Complementary and Alternative Medical Therapies: Implications for Medical Education

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Increased use of complementary and alternative medicine (CAM) has made it imperative that these topics be included in medical education from the preclinical years through residency and beyond. There has been progress in this direction in recent years, with a steady increase in the number of medical schools that include CAM therapies in their curricula. There remains, however, a lack of clear goals and concrete suggestions for implementing these changes. This article examines the questions that arise when medical educators consider how to incorporate CAM therapies as an integral part of the medical curriculum. It offers practical suggestions for finding time in an already packed curriculum, getting started, including faculty and students in the process, and sustaining the initiative with the necessary administrative and institutional support.

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Few changes have occurred in health care as rapidly, or affected health care as profoundly, as complementary and alternative medicine (CAM) (1). A recent study showed that visits to CAM practitioners increased by more than 47% from 1990 to 1997 (2). Although insurers and managed care organizations are increasingly considering coverage (3), patients pay billions of dollars for CAM therapies (2). Not since the childbirth education movement of the 1950s and 1960s have Americans taken such active interest in what has previously been the province of medical doctors.

Information is available from magazines, books, newspapers, and the Internet but can be more confusing than helpful. People may logically turn to their primary care physicians and subspecialists for guidance and information about the benefits and safety of CAM therapies, but mainstream medical education has not traditionally prepared clinicians for this role. There is concern that less than 40% of patients discuss their use of CAM therapies with their primary care physicians (2). Moreover, this disclosure rate has not increased over the past several years, despite the increase in the use of CAM therapies (2, 4).

Recent reports highlight the need for all physicians to have basic knowledge of CAM, especially in regard to the use of herbs. Consider the study reported in *The Lancet* in which healthy volunteers were given the HIV protease inhibitor indinavir. When they subsequently took St. John's wort, the plasma level of indinavir was seriously reduced (5). Other incidents of unintended adverse effects of herbs have been reported (6, 7). For these reasons and more, information about CAM therapies should be included at all levels of medical education, from undergraduate to continuing medical education. This belief is shared by medical educators in other countries (8).

The State of CAM Education in U.S. Medical Schools

A look at curriculum content in the nation's medical schools reveals a growing tendency to include CAM therapies. According to a 1996–1997 American Medical Association survey, 46 of 125 U.S. medical schools offered CAM topics as part of a required course (9). In a subsequent survey in 1998, 75 medical schools reported offering CAM electives or including these topics in required courses (10). Authors using data from the 1999–2000 American Medical Association Liaison Committee on Medical Education Annual Medical School Questionnaire and other sources reported that 82 schools included content related to CAM as part of a required course (11). In the 1998 survey, 81% of the schools that include CAM in the curriculum did so by adding stand-alone courses or electives, 41% included these topics in required courses, and 23% had both stand-alone courses and topics as part of a required course (10). Adding an elective course that provides a comprehensive overview of CAM is one way to respond to the current trend, but it may tend to marginalize CAM in the minds of students, faculty, and deans as a frill or a subject for a few interested faculty and students. Often these courses are not in accordance with the overall goals and objectives of the school. They may lack budget support, be ill placed in the education sequence, or be diminished in importance by being scheduled during inconvenient times. Incorporating knowledge of CAM therapies in existing required courses ensures that all students receive minimal exposure to the topics, but doing so raises the question of what to omit. Either approach depends heavily on deans and course directors who have a particular interest in or knowledge of CAM therapies and does not substantially affect the basic fabric of medical education.

In addition, there are the usual barriers of lack of money, lack of time to plan and prepare, and sometimes outright animosity on the part of faculty. Some faculty members object because they see CAM as "unscientific," owing to the lack of mechanistic explanation or demonstrated clinical efficacy for many CAM therapies. They may fear that involvement with this area will be viewed as advocacy and be detrimental to opportunities for promotion. Others equate CAM with the most bizarre and ex-

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tremist treatments and remedies or have no knowledge of what CAM implies.

How Shall We Prepare the Physician of the Future?

Since 1997, the Special Interest Group on Complementary and Alternative Medicine of the Association of American Medical Colleges has discussed the emerging necessity of incorporating CAM into medical education at their annual meetings (12). Founded and convened by Patricia Muehsam, MD, of the Mount Sinai School of Medicine, working groups have grappled with ideas of how to develop practical strategies for the initial and later phases of curriculum development. They have discussed such questions as: Which CAM topics should be included in the medical school curriculum? What level of CAM information do allopathic doctors need? What teaching methods and formats are most effective? Who should instruct students about CAM risks and benefits? How can education about CAM therapies gain faculty and administrative commitment and support? How can CAM information be incorporated into existing curricula without marginalizing content? and What is a tenable vision for the future of CAM education?

An integrative approach to curriculum development in which CAM topics are found throughout courses and across the years of medical education continues to be the guiding vision of many educators who are engaged in this discussion (13). The goal is not to create CAM as a separate educational entity but to include it seamlessly with the full range of therapeutic modalities throughout the preclinical, clinical, and graduate medical curricula.

Signs of Progress

There is evidence that the trend is moving in this direction. Recently, the faculty council at Harvard Medical School voted to establish a Division for Research and Education in Complementary and Integrative Medical Therapies (14). Albert Einstein College of Medicine, Columbia University, Duke University, Mount Sinai School of Medicine, Stanford University, University of Arizona, University of Maryland, University of Pennsylvania, and several branches of the University of California are among the 75 medical schools previously noted that include CAM topics in their curricula (10), although the support of faculty is by no means unanimous (15).

At Georgetown University School of Medicine (Haramati A. Personal communication), Jefferson Medical College (Rosenzweig S. Personal communication), and the University of Minnesota (Kreitzer MJ. Personal communication), CAM competencies are articulated throughout the educational programs. Georgetown faculty have embarked on an educational initiative to integrate relevant CAM material throughout the 4-year curricula by introducing CAM subjects in the basic science courses for all students. For example, "Anatomy of Acupuncture" is presented in the gross anatomy course for first-year students, and the same lecturer will give a presentation on the mechanisms of pain relief by acupuncture in the neuroscience course. Biofeedback is introduced in the human physiology course, providing an important physiologic context to introduce the application of CAM techniques to students. In human endocrinology, the usual discussion on the physiology of stress includes elements of the relaxation response, followed by an experiential activity on stress reduction (Haramati A. Personal communication).

The aim at the University of Maryland, as reported by Brian Berman, MD, Director of the Complementary Medicine Program, is to present CAM therapies in the context of the students' own philosophies and models of health and illness. Medical students learn how to evaluate the evidence for safety and efficacy and have the opportunity to experience the clinical practice of these therapies both in the community and in their own integrated medical clinic (16). The University of Minnesota Medical School has written CAM competencies for each year of medical school and has designated the courses where CAM is taught (Kreitzer MJ. Personal communication.).

A recent goal of the Association of American Medical Colleges is to develop a consensus within the medical education community of the attributes that medical students should possess when they graduate. The 1998 Association of American Medical Colleges Medical School Objectives Report I makes reference to inclusion of "other . . . systems of care" (17). The report asserts that "As circumstances change, medical educators must understand the meaning that these changes have for medical practice and medical education, and must renew the medical student education program accordingly" (17).

The National Center for Complementary and Alternative Medicine of the National Institutes of Health has recognized this educational need by offering up to $300 000 per year for 5 years through competitive grants for innovative proposals to make CAM an integral part of medical, nursing, dental, postgraduate, and continuing medical education courses. The emphasis in this program announcement has been on the seamless integration of CAM throughout the training of all health care students (18).

Practical Steps toward Inclusion of CAM

There is no doubt that every practicing physician will encounter patients who are using therapies that we term "complementary" or "alternative." The following suggestions have emerged from ongoing discussion by medical educators and physicians.

1. Define a Core Curriculum in CAM

In this postgenomic era, it is difficult to find room in the curriculum for new material. Ultimately, the deans, curriculum planners, and faculty at each school are respon-

sible for deciding how best to incorporate CAM in an educational program that fits their goals, objectives, resources, and institutional culture. However, this is a broad and heterogeneous area with few guidelines. A starting point could be to teach students to become knowledgeable about the therapies most heavily used by U.S. patients as revealed in major studies (2, 4). These include chiropractic, spiritual healing, relaxation techniques, and massage. Knowledge of herbal remedies and dietary supplements is extremely important because of safety issues. The National Center for Complementary and Alternative Medicine Web site also maintains a frequently updated list of major CAM therapies for reference (19).

2. Teach *One* Medicine

Many educators agree with prominent journal editors that the ultimate goal is to teach *one* medicine in our medical schools (20). We agree that the curriculum should include the most solidly grounded information and techniques available, including information pertaining to CAM therapies and concepts. This is not meant to exclude other unproven therapies and healing modalities that students should know about. The communication gap between allopathic and CAM health care providers has been immense (21), but there is an increasing number of published peer-reviewed studies of CAM therapies (22). Information about more than 5000 randomized, controlled trials involving CAM is available through the Cochrane Collaboration's subscriber-based Internet database (23). Respected organizations, such as the Arthritis Foundation (24) and the American Cancer Society (25), provide excellent information about CAM for patients and health care clinicians. Is there any reason to debate the need for a curriculum that incorporates knowledge about CAM therapies and allopathic medicine?

Complementary and alternative medicine should be evidence-based, as are other therapies, but the evaluation of evidence must be unbiased. There is no doubt that more and better research using a variety of investigational techniques is needed to guide choices in this uncharted territory (26). There should be room for healthy diversity and pluralism of ideas, with respectful coordination, integration, and opportunity for rejection or acceptance. Students should be taught that this is not inconsistent with existing rules of evidence and the need to critically evaluate all therapeutic options. The CAM courses can teach medical students to be discerning, critical readers of *all* scientific research literature. This opportunity to examine the methods of studies and understand the epidemiology, the possible placebo effect, and other influences is a vehicle for skills training that goes far beyond CAM therapies.

3. Create Opportunities for Cross-Fertilization

It would be a tremendous step toward better communication and understanding if exchange rotations and externships were offered to students from allopathic schools and, for example, schools of chiropractic, acupuncture, mind–body therapies, therapeutic massage, and naturopathy. Others have written about the similarities and differences in the training of allopathic and CAM practitioners and advantages of becoming more familiar with each other's educational processes (27, 29). At the University of California, San Francisco, plans are under way to institute a fourth-year exchange program with the American College of Traditional Chinese Medicine and a "matching" program of medical students from the University of California, San Francisco, with medical students from local CAM colleges (Hughes E. Personal communication).

4. Involve Faculty and Students

Students may be enthusiastic and eager to have these topics included in their studies, and course directors and planning committees may devise excellent curricular offerings, but all can be undermined if the faculty is ignored in the developmental process. Harking back to the historical opposition of the American Medical Association, some faculty members may have a fundamentally negative attitude toward any therapeutic practice labeled "complementary" or "alternative." They must be given the opportunity to learn about CAM therapies, examine their own prejudices in a nonjudgmental atmosphere, and creatively engage other perspectives. The strong support of the dean or curriculum committee chair can encourage faculty to participate in intellectual inquiry into CAM therapies. A small group of knowledgeable and dedicated faculty who demonstrate a scholarly approach to incorporating CAM into the curriculum can gradually create acceptance among their colleagues by inviting them to observe class sessions, meet practitioners, share the best available reading material, and participate in a critical evaluation of the evidence. Educators can create faculty development sessions where CAM can be freely discussed. Faculty need to be assured that patient safety is paramount and that "above all, do no harm" applies to CAM therapies as well as other medical treatments.

Student interest has been a driving force for the development of CAM in the curriculum. Many schools have student interest groups, and individual students have sought out opportunities to learn about CAM when no official courses exist. Major student-led conferences have been planned and carried out at the University of California, San Francisco; Brown University; and University of Washington. This peer-to-peer influence motivates students to want to know more, even among those not initially interested in CAM. The opportunity to visit CAM practitioners and observe their work or experience a CAM treatment also increases interest.

5. Develop Support and Commitment from the Institution

In some schools, CAM courses—sometimes quite successful ones—have been developed as an adjunct to the curriculum. As long as CAM courses do not require budgetary support or an official description in the course cat-

alog, they are allowed to remain. It is increasingly difficult, however, for deans and curriculum committees to ignore the need to provide adequate training for students in therapies that have become so prominently used by patients. It is fair to ask the institution to provide the necessary monetary and organizational support for teaching CAM. Reference books; textbooks; photocopying; copyright royalties; honoraria for invited practitioners, panel members, and lecturers; and compensation for course directors and faculty are legitimate expenses. Facts, figures, and a coherent sense of how CAM courses fit with the overall mission of the medical school can help deans see the need for financial support.

Conversely, if we expect institutional support, we should also expect to report that resources are well spent through a valid means of assessment of student achievement and program evaluation. The Objective Structured Clinical Examination (30) has been validated as an acceptable means of assessment and will soon be used as part of the National Board of Medical Examiners Step 2 Licensing Examination. Any examination in a course that includes CAM should include questions or observed exercises demonstrating mastery of the CAM content. We should observe students demonstrating skills in speaking with patients about the use or avoidance of CAM and including CAM therapeutic options in treatment plans where appropriate.

6. Establish a Theme in the Curriculum

Simply adding courses to an already-packed curriculum is not a viable approach. One strategy is to establish a theme in the curriculum. The following eight steps can be applied to CAM content (31): 1) analyze the relevant content already in the 4-year curricula; 2) establish goals for the theme, including knowledge, skills, and attitudes; 3) sequence the goals in a developmentally appropriate order; 4) determine windows of opportunity in the existing curriculum; 5) design and implement teaching and learning strategies with course directors; 6) inform students and faculty of the theme's 4-year plan; 7) organize workshops to help faculty gain familiarity and techniques for incorporating the new material into their teaching; and 8) evaluate student competencies.

7. Incorporate CAM in Cases

Many medical schools use cases in their curricula. The CAM content can easily be built into the gradual disclosure cases of preclinical problem-based learning tutorials and included in case conferences of the clinical years. The CAM therapies should be included in case and course objectives to emphasize the importance of the material. Carefully chosen references to published CAM articles and books should be included with cases, as well as Web-based resources and references. Five teaching cases on CAM therapies can be ordered from Harvard Medical School, Osher Institute, 401 Park Drive, Suite 22A, Boston, MA 02215.

8. Offer a Well-Designed Elective

A well-designed, stand-alone elective may be the first step toward incorporating CAM therapies in the curriculum. A team or small committee with sufficient time and resources (both admittedly hard to come by) committed to this project can lay the groundwork for broader inclusion in the curriculum. As topics are chosen for the elective, other locations in the curriculum may become apparent. The ideal, suggested by some medical educators, is to have CAM topics incorporated throughout the first 3 years of medical school and offer a 1-month, full-time elective for fourth-year students wishing to pursue CAM in greater depth. Such a course can include extensive readings and the review of scientific literature, ample collaborative learning from practitioners and patients who use CAM therapies, and a strong experiential component. It is very important to allow enough lead time to assemble a comprehensive reading list and recruit CAM practitioners to participate as presenters in the course.

In addition to elective courses, several schools, such as Georgetown University School of Medicine, are moving rapidly toward integration of CAM therapies in the curriculum from day 1of the first year (Haramati A. Personal communication.). Specific courses where CAM topics might be easily incorporated are pharmacology (herbs), nutrition (diets and supplements), orthopedics (chiropractic, acupuncture, massage, and yoga), neurology (mind–body therapies, acupuncture, and chiropractic), oncology (CAM approaches to pain management, appropriate use or avoidance of herbs, and acupuncture for nausea), and women's health (herbs and supplements for premenstrual syndrome and menopausal symptoms and use of massage therapy during labor).

9. Include an Experiential Component

Offer the opportunity to visit and observe local CAM practitioners to help students gain experience with these therapies and develop their own philosophy about inclusion or exclusion of CAM therapies in their future practices. As part of the curriculum, students should have an opportunity to experience CAM therapies themselves if they wish. This can give them a depth of understanding that cannot be gained by simply hearing and reading about a therapy, or even hearing patients describe their own experiences. Examples may include acupuncture; specific massage techniques; sharing a macrobiotic meal (or other radical diet); field trips to local health food stores or drug stores to review herbs and supplements; shadowing chiropractors, acupuncturists, or naturopaths in their offices; rotations in integrative care facilities; and participation in interdisciplinary case-management conferences.

10. Plan across the Curriculum from Undergraduate to Graduate and Continuing Medical Education

As a relatively new field in U.S. medicine, CAM education is needed at all levels. Third- and fourth-year students and residents regularly encounter patients who ask

about CAM therapies. Because it has not been included in the preclinical curriculum, clinicians are often at a loss for accurate and authoritative information. Furthermore, many clinicians lack the training necessary to ask the patients about their use of CAM therapies in a respectful and supportive manner. This leads to the "don't ask, don't tell" syndrome that is an increasing concern (32). Residents should be encouraged, or perhaps required, to attend workshops, conferences, or informational sessions to address their need for information and skills related to CAM.

The Ultimate Goal

Despite escalating public interest, progress in teaching CAM throughout the medical school curriculum has been disappointingly slow. National and regional meetings of the Association of American Medical Colleges remain important venues for discussing innovations to integrate CAM into medical education. The Association's Special Interest Groups are now consigned to the regional level, offering the opportunity for medical schools in the same geographic area to plan collaboratively. The Society of Teachers of Family Medicine also has an active CAM interest group and is working to establish curriculum guidelines for CAM therapies in the family practice residency (33, 34).

The question is, What kind of health care clinicians do we want? Do we want to educate doctors who can read and evaluate studies using many types of interventions, weigh the evidence, and apply the findings for the benefit of the patient? Should we not clarify for the physician in training and in practice those criteria that must be met to recommend avoidance or use of a particular intervention regardless of its historical pedigree? We are properly concerned about teaching the next generation of doctors to be knowledgeable about the astounding new advances in the field of genetics. Should we not also want them to seek to understand the power of the placebo effect and how it may impact the effect size of any intervention (35, 36)?

Who can deny that the ultimate goal is to educate doctors to be knowledgeable and comfortable talking with patients about the entire range of allopathic and complementary therapies, familiar with local CAM practitioners and offerings, and dedicated to helping their patients gain and maintain optimal health through one inclusive medicine? If this is our goal, we need to implement the changes necessary in medical curricula to achieve this outcome.

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