact on the teaching missions of AHCs. AHCs have been forced to adjust to price-based competition and the demand for unprecedented clinical productivity and efficiency. AHCs and their owned or affiliated hospitals and clinics have sought to invest in new information systems and to re-engineer their administrative operations. Medical school clinical faculty, especially, have been pressed to devote more time to revenue-producing clinical activities and to develop more efficient practice patterns. These changed and still unsettled conditions—especially the diversion of institutional resources and faculty effort to generating new revenue—have added new challenges for AHCs and the health professions in modernizing and fulfilling their educational missions. Incentive structures to support such reforms remain weak at the time of this writing.

However, the concerns with medical education long predate the advent of managed care. They range from issues of quality and communication skills to maintaining ongoing, lifetime competency. (See Exhibit 3, page 10.)

Managed care raised the issue of whether physicians and other health professionals were being properly trained to provide care that would be safe, efficient, and effective in a more competitive, resource-constrained market for health care services. A prior and enduring—and perhaps more fundamental—question is whether the training of our health professionals in the arts and sciences of health care essential to the changing needs of society is nearly as good as it could or should be. Despite the fact that a number of medical schools have improved the first two years of UME and that a very few specialties have made admirable efforts to refocus on educational priorities in GME, the consensus is that health professional education is not nearly what it could be.

The Purposes of Health Professional Education

Discussion of the problems with health professional education must start with understanding and agreement on the purposes of such education. At a minimum, they include:

- Professional qualification—Providing opportunities for health professionals to acquire the knowledge, skills, values, and attitudes required for practice as a recognized specialist or generalist.
- Professional competence—Ensuring that, upon entering practice, health professionals possess the ability to perform the complex, integrative tasks required to provide high-quality health care in relevant venues.
- Career-long professional and clinical learning—Enabling health professionals to remain competent within the scope of their professional and practice activities throughout their professional lifetime.

In sum, the Blue Ridge Group believes that health professional education needs to embrace the attributes defined by the Institute of Medicine (Exhibit 3, page 10), requiring that health care be safe, effective, patient centered, timely, efficient, and equitable. Combined with the Blue Ridge definition of a value-driven health care system, adherence to performance standards set around these IOM attributes should define value in health care, especially in the context of managing the health of the entire population at the regional level.

To date, health professional education has focused on individual competencies and professional values, without relationship to the system in which these professionals practice and operate. To have a value-driven health care system in the future, system competence and professional values will need to be defined and incorporated into the education of health professionals at all levels of their education. The recent adoption by the ABMS and the ACGME of new core competencies is a move in this direction (ACGME 2001).

Exhibit 3: **IOM Target Areas for System Improvement**

In its report, *Crossing the Quality Chasm: A New Health System for the 21st Century,* the IOM surveyed the broader landscape of quality issues in health care and found a large gap between the promise and the realities of the health care system (IOM 2001). Describing the last quarter of the 20th century as the "era of Brownian motion in health care," the report suggests that this tumultuous period of "mergers, acquisitions, and affiliations" has produced a great deal of organizational turmoil but little in the way of significant or lasting improvements in either the quality of health care or in the health status of the population. A central message is that care delivery in the future must be constructed on three pillars: scientific evidence, well-designed systems, and patient-centered care.

One of the most important findings is that our existing systems of care are inadequate to deal with the complexity of modern health care and the growth of the health sciences knowledge base. Health professionals cannot provide high-quality care in a delivery system with deficient processes, inadequate information systems, and change unmanaged to the point of turmoil. In a manner akin to many of the Blue Ridge Group's own past recommendations, the IOM described our health system overall as lacking clarity of purpose, commonality of interests, and the shared values necessary to guide the various constituents of the health care system—from patients to health professionals to policy makers—in support of system-wide improvement.

The IOM has proposed a national agenda that includes the adoption of a "national statement of purpose" for the health care system and a set of six "aims," or target areas, for improvements in health care systems. The Blue Ridge Group strongly endorses this effort and the set of proposed aims, which prescribe that health care should be:

- **Safe**—avoiding injuries to patients from the care that is intended to help them.
- **Effective**—providing services based on scientific knowledge to all who could benefit and refraining from providing services to those unlikely to benefit (avoiding underuse and overuse).
- **Patient-centered**—providing care that is respectful of and responsive to individual patient preferences, needs, and values and ensuring that patient values guide all clinical decisions.
- **Timely**—reducing waits and sometimes harmful delays for both those who receive and those who give care.
- **Efficient**—avoiding waste, including waste of equipment, supplies, ideas, and energy.
- **Equitable**—providing care that does not vary in quality because of personal characteristics such as gender, ethnicity, geographic location, and socio-economic status (IOM 2001:6).

The Blue Ridge Group believes this statement of purpose reflects societal aspirations for our nation's health care system and that AHCs and the health professions should seek to align their missions and goals with these (Blue Ridge Group, Report 6, 2001b).

What Is Wrong with Health Professional Education?

There has long been clear evidence of variations in medical practice across the country (Wennberg & Gittleson 1982)—that doctors too often fail to prescribe clearly indicated therapies, that doctors overuse certain diagnostic and therapeutic modalities, and that doctors too often fail to use accepted prevention practices (Balas and Boren).

Some of these variations in quality of medical care can be attributed to problems with health care delivery systems and related variables. The dysfunction of our health care delivery system has been the subject of significant critique. (See, eg, Exhibit 3.) Yet it is likely that much of the

variation in practice behavior reflects the ways that doctors are educated and the habits and attitudes they adopt as they progress through the educational pipeline. When practicing physicians, including new practitioners, are asked if they were prepared adequately to deal with common problems they confront in their practices, they easily identify domains of their practices that were not adequately covered during their residency training (Blumenthal 2001). In addition, serious new concerns are being raised about the quality and efficacy of continuing medical education programs in helping physicians maintain their competence (Whitcomb 2002a).

As the 21st century dawned, a number of leading scholars and organizations have published significant studies that review and critique the status of health professional education and make recommendations for reform and improvement. In part, these studies compared the current situation with recommendations of reports from prior decades.

In the early 1980s, for instance, the Association of American Medical Colleges (AAMC) convened a panel of leading educators to review physician education and to make recommendations for improvement. A report (AAMC 1984) published by the Panel on the General Professional Education of Physicians and College Preparation for Medicine (GPEP) identified the clinical education of medical students as a serious weakness in the UME curriculum. In particular, the panel found that the third- and fourth-year UME clinical clerkships were often poorly structured and supervised, with little formal evaluation of the skills learned and experience gained.

The AAMC's GPEP report remains an important benchmark for all assessments of the medical education curriculum. Yet the evidence is that many of its most important recommendations remain to be implemented throughout medical education. In subsequent AAMC research and reports, there is an underlying and sometimes explicit concern that not enough progress is being made. In commentaries introducing a recent compendium of reform efforts in 10 medical schools, for example, Whitcomb and Ludmerer, two of the leading authorities on medical education policy and reform, describe the general failure of medical schools to address fundamental problems with their programs of education and training (Milbank 2000).

Whitcomb reports that while many medical schools have instituted important reforms in the first two years of the UME curriculum, most have found it "difficult, if not impossible, to make fundamental changes in the last two years of the curriculum, when the most clinical education occurs" (Whitcomb 2000). Whitcomb goes on to describe a deep and documented reluctance in medical schools nationwide to change elective experiences "rooted in the tradition and the culture of medical schools' clinical departments" (Ibid:10).

Ludmerer is even more critical. While acknowledging that the compendium of reform efforts in the 10 medical schools shows that some are taking education reform seriously, he declares that, "the approaches described in the case studies are insufficient to prepare the nation's medical students properly for the practice of medicine in the 21st Century" (Ludmerer 2000). He finds three serious flaws. First, the molecular revolution in biomedical science has left medical schools without a cohesive curriculum or teachers sufficiently qualified to teach at the cutting edge " . . . in both the scientific and clinical disciplines." Second, students are not being prepared to treat and manage patients with chronic diseases, which are likely to dominate the practices of most physicians in this century. Third, and most important from his view, is that AHCs and their medical schools have failed to cultivate and maintain a proper learning environment. He cites educational venues and a health system and profession driven by market-oriented forces that are "rapidly destroying the learning environment of clinical education" (Ibid:17).

Reports have since issued from the IOM, the Commonwealth Fund, several medical specialty societies, and others. Together, they describe a medical education system that remains mired in many of the problems and limitations described almost 20 years ago in the GPEP report.

The Blue Ridge group agrees with the overwhelming body of evidence (see Exhibit 4, page 12) that medical education is faced with these and many similar shortcomings and challenges and that we can and must do better.

Exhibit 4: Summary of Major Reports of Ongoing Problems in Medical Education

The Commonwealth Fund

In April of 2002, the Commonwealth Fund Task Force on Academic Health Centers published its report, *Training Tomorrow's Doctors: The Medical Education Mission of Academic Health Centers.* Among its major findings, the report cites the following concerns:

- The clinical environment within AHCs (and their teaching hospitals) is widely perceived as unreceptive to medical education.
- Pressures on the clinical enterprise undermine financial support for medical education.
- The medical education activities of faculty are valued less than research and patient care at AHCs.
- AHCs vary considerably in their use of educational innovations and reforms and in addressing perceived inadequacies in their curriculum.
- The quality of GME instruction in nonhospital settings lags behind that found in traditional settings.
- The quality of training may vary systematically from one training program to another.
- The number of under-represented minorities in medical schools remains below their proportion in the population as a whole.
- Data are inadequate to gauge the performance of AHCs in conducting their educational missions.
- AHCs face significant challenges in fulfilling their educational roles (CFTF 2002).

The Association of American Medical Colleges

The AAMC has had a longstanding focus on reform of medical education. Its GPEP report documented many issues in medical education and outlined recommended reforms. The AAMC has continued to develop both research and programs designed to improve the continuum of medical education, from UME to GME to CME. In addition to a wide variety of working groups that have addressed the full range of education issues, the AAMC hosts a conference on Research in Medical Education (RIME) at its annual meeting, and the AAMC journal, *Academic Medicine,* seeks to establish and publish research and policy on health professional education, including a yearly supplement devoted to education issues.

Of its more recent contributions, several stand out.

- *Academic Medicine* has published several thematic issues and supplements, including
  - > Issues and Strategies for Reform in Medical Education: Lessons from Eight Medical Schools, Supplement to *Academic Medicine*, September 1998
  - > A Snapshot of Medical Students' Education at the Beginning of the 21st Century: Report from 130 Schools, Supplement to *Academic Medicine*, September 2000
  - > Redefining Scholarship in Contemporary Academic Medicine, *Academic Medicine,* October 2002
  - > Cultural Competency in Medical Education and Practice, Special Theme Issue of *Academic Medicine*, March 2002
- The Working Group on Institutional Accountability for Graduate Medical Education has been issuing important reports designed to provide guidance to institutions on assuming greater responsibility for the quality and conduct of GME programs.
- In conjunction with the Milbank Memorial Fund, the AAMC has recently published a new survey of curricular reform, "The Education of Medical Students: Ten Stories of Curriculum Change" (Milbank 2000), profiling 10 innovative programs with a range of reform initiatives.

The Institute of Medicine

Two major studies by the Institute of Medicine surveyed the vast body of research and commentary on the status of health care in our nation and found significant problems (IOM 2000 and 2001). In its second report, *Crossing the Quality Chasm: A New Health System for*

the 21st Century, the IOM surveyed the broader landscape of quality issues in health care and concluded that existing care systems are inadequate to the complexity of modern health care and to the challenge of translating the fast-expanding knowledge base of the health sciences into broadly available health services (IOM 2001). The IOM also concluded that current education and training models were not optimally designed to prepare professionals for a new era of health care.

As a result, in June 2002, the IOM convened a multidisciplinary summit of leaders within the health professions to chart a course for restructuring the continuum of clinical education. The resulting report, *Health Professions Education: A Bridge to Quality*, recommends 10 steps designed to bring together AHC and educational leaders, professional associations, and accrediting, certifying, and licensing bodies to fulfill an overarching vision for all clinical education. The vision includes the following basic competencies:

"All health professionals should be educated to deliver patient-centered care as members of an interdisciplinary team, emphasizing evidence-based practice, quality improvement approaches, and informatics" (IOM 2003:3).

This report and its recommendations deserve widespread discussion and adoption.

Achieving Successful Reform in Health Professional Education and Training

In our review of the literature and research on educational reform, the Blue Ridge Group found an abundance of sound recommendations, experiments, and pilot programs that by now could or should have formed the basis for widespread and needed overhaul in health professional education. The fact that needed reforms have not been broadly adopted led us to conclude that it is not the dearth of good ideas and good research that has stymied reform. Indeed, the most useful contribution to educational reform will be to identify critical and persistent factors that have slowed or stymied adoption of needed reforms and to recommend action to address these factors.

The Blue Ridge Group has identified the following five factors as the most persistent and critical in slowing needed reform. These factors must be addressed as a precondition to planning and enacting system-wide educational reform. Therefore, not only AHCs but also the multiple bodies that participate in overseeing and regulating medical education must address these preconditions as their highest priority.

I. The art and science of education must become an explicit, manifest priority of the leadership of academic health centers.

II. Health professional schools must pioneer and use advances in knowledge concerning cognitive development, styles of learning, and education theory and practice.

III.Health professional schools must provide sufficient support and relevant rewards to faculty, volunteers, and residents who teach.

IV. AHCs must structure appropriate and consistent learning environments to meet the changing nature of illness and societal needs.

V. The regulatory framework must be streamlined and rationalized.

I. THE ART AND SCIENCE OF EDUCATION MUST BECOME AN EXPLICIT, MANIFEST PRIORITY OF THE LEADERSHIP OF ACADEMIC HEALTH CENTERS.

The balance of evidence shows that since the middle of the 20th century AHCs have devoted neither the leadership nor the resources to nurturing the art and science of health professional education that they have devoted to their other two main mission areas, research and clinical care (Ludmerer 1999).

It has been well documented that both

enhanced research funding and the Medicare and Medicaid funding for direct clinical care shifted the balance within medical school missions first toward research and then toward clinical care. Without the substantial, dedicated, and coherent funding streams available for research and clinical care, the education mission became the weakest leg of the three-legged stool. Faculty, busy with growing research and clinical responsibilities and typically focused on their specialty trainees where education was concerned, dedicated less time to the art and science of teaching across the educational spectrum. The curriculum became codified around rote memorization and standardized testing in the early UME years. At the same time, students in the GME years found themselves with less supervision from and access to senior faculty. By late 1970s and early 1980s, many educators and policy experts were expressing heightened concern on both of these counts (Bosk, Starr).

Starting in the 1970s, on the basis of new understandings about cognitive development and learning, many preclinical UME educators began to shift their strategies from treating learning as if students were empty vessels to be filled with information to new strategies that engaged students as active learners responsible for developing measurable competence (Carraccio, et al 2002). Medical schools began undertaking curricular reform designed around smaller seminars and group learning and with more attention to the attainment of specific competencies.

At the GME level, the American Board of Medical Specialties (and its certifying boards) and the Accreditation Council for Graduate Medical Education (ACGME) took the initiative to define and set standards and to develop the educational and regulatory framework for a new set of core competencies in clinical education. The competencies include:

- patient care
- medical knowledge
- practice-based learning and improvement
- interpersonal and communication skills
- professionalism
- system-based practice

Through a four-stage process that extends to 2011 and beyond, specialty Residency Review Committees (RRCs) and GME programs are adopting and refining the competency goals, while developing compliance processes and assessment tools. Starting in 2006, they are to begin comparing assessment and clinical outcomes data with the goal of expanding and enhancing the competencies, starting in 2011 (ACGME 2001).

A transformed GME system will embrace the quality attributes defined by the IOM. It will train physicians to work effectively in teams with other health professionals and will define both "individual" and "system" competence and professionalism. The ACGME's Toolbox (http://www.acgme.org/outcome/assess/toolbox.asp) already provides a template for developing a comprehensive competency assessment system.

This alignment of the major accrediting body with one of the major certifying bodies is a significant step forward. Even though there are ongoing issues and concerns being raised by certain specialty boards, the ABMS and the ACGME have established an overall framework of competency, including systems thinking, communications skills, safety, and quality, with which RRC and GME programs can work.

This new attention to active learning and clinical competency is necessary to educational reform, but not sufficient. With our health system in flux, the environments for care and learning are changing and are characterized by uncertainty. Health professionals must be able to make the most of the basic clinical relationship in order to be properly engaged with their patients.

This is why educational leadership in this new age requires a new attention to some of the oldest skills in health care, including mastery of the art and science of the clinical transaction.

Leadership: Making the Clinical Transaction Paramount

The clinical transaction—what happens between the physician and the patient—is the common thread in all of medicine. It is where art and science combine in the subtleties of a deeply personal, human interaction that has significance for patient satisfaction, competent healing, and cost-effective care. Not only do we need competency in the application of the clinical art to the immediate patient, we also need competency in the invocation of population-based and evidence-based approaches in such a way that the

scarce resources of our system are made available to the greatest number of patients.

A paper by Wendy Levinson and colleagues shows how far we have to go in restoring the patient-doctor relationship. Doctors in audiotaped office visits repeatedly missed emotional clues from their patients in both primary care and surgical settings. In a majority of cases, researchers found doctors responding inadequately to requests for more information, engaging in inappropriate humor and denial, or terminating interviews prematurely (Levinson et al, 2000).

It has been clear at least since the time of Hippocrates, and more recently Osler, that excellence in medicine begins in the exam room, with conversation, and often it can end there as well. Probabilistic, evidence-based medicine can satisfy the patient and heal the sick and may avoid expensive, unnecessary, inconvenient, risk-laden, and often inconclusive high-technology tests and screenings. It has been estimated, for example, that 88% of the diagnoses in primary care are made after the medical history and the physical exam.

Yet the art of the physical exam is a relatively neglected subject in most medical schools and residency programs. The drive for evidence places an increasingly prominent role on technology per se. Yet we know that excessive reliance on panels of blood tests and batteries of imaging exams can lead doctors to miss patient cues and concerns and to bypass important opportunities for therapeutic and diagnostic communication. Peculiarly, despite rising care costs, payment practices of managed care companies and other insurers favor high-tech over low-tech approaches. Research suggests that, in other countries, including the UK, Canada, Australia, and New Zealand, the art of history taking and the physical examination is still taught—and practiced—well. It is the judgment of the Blue Ridge Group that the clinical transaction must take a prominent place at the core of our undergraduate and specialty training.

Fortuitously, we live in a time when the conjunction of new technology, evidence-based medicine, and rekindled interest in the clinical transaction may pose a new appeal for young, technologically adept students. In his seminal 1992 *JAMA* article, "A Primer on the Precision and Accuracy of the Clinical Examination," David Sackett described how a series of five simple questions could be a powerful tool for diagnosing alcoholism or ruling out abdominal ascites in a newly admitted hospital patient. It is quicker, more economical, and more convincing than even a battery of blood tests and abdominal ultrasound. In just a matter of seconds, a series of simple yes and no answers can produce a likelihood ratio that a particular sign—a prominent belly—equals potentially life-threatening liver disease from alcohol abuse. Answers to the four CAGE screening questions for alcohol abuse or dependency, along with a question about swollen ankles, can equate with a high degree of probability—85%—to the likelihood of finding abdominal ascites on abdominal ultrasound (Sackett 1992). Though not intuitively obvious to a generation weaned on mass spectrometry and PCR, Sackett's work demonstrates the power of asking questions, getting answers, and drawing inferences. With the aid of a handheld computer, the art of taking a medical history may find new currency in students who cut their teeth on Super Nintendo.

Research will be needed to make such an approach useful across a wide range of com-

Teaching the Clinical Transaction

In particular, we should ask ourselves:

- How well is the clinical transaction taught in medical school and relied upon and reinforced during specialty training?
- What is the research base underlying the patient interview and the physical examination? The literature shows that the doctor-patient relationship—the clinical transaction—is what patients really respond to when they judge the quality of their medical care. This same clinical transaction is key to valid diagnosis.
- What advances in communications and information technology influence history taking and the physical examination and could profitably be incorporated into it?

plaints and problems. However, the systematic development of sophisticated yet apparently simple algorithms, made available in Palm or other related wireless handheld formats and incorporated into the training of medical students beginning at the undergraduate level, might improve the relationship between doctors and patients and greatly enhance the efficiency and economy of the health care system. Students are currently taught this methodology and use this technology for interpreting lab results, but they are not generally trained to use this approach in taking the patient history. This is an area where medical education can have a clear transformative effect on medicine as it is practiced. In time such methods will be integrated within the computer-based patient record so that decision-support is woven more effortlessly into the interaction.

Sackett and others have suggested there are several reasons why the art and science of the patient history and physical have been relatively neglected: Many people in our current system perceive laboratory science as more important than the clinical sciences; diagnosis is made by a pattern of symptoms and signs, not by a single definitive result, as with a lab test; many people regard physical examination as an art, not a science; and the payment system provides financial incentives to order technological tests, as opposed to taking histories and doing physical exams (Sackett and Rennie 1992).

The Blue Ridge Group notes that probabilistic diagnoses could be viewed with skepticism in a society so devoted to black-and-white answers that growing numbers of consumers are investing in extremely expensive whole-body scans. The fundamental challenge is not to submerge the patient-doctor relationship in technology but to incorporate technology, both low and high, in an appropriate way. Health professionals must play a leading role in educating patients and rebalancing their expectations to accommodate this approach to health care.

Another way to incorporate high technology in the low-tech art of the clinical encounter is through the use of simulations to enrich education and training. Commercial airline pilots are trained to fly a Boeing 747 by spending many hours in a simulator. Only after lengthy training in a setting that offers feedback on proper performance are they put in a real plane with a mentor (co-pilot). The incorporation of standardized patients has become almost ubiquitous in teaching communication and the art of the physical exam. Surgical training using simulators, often sponsored by surgery-related companies, is also becoming common. The US Army is evaluating virtual reality technologies for their effectiveness in training battlefield medics and nurses. The National Science Foundation is sponsoring research into "responsive virtual

A Dean's Dilemma

The new dean of a medical school was delighted to receive an invitation to lecture to the incoming class of undergraduate medical students. He was especially delighted to be invited to introduce the clinical transaction—the patient history and the physical examination.

Arriving at the appointed day and time, he was pleased but somewhat mystified by the gratitude he encountered. Both the young assistant professor who invited him and the first-year students themselves thanked him profusely for taking the time.

The dean said he couldn't think of anything more important than teaching that class.

Well, said the young assistant professor, I'm glad you look at it that way. I couldn't find anyone to do it. My chairman has a grant due, and the person he suggested is out of state at a conference, and the person he referred me to was tied up in lab. So I am really relieved you could do it, because I was running out of people to ask.

In that case, said the dean, ask me again next year.

But as he walked back to his office, the dean reflected on the status of teaching in his medical school and the inadvertent lessons that had already been transmitted to this new cohort of fledgling physicians. He resolved that it was time to address institutional education priorities.

human technology" to simulate interactions with trauma and terrorism victims as well as mentally disturbed individuals. The Blue Ridge Group recommends that health center leaders devote similar technology and resources to the clinical art and science of interacting with patients as an essential, irreducible core of the undergraduate and graduate medical curriculum. Few areas of research offer greater opportunities for rewards for professionals and their patients.

Leadership Resources: Budgeting for Educational Excellence

The costs involved in teaching are notoriously difficult to ascertain with precision because of the way in which the teaching costs are intertwined with those of faculty research and patient care. Nevertheless, a 1997 review of more than 20 years of studies found that the cost of medical student education can be estimated. When adjusted to a standard base year (1996 dollars), direct instructional costs are between $40,000 and $50,000 per student per year. Estimates of total educational resource costs (including the costs of supporting all faculty deemed necessary to conduct undergraduate medical education) were between $72,000 and $93,000 per student per year. Curricular innovation in the direction of more small-group learning, investment in educational and information technology, and clinical education in ambulatory sites raises the costs even further (Jones and Korn 1997).

Studies at select medical schools confirmed this survey. For instance, at the Virginia Commonwealth University, investigators were able to determine that medical school faculty spent more than 89,000 scheduled hours teaching 674 undergraduate medical students, with a faculty-student ratio of 1:3.35. Residents spent nearly 79,000 hours training undergraduate medical students. The total annual cost of undergraduate medical education was $69,992 per student (Goodwin, et al 1997). Based on these data, we can estimate that a medical school with a total enrollment of 500 medical students incurs costs of approximately $32 million to $40 million per year for undergraduate medical education.

These costs are substantial. Yet the Blue Ridge Group believes that professional education is sufficiently important that most AHCs would need to significantly increase their educational budget to reach an appropriate level of institutional commitment—at least for the short term as they add IT and other infrastructure. This will not be easy. Medical school tuition even at the most expensive private institutions averages less than half of the estimated total cost per student. This means that medical education already relies heavily on income from endowment, clinical revenues, and in some cases, public subsidies.

The challenge of finding substantial new money to invest in medical education can hardly be overestimated. This is why accomplishing significant reform and enhancement of health professional education will require commitment and prioritization at the highest levels of professional and university leadership. It will require the identification of new sources of funds for sustained investment in educational programming and resources. We believe that there is no more important investment that AHCs can make.

Recommendations

- **Education must become an explicit, manifest priority of the leaders in academic health centers. This means that each AHC must create a strategy with identified resource needs (budget and personnel), a structure for management, and performance rewards.**
- **AHCs should devote more and better resources to teaching the clinical transaction as the core of the clinical relationship, integrating social and humanistic skills with appropriate technology, interdisciplinary education (MD, RN), team-based models of health care delivery, and evaluation of processes and outcomes.**
- **Within two years, each AHC should identify its educational costs. This includes the educational infrastructure budget (technology, simulation, standardized patients, teacher education, training facilities, communications technology, faculty development, and personnel).**
- **AHCs must also identify new sources of funding, whether philanthropic, clinical, or public subsidy, so that they can substantially increase their investment in education within five years.**

II. HEALTH PROFESSIONAL SCHOOLS MUST PIONEER AND USE ADVANCES IN KNOWLEDGE CONCERNING COGNITIVE DEVELOPMENT, STYLES OF LEARNING, AND EDUCATION THEORY AND PRACTICE.

A distinguished panel of investigators recently completed a review of the literature in human learning from multiple disciplines for the National Research Council and published their findings under the title, *How People Learn: Brain, Mind, Experience and School* (HPL). HPL suggests that the goal of education for the 21st century should be "to help learners develop the intellectual tools and learning approaches needed to continuously acquire and use knowledge." What are these intellectual tools? While we cannot summarize all of the developments in this burgeoning area, the key findings of HPL are the following:

Students come to the classroom with preconceptions about how the world works. If their initial understanding is not engaged, they may fail to grasp the new concepts and information that are taught, or they may learn them for purposes of a test but revert to their preconceptions outside the classroom.

Pre-existing knowledge is the basis of all new learning. In attempting to understand something new, from a physical skill to a piece of information, individuals begin with what they already know. This initial understanding can either provide the substrate for accurate interpretation of new learning or interfere with understanding.

Nevertheless, most teachers make little attempt to activate prior knowledge and target teaching to the needs of the individual learner. Most lack knowledge of its importance. Even those who would do so are confronted with many obstacles, including lack of time, lack of comfort in opening up learner needs, the desire to teach what and how one knows best, a focus on diagnosing the patient rather than the learner, and a culture of silence in which the learner never admits not knowing, hearing, or seeing, and rarely asks why (Wilkerson and Irby 1998).

To develop competence in an area of inquiry, learners of all ages must (a) have a deep foundation of factual knowledge, (b) understand facts and ideas in the context of a conceptual framework, and (c) organize knowledge in ways that facilitate retrieval and application.

Understanding new things requires generating inferences, solving problems, reasoning, and applying knowledge to new situations. It requires the ability to construct coherent mental representations or explanations of events that go beyond the description of surface features. Knowledge of specific features needs to be embedded in a conceptual framework composed of rich interconnections among ideas for long-term retention and transfer. This is typically referred to as deep understanding. Deep understanding is the basis of competency and allows the learner to go beyond rule-based actions and transfer learning to new situations.

Also important to developing competence is a learning environment that enables and requires integration of new knowledge. Yet the health professions are organized in discrete units that discourage the learner from making connections across boundaries. Each phase of medical education is discrete or "siloed," with different accreditation requirements and organizations. Inpatient care is separated from outpatient care with rotations occurring first in one and then the other. Basic science generally is allocated to years 1 and 2 of medical school, clinical medicine to later years. The health professionals maintain separate training programs and assessment systems. Academic and community groups often don't mix. Education and research are most often structured as competitive rather than cooperative experiences. The curriculum is typically focused on individual achievement, without sufficient training in teamwork. (For example, how many awards are given at graduation to groups of students rather than to individuals?) The strengths of one clinical program are often not generalizable to others and therefore are inapplicable or inaccessible to residents training in other institutions. Classroom sessions can be viewed as divorced from practice, particularly by busy residents, as reflected in the adage that, "Real learning comes from taking care of patients."

Furthermore, examinations typically focus on a narrow range of competency in the form of acquired knowledge, rather than the application of knowledge, inference, synthesis, and evaluation. In one study of attending rounds, for example, only 20% of the questions asked by faculty or residents required more than simple

reporting of patient data or recitation of factual information (Wilkerson).

An exercise by Hilliard Jason illustrates how medical education often is conducted in ways that do not promote deep understanding. The exercise asks participants to decide how much time to spend in any of 10 activities over a 10-hour period to learn to play tennis. (See "You as a Learner.")

One option in the exercise is, "Practice with a friend, then report on what you did to a tennis coach who doesn't observe you but who provides you with feedback and advice." (Jason and Westberg 2001).

Most health professionals recognize this model as that used in their clinical training. Seeing this model in a new context helps make clear what is likely a shortcoming in the predominant clinical training model.

In addition to cognitive and learning theory, the new sciences of complexity theory and complex adaptive systems are teaching us much that is new about functioning in and managing complexity (Zimmerman, et al 2001; Beck 1992). Health professionals must be adaptable. They must have the ability to manage complexity and work with uncertainty and ambiguity over time. They must learn to innovate, to acquire and use

You as a Learner

We can learn a good deal about teaching by reflecting on the ways that we learn. In this exercise, we invite you to consider your preferences as a learner.

Imagine that you have never played tennis before. Some "friends" signed you up to play in a challenge tournament between the faculty and students. The tournament will be held in two weeks.

You want to do as well as possible. Between now and the tournament, you can spare only 10 hours for learning tennis. Several learning strategies are listed below. Your mission, should you choose to accept it, is to design your own "curriculum" for learning to play tennis. ***Decide how much time, if any, you will devote to each available activity. Remember: You have only 10 hours! Good luck!***

	Hours
1. **Listen** to lectures on the history of tennis and the techniques used by experts.	_____
2. **Listen** to lectures on "how to play tennis."	_____
3. **Read** about tennis.	_____
4. **Observe** experts play tennis.	_____
5. **Observe** an expert tennis player/coach who demonstrates and explains what he/she is doing.	_____
6. **Practice** tennis on your own (eg, hitting against a wall).	_____
7. **Practice** with a more advanced beginner who gives you some instruction.	_____
8. **Practice** with a friend, then **report** on what you did to a tennis coach who doesn't observe you but who provides you with feedback and advice.	_____
9. **Practice** tennis while being observed by a coach, who then provides you with feedback and advice.	_____
10. **Reflect** on and do a self-critique of your performance in the presence of your coach. This could include reviewing a video recording of yourself playing tennis.	_____
	Total 10 hours

Reprinted with permission (Jason and Westberg 2001).

new knowledge, and to work well and easily in multiple and changing interdisciplinary teams and environments.

A "metacognitive" approach to instruction can help students learn to take control of their own learning by defining learning goals and monitoring their progress in achieving them.

Effective learners are involved in metacognitive reflection on and monitoring of their own performance. Yet there is little emphasis on reflective practice throughout medical education. Among the abilities seen in self-reflective learners are:

- The ability to assess one's current state of knowledge accurately
- The ability to add to one's knowledge base and skill set self-consciously
- The ability to notice inconsistencies and problems and to make decisions in the face of uncertainty
- The ability to transfer what one knows and can do to a new situation (adaptive expertise)
- The ability to identify and define problems
- The ability and willingness to admit and learn from mistakes

This type of self-monitoring among expert professionals is known as "reflection in action," the ability to be surprised by an outcome or event during the event itself in time to make a difference in the outcome (Schoen 1987). While this type of metacognitive activity can develop naturally with experience, there is evidence that it can be taught within the context of specific fields of inquiry so that the novice behaves more like the expert—even before reaching expertise. The current motto of much clinical training, "never get caught making a mistake or not knowing," would be replaced by a genuine search for understanding and the motto, "I'm not sure; let me check."

A full survey of recent developments in education and learning theory is beyond the scope of this report. However, the foregoing clearly illustrates the extent to which our health professional education programs must more vigorously incorporate and use bodies of research, knowledge, and expertise that are vitally important to successful learning and teaching.

Recommendations

- **AHCs must each develop a core of faculty with education expertise in the form of scholars who can serve in curriculum development and teacher education.**
- **Funding from institutional and external sources should support**
  - **> faculty research in education,**
  - **> the design and implementation of new models of human cognition, and**
  - **> learning applied to the healing professions.**

III. HEALTH PROFESSIONAL SCHOOLS MUST PROVIDE SUFFICIENT SUPPORT AND RELEVANT REWARDS TO FACULTY, VOLUNTEERS, AND RESIDENTS WHO TEACH.

Of the several observations that convince us that education has become the shoemaker's barefoot child, none is more persuasive than the diminished and often demoralized status of faculty who concentrate on teaching.

It has been widely reported and documented that AHCs provide notoriously poor support and resources to either full-time or volunteer faculty who teach. Even educators who have been recognized for their excellence report finding insufficient institutional commitment. In a recent survey of award winning clinical teachers, faculty reported that their institutions were unwilling to pay for the time it takes to teach well. While they view their institutions as generally supportive of their teaching contributions, they find little support in dealing with payment regulations and the increased demand to generate clinical income that adversely affect their ability to teach (Woolliscroft, et al 2002).

Faculty members must have the institutional support necessary to develop the knowledge, skills, and strategies needed to attain and maintain teaching excellence. Faculty development has been defined as the "enhancement of educational knowledge and skill of faculty members so that their educational contributions can extend to advancing the educational program rather than just teaching with it" (Rubeck & Witzke 1998). New academies of medical educators

recently developed at the University of California at San Francisco and Harvard University are good models for emulation. By earmarking endowed funds, they are providing dedicated support for and heightened status to a cadre of "master teachers" in medical education. However, developments like these are rare and limited. These programs use a peer-review process to reward excellence in teaching. They establish a core group of acknowledged master educators.

In emulating these programs, institutions can go even further by institutionalizing educational and research programming on the latest advances in learning and education theory, establishing formal programs of systematic teacher training, and targeting support for the clinical educator, particularly in graduate medical education.

Another model has been developed by McGill University, which in 1977 established the Teaching Scholars Program for Educators in the Health Sciences. This is a yearlong program designed to promote professional development of faculty as educators, educational leaders, and scholars. Faculty take two courses in the departments of education, epidemiology, or management; participate in medical rounds; attend a monthly seminar; participate in faculty workshops; attend a national or international conference or course; and complete an independent study project devoted to curriculum design, improvement of teaching methods, program evaluation, and other topics in health sciences education. The program requires a commitment of a minimum of 2.5 days per week but is structured with flexibility to enable faculty members to maintain their clinical, teaching, research, and administrative responsibilities (Steinert, et al 2003).

The McGill model has a number of advantages over current programs at some AHCs that provide for faculty to participate in discrete workshops or short courses or to pursue faculty development fellowships and sabbaticals. The McGill model provides a strong institutional framework of support that includes a structured but flexible curriculum that draws on university resources, ongoing mentoring and feedback, group interaction, and team learning across disciplines, all while enabling faculty largely to maintain ongoing responsibilities. While the time commitment, content, and duration of the curriculum continue to be reviewed and refined, an evaluation and report of the program's impact and outcomes to date indicates that both participants and program advisers rated the program of high and enduring value (Steinert, et al, 2003).

Special Challenges for Education in the Clinical Setting

The clinical setting poses perhaps the most difficult challenge for education. After the first two years of medical school, learners spend the vast majority of their time in the clinical setting, with 50% or more of their time in inpatient settings. With the increased demand for faculty clinical productivity, the time faculty are required to spend on documentation, and new guidelines limiting resident work hours, there is general agreement that clinical training programs must be strengthened. Training and support for clinical educators must be a priority. It is apparent that we must work smarter rather than harder.

The Blue Ridge Group urges AHCs to establish formal clinical educator training and support programs to prepare faculty members and senior residents for the education of medical students and residents and to meet the MSOP and ACGME core competencies. These programs should focus on the mission of maximizing learning opportunities in the clinical setting. They could be structured also to create a nucleus of clinical master teachers. Given the findings reported out of UCSF concerning the effects of the new hospitalist service in internal medicine on housestaff satisfaction, perhaps hospitalists themselves might be important members of this clinical educators program (Hauer & Wachter 2001). Other additional new roles, such as "community specialist," "knowledge manager," and/or "lifelong learning mentor" also deserve exploration.

Core clinical teachers in each specialty and, increasingly, across specialties, would play a defining role in the GME program. They would follow learners over time, across rotations, and into the ambulatory setting. They would develop expertise in distinguishing levels of performance on ACGME core competencies and become skilled in the use of multiple assessment measures. A similar approach could be used to teach informatics and other useful new content of general importance to faculty.

The core educators would not obviate teaching by other faculty attendings. Instead, they would

supplement current systems of teaching rounds, work rounds, bedside rounds, and clinical conferences with systematic input and guidance that would enhance the capabilities of both teachers and students.

All clinical educators would be paid for their time devoted to teaching and for the quality of their efforts. And each institution would have to work with the medical school to develop clear processes of promotion for these clinician educators and provide opportunities for intensive and ongoing professional development. The University of Michigan Medical Education Scholars Program, established in 1997, provides an excellent model that has produced increased faculty educational scholarship, skills development, and leadership (Gruppen, et al 2003).

Other faculty educational development programs can be important as well. Examples of such programs include regularly scheduled grand rounds involving multiple departments, protected time for teaching skills workshops on site, and use of evidence of teaching quality and participation in faculty development in the promotion process. Programs like these can be started relatively quickly. For example, Cedars-Sinai Medical Center in Beverly Hills has instituted a combined medicine-surgical grand rounds on education that occurs several times a year (Bland, et al 2002).

In all such programs, the recommended changes should aim to develop skilled teachers who are capable of reflecting on their own practices and are able to address their own and their students' strengths and weaknesses as teachers, as clinicians, and as learners. Investment in educators at an organizational level and sponsorship of such programs in AHCs and their teaching hospitals and clinics provide clear evidence that teaching and learning are priorities in the organization.

Recommendations

- **AHCs should make teacher development a primary focus of the institution by developing formal clinical educator training and support programs. These programs should prepare faculty members and senior residents for the education of medical students and residents and to meet the MSOP and ACGME core competencies. This should include skill enhancement for faculty, core educational curricula for residents, involvement of residents in quality and process improvement initiatives, research capability in pedagogy, and regularly scheduled educational grand rounds in multiple departments. The McGill program serves as an excellent model. AHCs should also look to establishing formal training leading to a masters degree for those wishing to pursue scholarship and leadership in medical education.**
- **AHCs must protect time for teaching and for teacher development, including clinical onsite workshops.**
- **AHCs must work aggressively to develop better metrics for evidence of teaching quality and for faculty development in education for the promotion and tenure process.**

IV. AHCs MUST STRUCTURE APPROPRIATE AND CONSISTENT LEARNING ENVIRONMENTS TO MEET THE CHANGING NATURE OF ILLNESS AND SOCIETAL NEEDS.

The UME professional education process is where doctors initially develop their knowledge of medical science and practice, forge a professional identity (including the relevant values), and acquire a sense of how to relate to patients, to other health care providers, and to other institutions. While this foundation can be strong, many believe that the education of a medical professional is affected far more by what happens in GME than by the foundation laid in medical school (Hafferty and Franks 1994).

What is commonly known as GME's "hidden curriculum" often is credited with replacing the idealism of medical school graduates with professional values, expectations, and practices that are increasingly perceived as inappropriate to societal aims for our health system (Ibid, IOM 2001). As the clinical environment has grown increasingly market-driven and competitive, concerns about the clinical medical education environment have only grown (Ludmerer 1999).

The environment for medical education should provide for the systematic and consistent achievement of the purposes of health professional education (see earlier statement on the purposes of medical education, page 9). A host of changing conditions and factors make this century's educational goals different from those forged early in the last century. These include

- The explosion of knowledge, including the molecular and genetic revolutions.
- Changing demographics, including an aging and ever more diverse population, reflected in part by the growing importance of chronic disease and a growing number of people needing support through death and dying services.
- New understanding and focus on behavioral determinants of illness.
- Societal demands for efficient resource utilization and sound management and practice.
- The emergence of patients as informed decision makers, with expectations that must be incorporated and managed.
- The recognition that healing requires more than science and technology and must also include humanism, spirituality, and empowerment.

These and other new factors require that we revisit educational goals. They also suggest that medical schools may have lessons to learn from their sister health professionals and schools in nursing and public health about integrating the wider resources and tools of the humanistic academic environment.

An example of how one medical school is incorporating these various perspectives into its mission is outlined in Exhibit 5.

Exhibit 5: UCLA School of Medicine Medical Education Mission Statement

We, the faculty of the UCLA School of Medicine, seek to prepare our graduates for distinguished careers in clinical practice, teaching, research, and public service. Recognizing that medical school is but one phase in a physician's education, we must create an environment in which students prepare for a future in which scientific knowledge, societal values, and human needs are ever changing.

The faculty and students will actively collaborate to build a strong foundation, which will include:

1. Enthusiasm for lifelong learning.
2. Commitment to humanistic, compassionate, and ethical care of the individual and family.
3. Skills in effective communication and commitment to education, including teaching students, colleagues, patients, and the community.
4. Ongoing development of a broad and flexible base of knowledge and skills that integrates basic, clinical, social, and behavioral sciences with the art of medicine.
5. An understanding of the scientific method and an appreciation of its application to clinical practice as well as to research.
6. Commitment to promote the health and well-being of the community and an understanding of the special challenges and requirements of a pluralistic society.
7. Ability to lead in their chosen fields, in settings of rapidly changing technology and societal needs.
8. The ability to address complex societal and medical issues through a systematic, multidisciplinary, and collaborative approach.

At the turn of the last century, Flexner's report on medical education sparked a major re-examination of and rededication to educational goals. A new consensus emerged that teaching should be carried out by qualified faculty engaged in active research and care, that the curriculum must be scientifically grounded, and that students must be admitted only with appropriate qualifications. Equally important, it was agreed that medical education should be based in universities, where traditions of seeking evidence, truth, and technical competence combined to provide a well-rounded and well-grounded humanistic education. Over many decades, an implicit social contract was built between universities and society, where significant societal resources were provided to support medical education, research, and care in academic health centers. These centers, in return, would educate physicians and other health professionals to the highest standards of competence and professionalism.

The importance of the academic environment to the AHC mission cannot be overestimated (Dickstein 2001). Yet many commentators have observed that the implicit social contract seems to have become strained, or worse (Ludmerer 1999). And there is much evidence that the relationship of the medical school and the AHC to the university has also come under stress—and that these two phenomena are related (Duderstadt 2000). At the same time, there is increasing concern with the continuing growth in the length and cost of training in many specialties. Some have suggested that greater attention to the learner's needs rather than to clinical service needs could trim years off of the average training period, while improving the educational experience and outcome (Johns 2001).

The Blue Ridge Group believes that AHCs and their professional schools must reaffirm and renew their commitments to the ennobling missions and learning environments of the university. AHCs must carry forward our society's aspirations for its university-based intellectual resources and service functions. AHC professional schools must be more—far more—than technical professional schools. Their clinical facilities must have far higher aspirations than productivity and commercial success. AHCs must be institutions of higher learning, where the most sophisticated education is firmly rooted in the most advanced research and discovery. Rather than making GME a term of service, they must maintain exquisitely fine-tuned educational and service environments, oriented to the needs of the learners (Johns 2001).

The Blue Ridge Group has recently made recommendations to address the need for cultural and organizational change in the AHC (Blue Ridge Academic Health Group 2001b). AHCs must reaffirm and renew their commitments to providing a humanistic environment appropriate to their missions in education, research, and care.

Recommendations

- **AHCs should systematically review and renew their roles as academic centers to ensure that their educational and service units operate within and are consistent with their university traditions of seeking evidence, truth, and technical competence within a humanistic environment.**
- **AHCs should modify their health professional curricula to incorporate humanistic and social science disciplines.**
- **AHCs should evaluate whether training can be made less lengthy and expensive, while improving productivity, quality, and patient satisfaction.**
- **AHCs should bring their facilities and technologies into line with their curricular goals, including provision for team medicine and team learning.**

V. THE REGULATORY FRAMEWORK MUST BE STREAMLINED AND RATIONALIZED.

The health professions' historical organization and development has led to the development of an unwieldy patchwork quilt of regulatory responsibility and oversight in medical education. Nationwide, there are more than 400 organizations involved in accreditation, licensing, and certification of health professionals (IOM 2003).

The IOM, in its report, *Health Professions Education: A Bridge to Quality,* surveys the full extent of accrediting and licensing organizations (see Exhibit 6). In addition to these bodies and to AHCs' own internal reviews and standards, most health professional organizations have independent certifying bodies, and each state has a licensing process.

It has been variously recommended that leaders and representatives from all of these oversight and regulatory bodies should coordinate and focus on common, or at least consistent, standards so that health professional education can better achieve desired goals and competencies (HRSA 1999, Pew Health Professions Commission 1995). The IOM has suggested bien-

Exhibit 6: **Accrediting and Licensing Organizations** *(Adapted from IOM 2003)*

ACCREDITING ORGANIZATIONS

Medicine
- Liaison Committee on Medical Education (LCME)
- American Osteopathic Association (AOA and AOA-Grad)
- Accreditation Council for Graduate Medical Education (ACGME)

Pharmacy
- American Council on Pharmaceutical Education (ACPE)
- American Society of Health-System Pharmacists (ASHP)

Physician Assistant
- Accreditation Review Commission on Education for the Physician Assistant (ARC-PA)

Nursing
- National League for Nursing Accreditation Commission (NLNAC)
- Commission on Collegiate Nursing Education (CCNE)

Occupational Therapy
- Accreditation Council for Occupational Therapy Education (ACOTE)

Clinical Laboratory
- National Accrediting Agency for Clinical Laboratory Sciences (NACCLS)

Respiratory Therapy
- Committee on Accreditation for Respiratory Care (C-ARC)

LICENSING ORGANIZATIONS

Medicine
- United States Medical Licensing Exam (USMLE)
- National Board of Osteopathic Medical Examiners (COMLEX)
- Federation of State Medical Boards (FSMB)

Pharmacy
- National Association of Boards of Pharmacy (NAPLEX)

Nursing
- National Council of State Boards of Nursing (NCLEX-RN)

Allied Health
- National Board for Certification in Occupational Therapy (NCBOT)
- National Board for Respiratory Care (NBRC)
- National Commission on Certification of Physician Assistants (PANCE)

CERTIFICATION AND CREDENTIALING ORGANIZATIONS (SAMPLING)

Medicine
- American Board of Medical Specialties (ABMS)
- American Osteopathic Association (AOA)

Pharmacy
- Council on Credentialing in Pharmacy (CCP)
- Board of Pharmaceutical Specialties (BPS)
- National Institute for Standards in Pharmacist Credentialing (NISPC)
- Commission for Certification in Geriatric Pharmacy (CCGP)

Physician Assistants
- National Commission on Certification of Physician Assistants (NCCPA)

Occupational Therapy
- National Board for Certification in Occupational Therapy (NBCOT)

Also important to medical education and credentialing are a number of national professional societies, including the Joint Commission on Accreditation of Healthcare Organizations (JCAHO), the American Medical Association (AMA), the American Hospital Association (AHA), and the National Committee for Quality Assurance (NCQA).

nial summit meetings (IOM 2003). This would be an important step. However, the Blue Ridge Group believes a prior step is required. The multi-polarity of responsibility and authority for health professional education must itself be addressed. The existing regulatory framework is too unwieldy and must be streamlined and consolidated. (Taken in aggregate, the fees alone that schools pay to relate to and support the array of entities adds up to a substantial cost and a serious question as to the return on investment.) While important reform efforts made by many organizations (such as the American College of Physicians, the American Board of Internal Medicine, and the American College of Surgeons) deserve acknowledgement, the continuing multiplicity of bodies and responsibilities prevents optimal, system-wide approaches.

The Blue Ridge Group believes that leadership for such an effort must come from the highest levels of key organizations and from the AHCs. In the process of redefining and reasserting the role of health professional schools as centers of responsibility, authority, and leadership for the lifelong education and training of health professionals, AHC leaders must initiate a national strategy to develop a new model for the regulation and oversight of health professional education.

Recommendations

- **AHC leadership must redefine and reassert the role of health professional schools as centers of responsibility, authority, and leadership for the lifelong education and training of health professionals.**
- **AHCs should work with all professionally related boards to ensure that proficiency and certification standards are consistent with competence and newly emerging educational strategies and goals. One example would be to change the AMA Category I CME certification process so that it rewards only high-quality, evidence-based, and cost-effective CME experiences.**
- **AHCs should participate in a national strategy to create a national education initiative. As a piece of that strategy, multiple components must be developed and AHCs must offer their fair share of leadership and resources to this key challenge.**

  a. An IOM initiative or Presidential/HHS Secretary/Congressionally mandated commission is needed to review the historic roles of professional societies in standard setting, evaluation, and regulation of UME, GME, and CME. This should entail a process that includes all key leaders of relevant organizations, including specialty boards, specialty societies, residency review committees, ACGME, USMLE, LCME, ACCME, and JCAHO, and their equivalents in nursing and other health professions.

  b. The charge to the IOM committee and/or commission would be to identify a rational system for the future, including a coordinating body and a strategy for moving from the present to the recommended model. The IOM committee should be asked to identify and assess a variety of models to assure oversight, responsibility, and accountability in medical and other health professional education. Funding for the initiative should be sought from AHCs, the US government, and philanthropic foundations.

  c. The IOM commission in particular should consider the creation of a National Institute of Health Education, which could logically find its home within the National Institutes of Health or the National Library of Medicine. This new institute should define its mandate broadly, including not only health professional education but also public health and patient information.

  d. AHCs need to work with others to develop and lead a campaign to ensure implementation of these recommendations. Research!America is one successful model of such a comprehensive coalition effort.

Conclusion

There is a substantial body of research and policy work, spanning decades, which points to persistent and substantial challenges for health professional education and for medical education in particular. There are numerous and well-conceived experiments in educational reform ongoing in medical schools throughout the country. Nevertheless, these efforts are likely to remain limited until leaders address the underlying factors that have enabled problems to persist.

About the Blue Ridge Academic Health Group

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

Three basic premises underlie this mission. First, health care in the United States is experiencing a series of transformations that ultimately will require new approaches in health care delivery systems, education, and research. Second, the recent upheavals in health care have been largely driven by financial objectives. Yet the potential exists for fundamental changes in health care to improve health and manage costs. Analysis and evaluation of the ongoing evolution in health care delivery must address this impact on the health of individuals and the population, as well as on cost. Third, AHCs play a unique role in the US health care system as they develop, apply, and disseminate knowledge to improve health. In so doing, they assume responsibilities and encounter challenges other health care provider institutions do not bear. As a result, AHCs face greater risks and opportunities as the US health care system continues to evolve.

The Blue Ridge Group was founded in March 1997 by the Virginia Health Policy Center (VHPC) at the University of Virginia and the Health Market Unit leadership at Ernst & Young, LLP (now Cap Gemini Ernst & Young). Group members were selected to bring together seasoned, active leaders with a broad range of experience in and knowledge of AHCs in the United States. Other participants are invited to Blue Ridge Group meetings to bring additional expertise or perspectives on a specific topic.

Blue Ridge Group members collectively select the topics to be addressed at annual meetings. Criteria for selection of report topics include relevance to AHC operations, consistency with AHCs providing value to society, the likelihood of being able to make specific recommendations that will lead to productive action by AHCs or other organizations, and the ability to frame useful recommendations during two-day meetings.

Before each meeting, an extensive literature review is conducted. During the meeting, participants reflect on emerging trends, share experiences from AHCs, and hear presentations on specific issues. Most of the working session is dedicated to a discussion of what AHCs can and should be doing in a particular area to achieve visible progress or what public and private policy and philanthropic organizations can do to facilitate the efforts of AHCs to fulfill their societal mission. The results of the group's deliberations are presented in brief reports that are disseminated to targeted audiences.

References

Accreditation Council for Graduate Medical Education (ACGME). 2001. Annual Report. Online at http:/www.acgme.org/About/2001AnnRep.pdf.

American Board of Internal Medicine (ABIM). 2001. *Project Professionalism.* Philadelphia: American Board of Internal Medicine Publications. Online at www.abim.org.

ABIM Foundation. 2002. Medical Professionalism in the New Millennium: A Physician Charter. *Ann Intern Med* 136(3):243-246.

Association of American Medical Colleges (AAMC). 1984. *Physicians for the Twenty-First Century: Report of the Project Panel on the General Professional Education of the Physician and College Preparation for Medicine (GPEP Report).* Washington DC.

Association of American Medical Colleges (AAMC). September 1998. Issues and Strategies for Reform in Medical Education: Lessons from Eight Medical Schools. Suppl, *Acad Med.*

Association of American Medical Colleges (AAMC). 2000. A Snapshot of Medical Students' Education at the Beginning of the 21st Century: Report from 130 Schools. Suppl, *Acad Med.*

Association of American Medical Colleges (AAMC). 2002a. *Redefining Scholarship in Contemporary Academic Medicine.*

Association of American Medical Colleges (AAMC). 2002b. Cultural Competency in Medical Education and Practice. Special theme issue, *Acad Med.*

Association of American Medical Colleges (AAMC). 2002c. *AAMC Graduation Questionnaire: All Schools Report.* Washington DC.

Balas ES, Boren SA. 2000. *Managing Clinical Knowledge for Health Care Improvement. Yearbook of Medical Informatics.* Stuttgart: Schattauer, 65-70.

Barnard A. Dec 8, 2002. Radical Change in Doctor Training Needed. *The Boston Globe.*

Batalden P, Leach D, Swing S, Dreyfus H, and Dreyfus S. 2002. General Competencies and Accreditation in Graduate Medical Education. *Health Aff* 21(5):103-111.

Beattie DS. 2000. Expanding the View of Scholarship: Introduction. *Acad Med* 75:871-876.

Beck U. 1992. *Risk Society: Towards a New Modernity.* London: Sage Publications Ltd.

Bland C, Seaquist E, Pacala J, Center B, and Finstad D. 2002. One School's Strategy to Assess and Improve the Vitality of its Faculty. *Acad Med* 77:368-376.

Bloom, SW. 1998. Structure and Ideology in Medical Education: An Analysis of Resistance to Change. *J Health Soc Behav* 29:294.

Blue Ridge Academic Health Group. 1998a. *Academic Health Centers: Getting Down to Business.* Washington DC: Cap Gemini Ernst & Young US, LLC.

Blue Ridge Academic Health Group. 1998b. *Promoting Value and Expanded Coverage: Good Health Is Good Business.* Washington DC: Cap Gemini Ernst & Young US, LLC.

Blue Ridge Academic Health Group. 2000a. *Into the 21st Century: Academic Health Centers as Knowledge Leaders.* Washington DC: Cap Gemini Ernst & Young US, LLC.

Blue Ridge Academic Health Group. 2000b. *In Pursuit of Greater Value: Stronger Leadership in and by Academic Health Centers.* Washington DC: Cap Gemini Ernst & Young US, LLC.

Blue Ridge Academic Health Group. 2001a. *e-health and the Academic Health Center in a Value-driven Health Care System.* Washington DC: Cap Gemini Ernst & Young US, LLC.

Blue Ridge Academic Health Group. 2001b. *Creating a Value-driven Culture and Organization in the Academic Health Center.* Washington DC: Cap Gemini Ernst & Young US, LLC.

Blumenthal D. 1997. The Future of Quality Measurement and Management in a Transforming Health Care System. *JAMA* 278(19):1622-25.

Blumenthal D, Causino N, Campbell EG, and Weissman J. 2001. The Relationship of Market Forces to the Satisfaction of Faculty at Academic Health Centers. *Am J Med* 111(4):333-340.

Blumenthal D, Manjusha G, Campbell E, and Weissman J. 2001. Preparedness for Clinical Practice: Reports of Graduating Residents at Academic Health Centers. *JAMA* 281:1027-1034.

Bosk CL. 1979. Forgive and Remember: Managing Medical Failure. Chicago: University of Chicago Press.

Bowen J and Irby D. 2002. Assessing Quality and Costs of Education in the Ambulatory Setting: A Review of the Literature. *Acad Med* 2002:77:621-638.

Boyer, EL. *Scholarship Reconsidered: Priorities of the Professoriate.* Princeton, NJ: Carnegie Foundation for the Advancement of Teaching.

Branch M. 2000. Supporting the Moral Development of Medical Students. *J Gen Intern Med* 15(7):503-508.

Cantor JC, Cohen AB, Barker DC, Shuster, AL, and Reynolds RC. 1991. Medical Educators' Views on Medical Education Reform. *JAMA* 265:1002-1006 (Abstr).

Carraccio C, Wolfsthal S, Englander R, Ferentz K, and Martin C. 2002. Shifting paradigms: From Flexner to Competencies. *Acad Med* 77:361-7.

Commonwealth Fund Task Force on Academic Health Centers (CFTFoAH). 2002. *Training Tomorrow's Doctors: The Medical Education Mission of Academic Health Centers*. The Commonwealth Fund. Online at www.cmwf.org.

Cooke M and Irby D. 2002. The UCSF Academy of Medical Educators. A*cad Med* 77:455-6.

Detmer DE. 1997. Knowledge: A Mountain or a Stream? *Science* 275:1859-1860.

Dickstein L. 2001. Educating for Professionalism: Creating a Culture of Humanism in Medical Education. *JAMA* 285(24):3147-3148.

Donini-Lenhoff F and Hedrick H. 2000. Growth of Specialization in Graduate Medical Education. *JAMA* 284:1284-1289.

Duderstadt JJ. 2000. *A University for the 21st Century.* Ann Arbor: University of Michigan Press.

Duffy J. 1993. *From Humors to Medical Science: A History of American Medicine* (second ed). Urbana and Chicago: University of Illinois Press.

Epstein R and Hundert E. 2002. Defining and Assessing Professional Competence. *JAMA* 287:226-35.

Friedman CP. 2000. The Marvelous Medical Education Machine or How Medical Education Can Be Unstuck in Time. *Acad Med* 75:S137-S142.

Fung M, Walker M, Fung K, Temple L, Lajoie F, Bellemare G, and Bryson S. 2000. An Internet-based Learning Portfolio in Resident Education: The KOALA Multicentre Programme. *Med Educ* 34:474-479.

Glick T. 2002. How Best to Evaluate Clinician-Educators and Teachers for Promotion? *Acad Med* 77:392-397.

Goodwin MC, Gleason WM, and Kontos HA. 1997. A Pilot Study of the Cost of Educating Undergraduate Medical Students at Virginia Commonwealth University. *Acad Med* 72:211-217.

Gruppen LD, Frohna AZ, Anderson RM, and Lowe KD. 2003. Faculty Development for Educational Leadership and Scholarship. *Acad Med* 78:137-141.

Hafferty FW and Franks R. 1994. The Hidden Curriculum: Ethics Teaching, and the Structure of Medical Education. *Acad Med* 69(11):861-871.

Hauer KE and Wachter R. 2001. Implications of the Hospitalist Model for Medical Students' Education. *Acad Med* 76:324-30.

Health Resources and Services Administration. 1999. *Building Future Allied Health, Report of the Implementation Task Force of the National Commission on Allied Health.* Rockville MD.

Institute of Medicine. 1999. *To Err Is Human: Building a Safer Health System.* Washington DC: National Academy Press.

Institute of Medicine. 2000. *How People Learn: Brain, Mind, Experience, and School.* Washington DC: National Academy Press.

Institute of Medicine. 2001. *Crossing the Quality Chasm: A New health System for the 21st Century.* Washington DC: National Academy Press.

Institute of Medicine. 2003. *Health Professions Education: A Bridge to Quality.* Washington DC: National Academy Press.

Issenberg S, McGaghie W, Hart I, Mayer J, Felner J, Petrusa E, Waugh R, Brown D, Safford R, Gessner I, Gordon D and Ewy G. 1999. Simulation Technology for Health Care Professional Skills Training and Assessment. *JAMA* 282:861-866.

Jason H and Westberg J. 2001. University of Colorado, Department of Family Medicine.

Johns M. 2001. The Time Has Come to Reform Graduate Medical Education. *JAMA* 286:1075-1076.

Jones and Korn D. 1997. On the Cost of Educating a Medical Student. *Acad Med* 72:200-210

Kapur P and Steadman R. 1998. Patient Simulator Competency Testing: Ready for Takeoff? *Anesth Analg* 86:1157-59.

Leach D. 2002. Competence Is a Habit. *JAMA* 287:243-4.

Levinson W, Branch J, and Kroenke K. 1998. Clinician-Educators in Academic Medical Centers: A Two-Part Challenge. *Ann Intern Med* 129:59-64.

Levinson W and Rubenstein A. 1999. Mission Critical: Integrating Clinician-Educators into Academic Medical Centers. *N Engl J Med* 341:840-843.

Levinson W, Gorawara-Bhat R, and Lamb J. 2000. A Study of Patient Clues and Physician Responses in Primary Care and Surgical Settings. *JAMA* 284:1021-1027.

Long DM. 2000. Competency-Based Residency Training: The Next Advance in Graduate Medical Education. *Acad Med* 75(12).

Ludmerer K. 1999. *Time to Heal: American Medical Education from the Turn of the Century to the Era of Managed Care.* New York: Oxford University Press.

Ludmerer K. 2000. Curriculum Reform, 2000: An Analysis. In Milbank 2000, 11-20.

Milbank Memorial Fund. 2000. *The Education of Medical Students: Ten Stories of Curriculum Change.* New York: Milbank Memorial Fund.

Pew Health Professions Commission. 1995. *Critical Challenges: Revitalizing the Health Professions for the Twenty-First Century.* San Francisco.

Rouan, GW, Wones, RG. 1999. Rewarding Teaching Faculty with a Reimbursement Plan. *J Gen Intern Med* (14)6:327-332.

Rubeck RF, Witzke DB. 1998. Faculty Development: A Field of Dreams. *Acad Med* 79(9suppl):S32-S37.

Sackett D and Rennie D. 1992. The Science of the Art of the Clinical Examination (Editorial). *JAMA* 267:2650-2651.

Sackett DL. 1992(b). A Primer on the Precision and Accuracy of the Clinical Examination. *JAMA* 267:2638-2644.

Schoen DA. 1987. Educating the Reflective Practitioner: Toward a New Design for Teaching and Learning in the Professions. 1st ed. San Francisco: Jossey-Bass.

Small S, Wuerz R, Simon R, Shapiro N, Conn A, and Setnik G. 1999. Demonstration of High-Fidelity Simulation Team Training for Emergency Medicine. *Acad Emerg Med* 6:312-23.

Smith RC, Lyles JS, Mettler J, Stoffelmayr BE, Van Egeren LF, Marshall AA, Gardiner JC, Maduschke KM, Stanley JM, Osborn GG, Shebroe V, and Greenbaum RB. 1998. The Effectiveness of Intensive Training for Residents in Interviewing: A Randomized, Controlled Study. *Ann Intern Med* 128(2):118-126.

Starr P. 1982. *The Social Transformation of American Medicine: The Rise of a Sovereign Profession and the Making of a Vast Industry.* New York: Basic Books.

Steinert Y, Nasmith L, McLeod PJ, Conochie L. 2003. A Teaching Scholars Program to Develop Leaders in Medical Education. *Acad Med* 78:142-149

Tousignant M and DesMarchais J. 2002. Accuracy of Student Self-assessment Ability Compared to Their Own Performance in a Problem-Based Learning Medical Program: A Correlational Study. *Adv Health Sci Educ* 7:19-27.

Turnbull J, MacFadyen J, Barneveid C, and Norman G. 2000. Clinical Work Sampling: A New Approach to the Problem of In-training Evaluation. *J Gen Intern Med* 15:556-61.

Ward M, Gruppen L, and Regehr G. 2002. Measuring Self-Assessment: Current State of the Art. *Adv Health Sci Educ* 7:63-80.

Wear D and Castellani B. 2000. The Development of Professionalism: Curriculum Matters. *Acad Med* 75(6):602-611.

Weingart S. 1996. House Officer Education and Organizational Obstacles to Quality Improvement. *Joint Commission Journal on Quality Improvement* 22 (9):640-646.

Wennberg J E and Gittleson A. 1982. Variations in Medical Care Among Small Areas, *Sci Am* 246:120-134.

Whitcomb ME. 2000. Responsive Curriculum Reform: Continuing Challenges. In Milbank 2000, 1-10.

Whitcomb ME. 2002a. CME Reform: An Imperative for Improving the Quality of Medical Care. *Acad Med* 77:943-944.

Whitcomb ME. 2002b. Research in Medical Education: What Do We Know About the Link Between What Doctors Are Taught and What They Do? *Acad Med* 77:1067-1068.

Wilkerson L and Irby D. 1998. Strategies for Improving Teaching Practices: A Comprehensive Approach to Faculty Development. *Acad Med* 73:387-96.

Woolliscroft J, Harrison RV, and Anderson M. 2002. Faculty Views of Reimbursement Changes and Clinical Training: A Survey of Award-Winning Clinical Teachers. *Teach Learn Med* 14:77-86.

Zimmerman B, Lindberg C, and Plsek P. 2001. *Edgeware: Insights from Complexity Science for Health Care Leaders.* Irving, Tex: VHA, Inc.

Notes

Blue Ridge Academic Health Group Report

ORDERING INFORMATION

If you would like to order copies of this publication—or any of the others listed below—please contact

Sharen Olson
Woodruff Health Sciences Center
Emory University
1440 Clifton Road, Suite 400
Atlanta, GA 30322
Phone: 404-778-3500
Fax: 404-778-3100
blueridge@emory.edu

When requesting publications, please refer to the report number and title and provide your full name, organization name, business address, city, state, zip, telephone, and email.

Report 7: R*eforming Medical Education: Urgent Priority for the Academic Health Center in the New Century*

Report 6: *Creating a Value-driven Culture and Organization in the Academic Health Center*

Report 5: *e-Health and the Academic Health Center in a Value-driven Health Care System*

Report 4: *In Pursuit of Great Value: Stronger Leadership in and by Academic Health Centers*

Report 3: *Into the 21st Century: Academic Health Centers as Knowledge Leaders*

Report 2: *Promoting Value and Expanded Coverage: Good Health Is Good Business*

Report 1: *Academic Health Centers: Getting Down to Business*


EMORY
ROBERT W.
WOODRUFF
HEALTH
SCIENCES
CENTER