

# What Should Students Learn about Complementary and Alternative Medicine?

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## Abstract

With thousands of complementary and alternative medicine (CAM) treatments currently being used in the United States today, it is challenging to design a concise body of CAM content which will fit into already overly full curricula for health care students. The purpose of this article is to outline key principles which 15 National Center for Complementary and Alternative Medicine-funded education programs found useful when developing CAM coursework and

selecting CAM content. Three key guiding principles are discussed: teach foundational CAM competencies to give students a framework for learning about CAM; choose specific content on the basis of evidence, demographics and condition (what conditions are most appropriate for CAM therapies?); and finally, provide students with skills for future learning, including where to find reliable information about CAM and how to search the scientific

literature and assess the results of CAM research. Most of the programs developed evidence-based guides to help students find reliable CAM resources. The cumulative experiences of the 15 programs have been compiled, and an annotated table outlining the most highly recommended resources about CAM is presented.

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**C**omplementary and alternative medicine (CAM) is a broad term that encompasses a wide range of healing therapies and practices. A large number of disparate CAM modalities are currently being used in the United States today.<sup>1</sup> Health science educators setting out to incorporate knowledge about CAM into their curricula thus face a daunting challenge: how to identify a concise set of high-quality CAM content from such a complex and diverse field. Such an undertaking is especially difficult given the need to fit CAM content into health sciences curricula, which are already full and under pressure from many competing priorities.

Between 2000 and 2002, the National Center for Complementary and Alternative Medicine (NCCAM) hoped

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to address this problem by awarding education grants to 12 medical schools, two nursing schools, and one foundation to develop CAM education initiatives. All 15 institutions individually addressed the challenge of how to select quality CAM content. Via interviews and a survey of the educators who worked on these projects, we have drawn together the individual experiences of these institutions in meeting that challenge. Following is a summary of the principles which these programs found most useful when selecting quality CAM content for health sciences curricula.

### Foundational Skills

Curricular content about CAM can be divided into broad foundational skills and specific content areas. Introductory foundational principles are generally taught before specific content and are designed to give students a framework for future learning. Such principles include understanding the terms *CAM* and *integrative medicine*, understanding why patients use CAM, learning how to ask about and discuss CAM with patients in a nonjudgmental manner, and understanding the basic tenets of alternative healing systems, such as traditional Chinese medicine and naturopathy.

The concepts of patient-centered communication and the biopsychosocial approach to patient care, now widely

accepted as being at the core of medical education,<sup>2-4</sup> provide a solid basis for incorporating these CAM-related foundational skills into the curriculum. Several modular examples of how such principles can be taught are available in electronic form<sup>5-8</sup> and can guide educators seeking to provide students with an understanding of the basics of CAM and a groundwork on which more specific knowledge can later be added.

### Criteria for Selecting Specific Content

From discussions with educators at the institutions that have implemented NCCAM education projects, three questions emerge as central to the decision of which specific CAM therapies students should be taught: (1) is there significant scientific evidence for a therapy's efficacy or harm? (2) is there evidence that a therapy is being widely used by patients? and (3) does a therapy have the potential to treat a medical condition for which conventional medical approaches are lacking? Generally speaking, specific content needed to meet at least one of these three criteria to be considered for inclusion into a CAM curriculum. Topics with all three attributes were considered the most important to include in a curriculum.

### Teach what works and what is harmful

Scientific evidence is central to health care and to medical education, and CAM

must be held to similar standards.<sup>9,10</sup> The evidence for or against the efficacy and safety of CAM therapies must be at the center of choosing what to teach.

Focusing on the evidence is especially important given the increasing number of high-quality studies of CAM therapies which are now being published. Whereas some of these have been positive,<sup>11,12</sup> others have been negative,<sup>13,14</sup> highlighting even more the importance of teaching students the science behind CAM. Such education about evidence is particularly important for dietary supplements, because the U.S. Food and Drug Administration (FDA), the usual federal body on which we rely to evaluate the efficacy of medicinal therapies, does not routinely perform this function for dietary supplements. Instead, under the Dietary Supplement Health and Education Act, the FDA's responsibility lies in taking action against unsafe dietary supplement products after they reach the market.<sup>15</sup>

Beyond gaining awareness about what works and what doesn't work in CAM, students must also learn the evidence that suggests which CAM therapies can be harmful. An example for potential harm is the very strong interaction between St. John's wort and many commonly used drugs.<sup>16</sup> Supplements such as this have a high risk of hurting patient and are, therefore, very important for students to learn about.

Although those who study CAM therapies face many challenges, such as variability in herbal extract formulations or difficulty in blinding acupuncture interventions, such challenges can be overcome,<sup>17</sup> and the evidence gleaned from such research should be used to guide education about CAM.

### Teach what patients are using

Students should be taught societal CAM-use patterns so that they have a basic understanding of the CAM treatments their patients will be using. Such an understanding will give students better insight into the care their patients may be seeking elsewhere and will also better prepare them to answer their patients' questions about such treatments.<sup>18</sup> For example, the dramatic growth in the use of dietary supplements seen in the latter part of the 1990s has now stabilized rather than receded,<sup>19</sup> and students need some knowledge of some of these supplements that are so widely used.<sup>1</sup>

Another specific example of CAM which is increasingly being used by patients is mind–body techniques such as relaxation and meditation.<sup>1</sup> Many education programs have recognized the potential for such self-care techniques to potentially reduce student stress<sup>20</sup> and possibly prevent professional burnout.<sup>21</sup> As a result, many have developed experiential mind–body electives to teach students more about these techniques, with the dual purpose of helping the students now and, possibly, their patients in the future.

### Teach which medical conditions are most appropriate for CAM therapies

Some conditions are more appropriately treated with CAM than others. CAM therapies for conditions that are not well addressed by conventional medicine are more justifiably integrated with conventional care. When deciding what CAM to teach, therefore, educators should emphasize CAM therapies which have evidence for successfully treating conditions that allopathic medicine lack effective therapies.

For example, although there is little role for CAM in the treatment of acute appendicitis, the potential role for CAM as part of a multifaceted approach to the treatment of irritable bowel syndrome or fibromyalgia is clearer, because these are conditions for which conventional approaches lack efficacy and safety.<sup>22,23</sup> Menopausal symptoms could also be included in this category, given safety concerns with conventional approaches,<sup>24</sup> as could the treatment of depression, given the resistance among many patients to try standard antidepressants.<sup>25</sup> Knowledge about potentially effective CAM therapies for such conditions could have a significant impact on patients' health and, thus, should be considered as more important for students to learn about.

### Tools for the Future

Regardless of how much content is provided in a curriculum, science will evolve and questions will change. It is, therefore, of the utmost importance to provide students long-lasting tools for self-learning about CAM: (1) where they can find reliable information about CAM, and (2) how they can best search and interpret the literature to assess the results of CAM research.

### Finding reliable reference resources

Ten years ago, there was much less interest among conventional health practitioners in learning about CAM, and there was also a dearth of high-quality research published about CAM.<sup>26</sup> As a result, it was difficult to make good, evidence-based recommendations about CAM therapies and to find well-recognized reference works on the topic. In the past decade, however, practitioner interest in CAM has increased, the amount of CAM clinical trial data has expanded, and there are now a number of new reference resources available on the topic.

It was, thus, a high priority for many of the 15 institutions that implemented NCCAM education grants to identify or design resources where learners could find reliable, high-quality information about CAM. A survey of these 15 institutions yielded a list of the most highly recommended resources for students to use. This list is summarized in Table 1.

### Assessing the literature

Another key skill needed for lifelong learning is the ability to find and interpret the results of medical research about CAM. Although this skill is clearly important for medicine as a whole, evaluating CAM literature is an especially challenging and useful skill for students to learn.

Given the challenges inherent to CAM research, including difficulties in standardizing herbal extracts and blinding interventions such as acupuncture, students evaluating CAM literature must learn to assess gaps in imperfect evidence and to familiarize themselves with how such gaps might be overcome. Because similar obstacles occur also in other areas of medicine, skills learned in assessing CAM literature are widely applicable.

Practicing medicine with imperfect evidence is an issue that all clinicians must confront and one to which students often have difficulty adjusting. Studying how to analyze CAM literature provides valuable experience in addressing this challenge and can help instill long-lasting attitudes of curiosity and inquisition.

A recurring goal among the 15 institutions that received NCCAM

Table 1

**Most Useful Resources for Students to Find Reliable Information About Complementary and Alternative Medicine (CAM)**

Resource	Identifying information	Comments
<b>Large resource databases: mini-reviews of CAM therapies</b>		
Medline Plus—Herbs and Supplements	( <a href="http://www.medlineplus.gov">www.medlineplus.gov</a> )	National Library of Medicine offers excerpts of National Standards' monographs on herbs and supplements, including the most clinically useful core content and summary paragraphs on <i>evidence base</i> . Does not include access to their modality-related monographs. (Free access)
Micromedex—Alternative Medicine	( <a href="http://www.micromedex.com">http://www.micromedex.com</a> )	Evidence-based reviews of herbal medicines and other dietary supplements. Particularly useful for checking drug interactions given integration with the DRUGDEX system. (Subscription-based access)
NCCAM (National Center for Complementary and Alternative Medicine)	( <a href="http://nccam.nih.gov">http://nccam.nih.gov</a> )	Includes general information about CAM and concise summaries of the efficacy and safety of various CAM therapies. A clearinghouse for CAM-related materials prepared by any of the institutes of the National Institutes of Health. (Free access)
Natural Medicines Comprehensive Database	( <a href="http://www.naturaldatabase.com">www.naturaldatabase.com</a> )	More than 1000 detailed monographs provide evidence-based information on herbs and supplements. Especially useful for information on less common supplements or for identifying the ingredients of a specific supplement product. (Subscription-based access)
Natural Standard	( <a href="http://www.naturalstandard.com">http://www.naturalstandard.com</a> )	Evidence-based reviews of herbs and supplements in addition to various CAM modalities. Content is also grouped by condition. Not as exhaustive as Natural Medicines Comprehensive Database, but covers nonherb modalities also. (Subscription-based access)
<b>Citation databases: searching the literature</b>		
CINAHL (Cumulative Index to Nursing & Allied Health Literature)	( <a href="http://www.cinahl.com">http://www.cinahl.com</a> )	Indexes nursing and allied health literature, including some full text of selected alternative therapies, herbal medicines, and dietary supplements. (Subscription-based access)
EMBASE (Excerpta Medica Database)	( <a href="http://www.embase.com">http://www.embase.com</a> )	Indexes a wide range of non-English language journals, which may not be indexed in Medline. (Subscription-based access)
IBIDS (International Bibliographic Information on Dietary Supplements)	( <a href="http://ods.od.nih.gov/Health_Information/IBIDS.aspx">ods.od.nih.gov/Health_Information/IBIDS.aspx</a> )	Includes articles on dietary supplements from a wide group of nutrition and agricultural journals, which may not be indexed in Medline. Maintained by the National Institutes of Health and the U.S. Department of Agriculture. (Free access)
Medline (PubMed)	( <a href="http://www.ncbi.nlm.nih.gov/entrez/query.fcgi">http://www.ncbi.nlm.nih.gov/entrez/query.fcgi</a> )	The world's premier biomedical database, indexing more than 4,800 journals. Search can be limited to CAM subset. (Free access) Bastyr University also offers a useful guide to finding CAM citations in Medline: ( <a href="http://www.bastyr.edu/library/resources/researchguide/default.asp">www.bastyr.edu/library/resources/researchguide/default.asp</a> )
<b>Databases of systematic reviews with significant CAM coverage</b>		
BMJ Clinical Evidence	( <a href="http://www.clinicalevidence.com">www.clinicalevidence.com</a> )	Organized by condition. If available, concise summaries of the data for many CAM therapies are integrated. (Subscription-based access)
Cochrane Library	( <a href="http://www.cochrane.org">http://www.cochrane.org</a> )	More than 200 high-quality meta-analytic systematic reviews of CAM therapies. (Free access to abstracts; subscription for full text)
<b>Quality and safety of dietary supplements</b>		
ConsumerLab.com	( <a href="http://www.consumerlab.com">http://www.consumerlab.com</a> )	Independent testing lab that evaluates the quality of dietary supplement products. Focuses on truth in labeling and potential contaminants. (Free access to manufacturer-sponsored content; subscription for full access)
FDA Center for Food Safety	( <a href="http://www.cfsan.fda.gov/dms/supplmnt.html">www.cfsan.fda.gov/dms/supplmnt.html</a> )	List of FDA safety warnings on dietary supplements and information on the status of government regulations. (Free access)
US Pharmacopeia—Dietary Supplements	( <a href="http://www.usp.org/USPVerified">http://www.usp.org/USPVerified</a> )	Independent testing of supplements. Includes only manufacturers who voluntarily participate in the USP verification program. (Free access)

(Table Continues)

Table 1

Continued

Resource	Identifying information	Comments
<b>Learning resources for students funded by NCCAM</b>		
AMSA (American Medical Student Association)	( <a href="http://www.amsa.org/humed/CAM">http://www.amsa.org/humed/CAM</a> )	Online learning materials designed for medical students. Also includes a module on personal health assessment / self-care and a nationwide directory of CAM electives.
Children's Hospital, Boston	( <a href="http://www.holistickids.org">www.holistickids.org</a> )	Detailed sections on 24 common pediatric conditions. Also includes free access to chapters from Kathi Kemper's <i>The Holistic Pediatrician</i> as well as built-in "smart" Medline searches by topic.
Tufts University	( <a href="http://www.tufts.edu/med/ebcam">http://www.tufts.edu/med/ebcam</a> )	Descriptions of common CAM modalities as well as evidence-based reviews of common indications for CAM in practice. Also includes insights on interpreting literature on CAM modalities.
University of Minnesota	( <a href="http://www.csh.umn.edu/modules/index.html">http://www.csh.umn.edu/modules/index.html</a> )	Web-based CAM modules created by instructional designers using adult learning and interface design principles to facilitate learning, motivation, and ease of use.
University of North Carolina at Chapel Hill	( <a href="http://pim.med.unc.edu/Monographs.html">http://pim.med.unc.edu/Monographs.html</a> )	Series of well-designed 20- to 30-page monographs on general CAM topics, such as models of healing, safety issues in CAM, and assessing CAM research.
University of Washington	( <a href="http://www.uwcam.org">www.uwcam.org</a> )	Concise, evidence-based reviews of CAM modalities as well as of 30 of the most important herbs and supplements health care providers should know about.
<b>Books</b>		
<i>The Desktop Guide to Complementary and Alternative Medicine</i>	Edzard Ernst, MD, PhD, ed, 2006 (2nd ed)	A balanced, clear evaluation of a wide range of modalities based on existing evidence. Organized by modality and by medical problem for efficient reference.
<i>Integrative Medicine: Principles for Practice</i>	Benjamin Kligler, MD, and Roberta Lee, MD, eds, 2004.	Comprehensive textbook with more than 900 pages, organized by body system with case reviews as well.
<i>Integrative Medicine</i>	David Rakel, MD, ed, 2007 (2nd ed)	Organized by condition, this exhaustive, evidence-based textbook also includes software for use on handheld devices.

education grants was to build such a model of inquiry into their CAM curricula. With the aim of fostering an open-minded, evidence-based approach to research and patient care, programs worked to design modules in which treatments were neither accepted nor discounted on face value; instead, the treatments were investigated to discover what is known scientifically about their mechanism of action, safety, or efficacy.

### Guiding Principles

The 15 institutions that implemented NCCAM education grants faced similar challenges in selecting CAM content, and they settled on similar guiding principles: teach foundational CAM competencies; choose specific content on the basis of evidence, demographics, and types of conditions treated; and provide students with skills for future learning. Such skills include finding reliable CAM resources for answering questions which arise in the course of clinical practice, and

knowing how to best search and evaluate the medical literature regarding CAM therapies.

We believe that our summary is the first attempt to formulate explicit guidelines for how to select quality CAM content. Although other groups have published CAM curricula and core competencies in CAM,<sup>8,27-30</sup> this summary focuses on the rationale for deciding what concepts to teach rather than on specific recommendations for curricular content. Although the outlined approach is generally applicable to other areas of medicine, in our opinion there are aspects of CAM that are uniquely addressed by the considerations above.

As the evidence base for CAM continues to grow, better clarifying which CAM treatments are more effective than placebos, it will become clearer which aspects of CAM are most suitable for integration into conventional care. By the same token, the process of continuous reevaluation and assessment of the data

according to the above principles will further inform decisions about which CAM therapies should be part of the core curriculum for health sciences students.

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