

Innovation

An Alternate Model for Medical Education: Longitudinal Medical Education Within an Integrated Health Care Organization—A Vision of a Model for the Future?

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As the health care debate in the US rages on, we need also to examine whether our medical education system is keeping pace with the changing landscape of medicine and how well it will cope with the proposed changes in health care delivery. Are we graduating sufficient numbers of physicians in the correct specialties and in a timely manner? Are medical trainees being adequately trained for the molecular and digital revolutions in science and technology? Are there other models of medical education outside of the universities that we might explore for training outstanding physicians in America in the 21st century?

We propose situating a medical school program within one of the larger progressive, nonprofit, integrated, managed care organizations in the US. At first, this may appear an audacious suggestion. The recent health care reform legislation and current policy discussions suggest that these integrated delivery systems may become the model for future care delivery. It seems legitimate to try to use their strengths in seeking solutions to the country's health care dilemmas. From this perspective, we suggest that situating modular and longitudinal medical education within a progressive integrated health care system such as a large, multispecialty group model, nonprofit health maintenance organization might provide a valid alternate stream of education and training for physicians (and other health care workers). It could draw its trainees

from a broader but ultimately not less deserving pool of applicants and potentially also help alleviate certain health care worker shortages.

We conceive of this alternate medical education course operating alongside the traditional university-based medical schools rather than replacing them. We suggest the hypothetical name *Kaiser Permanente School of Medicine* (KPSOM) to exemplify the alternative model we describe. Kaiser Permanente (KP) is a large, integrated, prepaid Health Plan with 8.6 million members and more than 14,000 physicians in eight Regions.¹ The organization has established for itself a solid reputation as a progressive health care delivery organization with a focus on preventive, patient-centered care and patient satisfaction.

The KPSOM for the training of health care workers would be one that 1) uses the existing structures of a progressive health care management organization (with existing graduate physician-training programs) and does not require the construction of new medical schools; 2) co-trains physicians, physician's assistants, nurses, nurse practitioners, and potentially even health care administrators; 3) has a streamlined and less costly admissions process and functions alongside traditional university-based medical schools; 4) acknowledges the student-centric learning style and computer proficiency of the incoming Millennial Generation (or Generation Y) students; 5) maximizes human potential by taking into account differences in learning styles and accommodating self-paced modular learning; 6) increases the number of physicians (as well as other health care workers) by drawing on a

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pool of applicants, some of whom may conventionally be considered underqualified for admission but will prove to be equally qualified after training; and 7) enhances opportunities for medical careers to students from economically disadvantaged backgrounds.

Applicants to the Kaiser Permanente School of Medicine

A central component of the school would be the admission and training of what we call the pluripotential health care worker. The baseline 1 to 3 years of learning in this school (depending on how the students pace their learning) would involve the training of a generic or pluripotential student apprentice who would be well versed in both basic science and basic medical skills at a level of competence necessary for medical students, physician's assistants, and nurses or nurse practitioners.

Because baseline training before specialist training would be pluripotential, applicants could also be selected from a broader background of applicants. In particular, applicants from underprivileged and underserved areas might be accepted into the program because learning in the program is self-paced and modular in nature, with backup mentoring and academic support (as described in the following section). The school would be attractive to a diverse range of students, including those from resource-poor settings; students interested in a career in health care but undecided about the specific direction; students who prefer the option of self-paced learning; and students attracted by the option of remaining within a large organization for residency, fellowship, and subsequent employment opportunities.

An advantage of this hypothetical model would be that it could function without some of the current constraints that render the current admissions process to university medical schools cumbersome, expensive, and drawn out. Students applying to the KPSOM would not need to apply to and interview at numerous medical schools. The current highly competitive system is draining and costly and entails students crossing the country for multiple interviews and schools investing substantial time and money into screening applications and interviewing students—overall, an exhausting, time-consuming, and costly process. This new hypothetical institution might not require the MCAT (Medical College Admission Test) for admission, because it would conduct its own in-house assessment of candidates. It would not directly compete with university medical schools because it would accept trainees from a wider pool of applicants and nurture them within

the organization to the required level of competence. The school would conduct its own in-house evaluations, monitored by the Liaison Committee on Medical Education (LCME), of students it admits. These could take the form of an initial basic competency test, followed by formative and summative testing as students progressed through the modular self-paced learning system (see the next section).

This progressive admissions policy would allow applicants from a broader range of educational backgrounds, not only from elite schools but also from underserved areas. This would make for a healthy diversity among trainees. It has been recently noted that about 75% of US medical students come from the upper wage-earning quintile of the population. According to a report on the Web site of the Association of American Medical Colleges (AAMC), the Matriculating Student Questionnaire, All Schools Summary Report for the years 2006, 2007, and 2008, 69% to 71% of students reported that their parents' gross income was \$75,000 or more, and the average was between \$149,779 (2006) and \$164,483 (2008). In these same years, 15% or less reported that their parents' gross income was less than \$40,000.² In keeping with the community mission of KP, this new training model could help redress this imbalance by accepting minority and less-privileged students. Recruitment from a wider pool of applicants would likely also increase numbers of medical, nursing, and physician's assistant graduates and might have the added consequence of increasing the supply of qualified health care workers to underserved areas.

Modular Self-Paced Learning

Education and training at this new school would be modular and self-paced but would be buttressed with sophisticated academic support and mentoring. An organization the size of KP has ample resources to provide such academic support. Students would not study in lockstep with the entire class being at the same point in the curriculum at any one point, as in most current medical school curricula, but would instead pace their own learning. Coursework would be completed in modules, and trainees could be tested for competency at critical steps in their learning before being permitted to move on to the next learning module.

Modular learning in the basic sciences would be largely Web based. Because it would not be a classic university, this new alternative medical school would

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not employ basic science faculty for lecture-style teaching. The school might partner with universities for parts of the basic science teaching. Students would be assigned (as apprentices) to KP clinical faculty members, many of whom are already clinical faculty members at local universities and are engaged in the teaching of graduate physicians. The students would shadow the faculty in clinics and hospitals while they also engaged in completing modules in clinical skills. Students would not be permitted to proceed to the next level of learning in the basic sciences or clinical skills until they had demonstrated adequate competency at each prior level of learning. Although the program would be self-paced, there would nonetheless be a limited time frame for completion of specific tracks (possibly five to seven years).

We envisage students learning the basic sciences concurrently with clinical skills so that concepts from these two spheres of knowledge would reinforce each other. The specifics of the school's curriculum model would remain to be deliberated but would be based on recommendations of the AAMC for small interdisciplinary group teaching that would incorporate aspects of problem-based and team-based learning as well the more recent recommendations of the Carnegie Foundation's 2010 report for supportive learning environments that encourage curiosity, encourage feedback improvement, and promote learners' ability to work collaboratively in health care teams.³ As recommended in the Carnegie Foundation report, the KPSOM would also, through its apprenticeship model, incorporate more clinical experiences earlier in the curriculum. Examples of current curricula that may provide guidance are Harvard Medical School's New Pathway MD Program (<http://hms.harvard.edu/admissions/default.asp?page=pathway>); the symptom-based curriculum of Calgary Medical School in Canada (www.medicine.ucalgary.ca/) and the new Paul L Foster Medical School in El Paso, Texas (www.ttuhsu.edu/elpaso/); and the "longitudinal integrated" clerkship curriculum of the Cambridge Health Alliance and Harvard Medical School (www.cha.harvard.edu/academics/integrated_clerkship.shtml) in Boston.

It is anticipated that the students would learn better and more quickly because the program would be embedded in an integrated health care system. While proceeding with their modules in the basic sciences, students would work at KP as clinician apprentices. Initially, they would do very basic clinical work while shadowing experienced physicians in clinics and hospitals, and only after demonstrated basic clinical competencies would they proceed to more self-reliant clinical work.

Millennial Generation or Generation Y: Self-Based Style of Learning

A curriculum of self-paced modular learning has a number of advantages. First, it would accommodate differences in students' learning styles and would be advantageous to students from challenged backgrounds by allowing them to proceed through the program at their own learning pace (within certain time limits). Second, it would accommodate the self-based learning style of the "Millennial" or "Generation Y" students who are generally adept at computers and are swift at information retrieval from the Internet, who ostensibly have shorter attention spans than students in past generations, and who prefer to take charge and be at the center of their own learning.⁴ Third, it would take account of the exponential increase in medical knowledge by presenting it in modular form and allowing students to pace their learning.

The Pluripotential Baseline Trainee

The first benchmark phase of the KPSOM would be the training of a pluripotential health care worker who would subsequently proceed with more specific training along designated tracks toward becoming a physician, physician's assistant, nurse, nurse practitioner, or health care administrator. Each track would have graduated levels of competency in training, and trainees would have to demonstrate adequate competency at each level before being admitted to the next.

Many students might know from the start which graduation track they wish to pursue, but all would initially go through the gatekeeping pluripotential track, during which they would also be tested for their natural learning styles, aptitude, and acquired competencies before being admitted to the graduation track of their choice. Such monitoring would maximize human potential because there would presumably be a closer fit between candidates' aspirations and their true capabilities. A trainee who did not qualify for the physician track might still be offered the choice of the less demanding physician's assistant track. After completion of the basic gatekeeping pluripotential track, the different tracks would, however, not be melded but would be separate and have strict competency attainment requirements. This hypothetical new school could afford having different tracks of health care professional training because unlike a university medical school, it would ultimately offer employment to most graduates in the different tracks.

Regarding administrative regulation of the school, the LCME—which currently appears to be interested

in innovative projects in medical education—would maintain its standard accrediting and regulatory role at all stages of the school's development, as it does for all other US medical schools. Students would be required to pass the standardized National Board of Medical Examiners subject examinations as well as the US Medical Licensing Examination steps 1, 2, and 3 for licensure. In any case, in 2010, the centennial year of its groundbreaking *Flexner Report*, the Carnegie Foundation released another call for reform, *Educating Physicians: A Call for Reform of Medical School and Residency*,³ in which it drew attention to the need for reform with regard to admissions, accrediting, certifying, and licensing in medical education in a manner that resolves conflicts but ensures diversity of medical schools. The first two of the report's seven recommendations read as follows³:

1. AAMC and medical schools work together to revise premedical course requirements and admission processes, ensuring the diversity of those in medical schools.
2. Accrediting, certifying, and licensing bodies together develop a coherent framework for the continuum of medical education and establish effective mechanisms to coordinate standards and resolve jurisdictional conflicts.

Students as Reduced-Tuition Employees of the Organization

Tuition would be reduced because students would be admitted as part-time employees and would perform, in their roles as clinical apprentices, basic clinical service functions for the organization's clinics and hospitals. Conceivably, as employees they might also receive a reasonable stipend to cover living expenses. Analogous education models exist within engineering schools in which students may spend half the year within the university and the other half employed by an engineering firm (Richard K Miller, personal communication, May 2009).^{4,5} The organization would ensure that appropriate supervision is provided at all times to guarantee that patient safety and quality of care is maintained.

Students of the new school would graduate with less financial debt than students of university medical schools and would therefore not be unduly influenced by considerations of the size of tuition loans in their choice of medical specialty training, as is happening with current medical school graduates applying for residency. Moreover, a less costly system may be enticing to students from disadvantaged educational backgrounds as well as to more accomplished students from better endowed institutions. This would enhance the diversity

of the school's student population and may ultimately also increase the numbers of physicians choosing to return to work in resource-poor settings.

The financing of the school itself, which may require some additional infrastructure but little physical construction, may come from KP itself, particularly if it viewed the venture as a good investment. Because the school would attract students from resource-poor settings, additional financing might be obtained via the federal government, such as through new health care legislation,⁶ or through state support, or from large philanthropic organizations with an interest in education such as the Carnegie or Rockefeller Foundations.

The Lifelong Medical School: Residency, Fellowship, Cross-Training, and Continuing Medical Education

The KPSOM would continue and expand its own in-house residency and fellowship programs that encompass a number of medical specialties and subspecialties. Medical student trainees would apply from within the organization for specialty training at any one of its many hospitals.

Because the medical school and residency programs would be housed within the same organization, applications for residency would also be greatly facilitated. The drawn-out and costly process of the current residency application and cross-country interview process, which consumes the better part of the fourth year of medical school, would be obviated. This time saving could eliminate a year of medical training for the motivated, quicker-paced student or else provide the additional time required for the slower-working, self-paced student. During their 'medical school' training, students would be carefully monitored, evaluated, and assessed for their aptitudes and learning styles in deciding about residency. The processing of applications from within the organization would not only streamline the process but also might improve quality control and standardization of applications. Residency programs would also be largely modular in structure and self-paced for the learning of clinical competencies.

Although there might be some loss of diversity among residents who all derive from the same organization, compared with residents entering from a variety of different medical schools, the gain to the residency program would be in having a more carefully monitored, standardized, and appropriately matched (by aptitude, learning style, and intellectual capability) program of residents. Students would not be required, however, to

complete all their clerkships and rotations within the school but would be encouraged to do rotations outside of KP, which already has formal affiliations with medical schools such as those with the University of California, San Francisco; Stanford University; the University of California, Los Angeles; the University of California, Davis; the University of Southern California; and the University of California, Berkeley (public health). Depending on their examination grades, performance, and recommendations, students from KPSOM applying for rotations, residencies, and fellowships

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outside of the organization should be readily competitive with students from other medical schools. Applications to outside programs should not present a compatibility problem, as KP already interfaces with several such residency programs.

The program might also admit a limited number of residents from other US medical schools as well as graduates of foreign medical schools, who would also be carefully assessed and then slotted into the appropriate phase of the training program. Currently, international medical applicants to US residency programs are required to repeat their entire residency training regardless of their prior training and competency. In this proposed alternative medical school, foreign residency applicants would nonetheless still have to pass US medical board examinations and satisfy all LCME accrediting requirements.

Applications to fellowship programs, which would also be in-house, would be similarly handled. The proposed KPSOM would also readily accommodate cross-training of its employed physicians into different associated subspecialties, a trend that is occurring increasingly as medical knowledge expands. For instance, the increasing role of invasive radiologic techniques and laparoscopic surgical techniques has changed management in a variety of surgical disciplines. Finally, continuing medical education programs would be easier to implement and monitor from within the organization, whereas the current system of accumulating continuing education credits is often seemingly haphazard and fragmented.

Continuity of Care, Preventive Care, and Patient Satisfaction in the Lifelong/Longitudinal Medical School

Because most trainees would continue their training within the organization initially as medical students, then as residents, fellows, and finally as fully employed physicians, they could provide better continuity of care

for patients over this extended period of participation in the organization. This would lead to both enhanced patient care and, as a consequence, overall higher levels of patient satisfaction. Instead of experiencing continual disruptions in their care with frequent changes in physicians and hospitals, patients would continue to see the same physicians they initially encountered when these physicians were medical students or residents and who would therefore have a more substantial grasp of their ongoing health care needs over time.

In addition, with enhanced continuity of care, the organization could implement highly effective longitudinal preventive-care programs, which would lead to improved health outcomes and patient satisfaction. The integrated modular nature of this course would allow for flexibility in learning styles to be matched with the flexibility that would be needed of the future workforce. It would promote the concept of teamwork at an early stage, improve communication between trainees and teachers, and redefine the apprentice model in the 21st century.

Summary

In brief, the hypothetical KPSOM could be envisaged as a model of a lifetime medical school that would initially draw candidates from a diverse socioeconomic pool of applicants and guide them through a series of carefully monitored, modular, self-paced basic science and clinical skills learning programs, up to a phase where they would branch out into specialty programs leading to graduation as physician, physician's assistant, nurse, nurse practitioner, or health care administrator.

Tuition would be less costly because students would also be employees of the organization and would likely remain in the organization throughout their extensive training careers, from medical school and into subspecialty certification—and possibly as full-fledged physician employees. This system would be satisfying to patients as well as students because it would provide more effective longitudinal and preventive care.

The model is offered as an alternate stream of medical education that would not supplant university medical schools but would operate alongside them. This alternate model might serve to increase the number of qualified physicians without the need to build more costly medical schools, and it would train a broader range of health care professionals from diverse backgrounds within the same organization. ❖

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The Most Essential

The most essential part of a student's instruction is obtained, as I believe, not in the lecture room, but at the bedside. Nothing seen there is lost; the rhythms of disease are learned by frequent repetition; its unforeseen occurrences stamp themselves indelibly in the memory.

—Medical Essays, *"Scholastic and Bedside Teaching,"* Oliver Wendell Holmes, 1809-1894, American physician, professor, and author