An osteopathic prescription for medical education reform: Part 1. Curriculum and infrastructure

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Medical education has not kept pace with the evolving healthcare system. Criticism from industry and policy observers focuses on four major areas requiring reform: the curriculum, the fragmented educational infrastructure, the specialist-to-generalist mix, and the alienation from community and public health. The dominance of managed care organizations in the delivery and financing of healthcare is forcing a new set of physician competencies to the fore and changing projections of physician manpower and specialty needs. The authors address the four major criticisms from a uniquely osteopathic point-of-view. In this first of two articles, the authors describe the evolving osteopathic medical education model, and then employ a medical analogy to diagnose the causes of and propose treatments for curricular issues and infrastructure fragmentation. In the second article of the pair, they explore the causes of and propose strategies to address the generalist-to-specialist imbalance and the alienation of medicine from community and public health; the article also explores the role of technology in support of reform. In each article, the authors propose treatments to correct the problems in the osteopathic medical education model, and conclude that the profession is well-positioned to lead medical education reform.

(Key words: osteopathic medical education, managed care, medical education reform, curriculum reform, graduate medical education, fragmentation)

Educational reforms, begun in response to alterations in the healthcare delivery system, must engender a total revitalization of the medical education infrastructure, including an infusion of the principles of population medicine and community/public health, and the application of emerging information and communications technologies. Medical schools, residency programs, and teaching hospitals committed to supporting sustained growth in technology-based specialty healthcare suddenly find themselves reevaluating their purpose and their product with respect to the current evolution in healthcare delivery. This transformation in medical education, caused by monumental market forces acting on the healthcare industry, requires innovative and visionary solutions to ensure a capable physician workforce for the next millennium.

To adequately educate physicians for the future, the medical education model:

- must reflect the growing dominance of managed care and integrated delivery networks.
- must focus on improving students' ability to: use outcomes measures to inform care decisions; coordinate appropriate care across the continuum of healthcare services; communicate collaboratively with allied health providers and community service agencies; increase patient, payer, and provider satisfaction; and reduce cost.
- must effectively shift the focus of education from illness to include health and wellness, from the individual to the population, and from care provided in a single setting to care across the continuum.
- must shift the focus of training from the traditional hospital-based acute-care setting to more ambulatory and community-based training sites.
- must align each component of the educational experience so that formerly compartmentalized nodes of instruction fit together as an integrated and synthesized whole.

Graduating physicians, in large number, feel poorly prepared to function effectively in many of the areas adjudged to be essential in the evolving managed care–based delivery system.[1] To correct problems within the vertically and horizontally fragmented medical education system, institutions also must collaboratively revise their curricular content and context, commit resources to faculty development and retraining, accommodate revisions in the funding and responsibility for graduate medical education (GME), and realign medical education to embrace an emphasis on cost-efficient, team-coordinated care delivered in appropriate settings.

Osteopathic and allopathic medical institutions, alike, suffer from several maladies in the wake of the rapid changes occurring in the health financing and delivery system. Criticisms of the current medical education model affecting both osteopathic and allopathic medical schools include:

- ☐ the maintenance of a curriculum that does not adequately address the current trends in medical practice, accommodate the exploding biomedical information base, or integrate new communication technologies;
- ☐ the continued reliance on an inefficient and fragmented educational infrastructure;
- ☐ the production of an abundance of specialists and subspecialists uniquely trained to function in the hospital-based acute-care environment; and

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☐ the continued alienation of medicine from community and public health.

The first two criticisms deal with the need to reform the education system in order to accommodate the competencies required of future physicians. The final two criticisms focus on the necessity of instituting reforms to influence the outcome of the medical education system. Several reports from the Council on Graduate Medical Education, the Pew Charitable Trusts, and the Institute of Medicine recognize these criticisms as among those most pressing in the reform of medical education.[2]

The first article of this two-part series concentrates on strengths of the osteopathic medical education model, treating the chronic problems of the osteopathic medical education curriculum, and fragmentation in the healthcare delivery and education system. The second article will address the specialist-to-generalist mix and creation of a community health system, and will conclude with a view of how emerging technologies are facilitating reform in these four areas.

Osteopathic medical education model

The osteopathic medical education model is particularly relevant to the demands of the evolving delivery system.

■ Osteopathic medical education exhibits a proven track record in producing highly trained generalist physicians with distinctive training in a holistic, preventive approach to healthcare.

■ The whole-body focus within osteopathic medical education positions the profession at the forefront of current industry movement away from disease-based healthcare and toward total health promotion and maintenance.

■ The relative size of the osteopathic medical profession makes rapid change to the evolving educational paradigm less cumbersome than in the allopathic medical profession. Industry transformations signal a reversal in the physician discipline characteristics previously valued in medical education and practice (generalist over specialist).

■ Colleges of osteopathic medicine (COMs) do not carry the weighty burden of large tertiary care centers that present a challenge to most of allopathic medicine in the evolving market. The osteopathic medical profession's tradition of affiliating with community-based hospitals better situates it to quickly establish and nurture collaborative relationships. Emerging community-focused care systems are realized through medical staffs composed of community-based adjunct faculty.

■ The consortium approach to GME has been embraced by the profession through its new accreditation process for osteopathic graduate medical training, creating a vertically integrated medical infrastructure and the potential for a coordinated medical education continuum linking undergraduate and graduate medical education.

■ COMs have taken a discernible lead in accommodating innovative communication and information systems in education.

Visionary leadership in osteopathic medical education, combined with the profession's strengths, favorably position the osteopathic medical profession to take a lead role in modeling and shaping an innovative educational infrastructure for all of medicine.

Treating the chronic problems of the osteopathic medical education curriculum

In a witty but pointed 1978 essay, noted medical educator Stephen Abrahamson, PhD, of the University of Southern California School of Medicine, described nine "diseases" of medical school curricula.[3,4] Although these problems persist today in most osteopathic and allopathic medical school curricula, more is now known about the causes and treatment of such "diseases." Four chronic syndromes and diseases of medical education are described in the following text, with discussion of predisposing factors, causes, and treatment. Successful treatment of these problems will provide osteopathic medical education with a clear sense of direction and the flexibility needed to continuously update both curriculum content and learning methods as we educate osteopathic physicians for the 21st century. Left untreated, these problems will continue to plague osteopathic medical education with poorly integrated, inflexible curricula producing graduates ill-prepared to practice cost-effective medicine and engage in life-long learning.[2]

Basic biomedical atrophy

The first major syndrome, "basic biomedical atrophy," is suffered by many medical students as well as physicians in graduate training and practice. Symptoms include malaise, listlessness, irritability, and complaints about lack of relevance while taking basic science courses. Clinical trainees display forgetfulness concerning basic science concepts and an inability to apply the concepts they remember to clinical cases; experienced physicians often exhibit near-complete atrophy of basic science knowledge.

■ **Causes:**

☐ compartmentalization of basic sciences in the first 2 years of medical school (an unintended and disastrous effect of the 1910 Flexner report[5]);

☐ basic scientist dogmatism ("Never mind why you need to know this, you'll see why later") coupled with negative role modeling by clinicians ("You don't need all that basic science to practice medicine");

☐ passive learning methods emphasizing acquisition of disciplinary facts with little reference to clinical applications;

☐ selection of basic science curricular content with an emphasis on disciplinary inclusiveness rather than clinical relevance.

■ **Treatment:**

☐ explicit clinical framework provided for all curriculum content;

☐ "push-pull" integration of basic and clinical science learning activities throughout the continuum of physician training;

☐ discussion among faculty of the multiple roles of basic science knowledge in clinical reasoning (that is, describing cases, explaining findings, diagnostic reasoning in easy vs difficult cases);

☐ holistic osteopathic themes throughout the curriculum;

☐ more active, independent, integrative forms of learning.

Chronic curricular rigidity

The second syndrome is "chronic curricular rigidity." During a long period of time, faculty acknowledge curricular shortcomings and prescribe palliative treatments—that is, tinker with individual lectures and courses—never achieving any satisfying global curricular change. Important interdisciplinary topics fall through the rigid curriculum, never to be seen again.

■ Causes:
☐ lack of clear curricular outcome objectives;
☐ lack of rewards and incentives for faculty to engage in interdisciplinary curricular reform;
☐ entrenched departmental ownership of disciplinary courses;
☐ no mechanism for coordinated updates to curriculum content to meet such demands as managed care, the aging population, health promotion, minority health issues, etcetera.

☐ Treatment:
☐ a modular, interdisciplinary curriculum framework;
☐ an institutional commitment to ongoing curriculum review and thoughtful revision;
☐ a strong curriculum committee role in curriculum design, with balancing departmental participation.

Massive curricular hypertrophy

Third, and closely related to the second syndrome, is "massive curricular hypertrophy," which persists much as described by Abrahamson.[4] Students suffer from confusion, headaches, eyestrain, and "evaluation myopia" (living from one test to the next).

■ Causes:
☐ the biomedical information explosion;
☐ the curricular focus on rigorous disciplinary courses;
☐ academic elitism ("Everything I know is very important and therefore you have to learn it too");
☐ lack of clear curriculum goals and priorities;
☐ fact-oriented evaluation processes requiring binge-and-purge memorization of isolated chunks of knowledge.

■ Treatment:
☐ clear clinical performance goals for the curriculum to help to set content priorities and resolve "depth versus breadth" issues;
☐ teaching of information retrieval skills and self-evaluation habits;
☐ use of clinically-oriented evaluation methods such as case scenarios and simulations.

The clinical training blues

Finally, we have the "clinical training blues." Students and graduate medical trainees suffer from vague, but potentially crippling, anxiety about their clinical competence, the quality of their clinical learning experiences, and the ambiguous criteria by which they will be evaluated. Anxious, depressed trainees display obsequious behavior toward their preceptors and training directors as a way to ensure favorable subjective evaluations.

■ Causes:
☐ lack of clear clinical training goals and evaluation criteria;
☐ an unstructured, ad hoc, opportunistic apprenticeship model of clinical education;
☐ lack of continuity with undergraduate medical education.

■ Treatment:
☐ structured, and thorough clerkships and GME;
☐ clear, realistic performance expectations;
☐ closer integration of undergraduate and graduate osteopathic medical education through osteopathic postgraduate training institutes (OPTIs);
☐ independent study materials to supplement available clinical cases;
☐ incentives and faculty development for preceptors and training directors.

Discussion

The common thread among all the "treatments" for chronic curriculum problems is the need for a well-articulated, comprehensive osteopathic framework of physician skills, attitudes, and knowledge to drive curriculum design and evaluation of student learning. General performance standards are implicit in most problem-based-learning curricula; however, the osteopathic medical education community must develop a more explicit framework of clinically oriented goals.

Several efforts to define "clinical exit objectives" for medical school curricula are under way. The Ohio University College of Osteopathic Medicine (OUCOM) created a concise list of exit objectives in 1991, but the list requires expansion and revision. The Kirksville College of Osteopathic Medicine (KCOM) has recently adopted and modified a more extensive set of exit objectives (personal communication with L. Heun, PhD, assistant professor of General Practice and Family Medicine, and J. Kangas, MS, Curriculum Coordinator, Medical Education Department , KCOM, June 1996). In allopathic medical education, the Association of American Medical Colleges has begun a national Medical School Objectives Project, in which Brown University School of Medicine is an acknowledged leader in involving faculty, administration, and medical students in the development of curricular outcome objectives.[6]

In another approach to the same issue, the University of Calgary Faculty of Medicine has analyzed and reorganized the school's curriculum content around 120 common clinical presentations, such as chest discomfort, breast mass, skin blister, and anemia/pallor/fatigue.[7] Calgary's new curriculum increases the integration of basic and clinical sciences while maintaining medical students' perceptions of workload and stress at the same level as the previous curriculum.[8] The University of North Texas Health Science Center at Fort Worth College of Osteopathic Medicine (TCOM) has recently experimented with a clinical presentation module concerning dyspnea (personal communication with J.W. Anderson, EdD, Associate

Dean, Department of Educational Planning, and J. Shores, PhD, Director of Faculty/Curriculum Developer, Department of Medical Education, TCOM, November 1996). The recent development of the COMLEX (Comprehensive Osteopathic Licensing Examination) Level 3 by the National Board of Osteopathic Medical Examiners reflects an increased emphasis on common osteopathic primary care clinical presentations.[9]

The treatments also require more integration of focused, interactive independent study to supplement group-oriented learning. Good independent study materials with clear learning goals can foster basic science and clinical integration, and encourage student self-evaluation in a low-risk setting. In the early years of medical school, tutorials and case simulations build life-long learning habits and help students to understand clinical applications of basic science content. In clinical settings, independent study materials can add needed structure to clinical training, support clinical skills development, and supplement available clinical cases to create more thorough and consistent learning.

Much work remains to be done to specify the details of a modular, flexible curriculum. Ideally, it will integrate osteopathic principles and other factors shaping the healthcare environment, and use psychologically appropriate and technologically advanced learning methods. The rewards will be large: such a curriculum will attract a large, diverse, committed body of students and will prepare its graduates to lead osteopathic medicine into the next millennium.

Integrating the fragmented delivery and education system

"The toe bone's ***not*** connected to the foot bone, the foot bone's ***not*** connected to the anklebone, the anklebone is ***not***...." (adaptation of the traditional African American spiritual "Dem Bones").

In 1994, the World Summit on Medical Education identified the lack of coordination between education and medical practice as its chief concern.

> *The disjunction between medical education and the medical practice environment*
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> Good medical education demands a useful match with the healthcare [delivery] system. A contemporary doctor cannot be trained in [the] university hospital alone. Without such partnership, the educational programme [sic] will be of limited relevance to the realities of practice, and will not provide appropriate training to meet the needs of the population to be served.[10]

Fragmentation in the delivery of healthcare and in medical education compromises efforts to streamline the provision of care, and compounds problems of adequately preparing physicians for the 21st century. Private physician practice, throughout the past 50 years, with its attendant reimbursement system contributed greatly to fragmentation in healthcare delivery. The fee-for-service/indemnity insurance system had at its core a cottage industry of hundreds of thousands of small businesses—solo practitioners and partnerships—with thousands of separately governed hospitals that courted solo-provider businesses. The recent move toward the managed care–based delivery system and the push to establish integrated delivery systems restructure the incentives to promote coordination among physicians and all health professions to improve overall community health.

Healthcare delivery has typically consisted of an uncoordinated mix of "episodes"—a fragmented series of outpatient visits, inpatient hospital stays, and outpatient follow-up or home care—lacking systematic design. Because clinical instruction takes place within this existing delivery system, fragmentation in the delivery of care has contributed to the overall fragmentation in medical education. The current generation of clinicians and academicians has been educated to perform and thus continue to educate in relation to this dysfunctional paradigm. Thus, altering the educational model to address marketplace transformations will require a Herculean effort to remove deeply-rooted attitudes, perceptions, and routines inappropriate to the new educational requirements.

■ **Causes:**

☐ curriculum expansion in response to externally imposed professional licensure, certification, accreditation, and credentialing requirements;

☐ separation of preclinical from clinical training—professors with PhDs have displaced physicians in teaching the basic sciences contributing to intense fragmentation between these phases of medical education;

☐ fragmentation of the undergraduate, graduate, and continuing medical education (CME) process producing disjointed curricular oversight and a disjointed response to change;

☐ four separate payment streams funding medical education—Medicare, employee benefits, Medicaid, and direct consumer spending—produce fragmentation among the delivery sites for undergraduate, graduate, and continuing medical education.

Policy makers, in their efforts to address health issues, have historically used and developed distinct payment streams that have contributed to:

☐ an increase in the physician workforce,

☐ a complex division of labor in healthcare,

☐ reward for specialization above generalism, and,

☐ financing GME with direct service dollars.

The existence of four sources of financing, each with different politics and interests, prevents the centralization of health policy, promotes fragmentation, and thwarts medical education reform efforts.

■ **Treatment:**

☐ integrate curricula from matriculation through residency and CME to support Continuous Quality Improvement of programs and outcomes measures;

☐ create educational consortia that structure the relationships between all the providers of medical education and form a basis for research consolidation;

☐ utilize the sophisticated information systems available to enhance education

and communication among educators to overcome geographic barriers and introduce resource efficiencies;
☐ closely coordinate medical practice requirements and medical education content to keep pace with change;
☐ relocate clinical education into integrated settings as managed care integrates practice delivery.

Discussion

The educational content of undergraduate programs and medical school have historically consisted of uncoordinated blocks of training, each milestone signaling a distinct end to a phase of preparation. Transformations in the service delivery sector, the explosion of biomedical information, and a realization that medical graduates are increasingly ill-prepared to function in the evolving practice environment have prompted educators to restructure the educational process along a more defined and monitored continuum. By creating educational systems linking the distinct components of the educational experience, educators and institutions gain more control over the content and synthesis of information occurring in both the lecture halls and in the clinical environment. Inasmuch as education within this system follows an orchestrated plan, the seamless flow promotes educational efficiency, and makes outcomes of physician training more predictable. The continuum concept in medical education will (1) facilitate the integration of basic science and clinical instruction, (2) foster self-learning opportunities, and (3) support health professions' collaborations in the form of team care within an integrated organizational structure.

To facilitate the integration of segmented educational blocks, educational institutions and training sites are coming together to create educational consortia. Consortia are cooperative ventures that provide a coordinated focus to achieve common goals. Their success is dependent on enlightened self-interest, the balance of cost and benefit, and the breadth of human and technologic resources to promote collective efficiency. Consortia foster innovation through collaboration, and the participants, through self-selection, become agents of change. In a team-oriented, cooperative environment, participants combine ideas from previously unconnected sources to test previously defined limits and boundaries.[11]

The osteopathic medical education community has already achieved great success with the Consortium for Osteopathic Graduate Medical Education and Training (COGMET) at Michigan State University College of Osteopathic Medicine (MSUCOM) and the Centers for Osteopathic Regional Education (CORE) at OU-COM. The two consortia have partnered with several osteopathic hospitals in their states, joining together in a more coordinated effort to provide quality graduate medical education. COGMET was formed in 1989 to improve the quality of osteopathic GME in Michigan by combining the resources of 13 osteopathic hospitals and Michigan State University—the system has since grown to 17 hospitals.[12,13] The CORE system in Ohio, implemented on July 1, 1995, consists of five regional CORE sites across the state, and combines the resources of 13 Ohio osteopathic hospitals and Ohio University.[13] Powerful, interactive video communication, distance-learning technologies, and system-wide communications networks (OhioONE and COREnet) link all members of the CORE system.

In the consortium approach to osteopathic graduate medical education, the emphasis is on training physicians in a continuum, rather than in the traditional compartmentalized system of the past. The new educational approach seeks to vertically integrate the process of osteopathic undergraduate and graduate medical education and to cosponsor all clerkship, internship, and resident programs in member hospitals. By connecting previously detached bundles of knowledge in a more coherent and efficient educational plan, the continuum spans matriculation through the end of residency training and beyond to CME.[14]

In July 1995, the American Osteopathic Association (AOA) Board of Trustees passed a controversial new regulation for the accreditation of osteopathic GME by establishing the OPTI system. The OPTI system sets the standards for the minimum number of residency programs and interns and residents to be trained by the OPTI, and requires college (COM) affiliation for all GME programs.[15] The OPTI-consortium model emphasizes collaboration, shared resources, consensus decision making, shared responsibility, and a commitment to excellence in osteopathic undergraduate and graduate medical education.

In practical terms, the OPTI system establishes the first step to unite the historically separated and compartmentalized educational modules to produce a seamless educational continuum with shared responsibility and accountability in all of osteopathic medical education. The OPTI system requires that COMs and hospitals work together, outlines a framework for collaboration, and sets minimal standards for the numbers of graduate programs and trainees necessary to constitute an OPTI.[16]

Two additional steps are needed to complete the continuum model, beyond the OPTI: the integration of the entire undergraduate medical education with the OPTI, and the extension of OPTI principles (facilitated by technology) into CME.

To maximize the ability to train physicians in the various relevant treatment settings, consortia must look outside the traditional training paradigm and direct efforts to cultivating managed care organizations as training partners. Managed care organizations could and should provide excellent sites for clinical training. They fulfill the need for ambulatory care teaching settings; they provide care to defined populations emphasizing prevention and cost-effectiveness; and they practice utilization review and quality assurance. However, the availability of medical student experiences in group and staff model health maintenance organizations (HMOs) remain relatively scarce. A 1994 survey of 125 US MD-granting institutions (with a 99% response rate) conducted by the Liaison Committee on Medical Edu-

cation revealed that in 17 schools all students had an experience in an HMO and in 58 schools, some students had such experiences.[17] In October 1995, the Council of Teaching Hospitals, whose members train 75% of the nation's residents, reported that only about 20%—53—hospitals use HMO sites for the training of house staff.[18]

Comments

The pace of changes taking place in the healthcare delivery and finance system mandate correspondingly swift action on the part of the nation's medical education infrastructure to accommodate instruction and training in the new and expanded competencies required of physicians. The proven strengths of the osteopathic medical education model, along with recent innovations in the osteopathic medical education infrastructure requirements, position the profession well to take a lead role as a model of a reformed medical education system.

The first article of this two-part series, prescribing strategies for correcting the maladies of the osteopathic medical education system, presents several treatment options for creating a new medical education system. By correcting curriculum dysfunction and system fragmentation, the osteopathic medical education model can improve on its ability to produce physicians in accordance with the demands of the 21st century. Without forward thinking and proactive corrective treatment, the osteopathic medical community will compromise its current successes and forfeit the opportunity to establish a viable model for the future.

The second article in this series, to appear in the August 1997 issue of *JAOA*, will address the reforms necessary to influence the outcome of the medical education system—tomorrow's physician workforce. The article will explore the options open to osteopathic medical education programs to influence the specialist-to-generalist mix, and the profession's ability to produce physicians prepared to accept accountability for the health status of the communities they serve. The article will then look at the opportunities that emerging communication and education technologies offer to support reforms recommended in both articles addressing the four maladies of the medical education system.

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