

EDUCATION, INITIATIVES, AND INFORMATION RESOURCES

Developing the Complementary and Alternative Medicine
Education Infrastructure: Baccalaureate Programs
in the United States

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ABSTRACT

Objectives: Efforts to build a complementary and alternative medicine (CAM) education and research infrastructure have been productive. Development has focused largely on graduate, postgraduate, and professional level training. This paper examines baccalaureate programs, looking at the prevalence and characteristics of CAM and holistic health training in the United States.

Design: A comprehensive literature and web site search was conducted to find educational institutions offering baccalaureate programs in CAM or holistic health. Search criteria included accredited undergraduate programs terminating in a minor, an AA, or a BA/BS degree.

Results: A search of health and education databases produced marginal results. Internet searches, by contrast, were very productive in locating CAM or holistic health-related programs generally and baccalaureate programs specifically. The most effective search strings included terms such as ‘holistic health,’ ‘minor,’ ‘certificate,’ and ‘undergraduate.’ Using these terms, 5 programs were found in the United States that met the inclusion criteria: Arizona State University East, Bastyr University, San Francisco State University, Metropolitan State College of Denver, and Georgian Court College.

Conclusions: Preparing tomorrow’s scholars and clinicians to contribute meaningfully to this emerging healthcare paradigm will require a plan that integrates all elements of higher education. The creation of a truly effective workforce of CAM-competent M.D.s, nurses, health educators, pharmacists, and other allied health professionals will increasingly necessitate baccalaureate preparation. Curriculum discussions at the campus, state, and national levels are needed.

INTRODUCTION

Complementary and alternative medicine (CAM) use continues to grow in the United States as a result of consumer demand and the expanding role of integrative medicine (Barnes et al., 2004; Barrett, 2003; Eisenberg et al., 2001; Snyderman and Weil, 2002). Consequences of this

growth include concerns for consumer safety, an increased need for reliable information, and a need for more evidence of efficacy (Berman and Straus, 2004; Gold et al., 2001; Izzo, 2004; White, 2002). These challenges require health care providers to become more informed. They also necessitate the cultivation of a new cadre of researchers capable of effectively exploring this emerging body of knowledge.

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On the provider side, clinical training is improving. Many medical schools in the United States now offer CAM courses in their curricula, as do numerous nursing, osteopathic, pharmacy, and public health programs (Bhattacharya, 2000; Burke et al., 2001; Dutta et al., 2003; Fenton and Morris, 2003; Saxon et al., 2004). CAM options in medical schools included elective CAM classes, the incorporation of CAM material into required courses, CAM rotations for residents, and the integration of CAM content into clinical case conferences (Carlston et al., 1997; Hui et al., 2002; Kligler et al., 2000; Wetzel et al., 1998). Although this progress is encouraging, some authors suggest that CAM training in medical schools remains inadequate because of limited faculty interest, already high demands on the curriculum, the absence of a critical analysis of CAM research and practices in CAM courses, and other factors (Sampson, 2001; Wetzel et al., 2003). Solutions that have been advanced include efforts to reform and standardize CAM curricula, increasing the number of postgraduate clinical fellowships, and training non-M.D. CAM providers to teach in medical schools (Curtis et al., 2002; Kligler et al., 2000; Maizes et al., 2002). CAM research training opportunities, such as university-based CAM research fellowships, are also growing (Shaw et al., 2003).

The National Center for Complementary and Alternative Medicine (NCCAM) has maintained a strong commitment to training and research, making these efforts major strategic objectives in two planning cycles (NCCAM, 2004a; NCCAM, 2004b). This agency has advanced the CAM education and research infrastructure through the creation of a national network of CAM research centers, and by providing support through predoctoral, postdoctoral, and career development awards. More recent innovative efforts to widen the infrastructure have been to train non-M.D. CAM providers in research methods, and the sponsorship of international research collaboratives between American and foreign partners (NIH, 2004; NCCAM, 2004c). Such strategies integrate experts from CAM traditions into the biomedical research infrastructure, enriching the knowledge base, and facilitating more culturally appropriate research and interdisciplinary thinking.

Another strategy to enhance the CAM infrastructure in the United States would be a vertical expansion, concurrently introducing tomorrow's scholar/clinicians to both views of medicine (conventional and alternative) during baccalaureate training. A strong CAM base at the baccalaureate level would lay the foundation for a new generation of highly skilled practitioners. CAM-oriented baccalaureate training, such as a minor in complementary health for undergraduate nursing students, has been suggested (Sofhauser, 2002). Such training could provide a more comprehensive foundation in scientific research methods, the basic sciences, holistic health/CAM concepts and practices, and appropriate culture and language studies.

Our investigation was conducted to assess the current

level of development of the CAM/holistic health education infrastructure at the baccalaureate level in the United States.

MATERIALS AND METHODS

Major health and education databases were searched to find education programs that met specific inclusion criteria. Google, a major Internet search engine, was also used to search for applicable programs.

Database Searches

Seven (7) health and education databases were searched: Academic Search Elite (an online database provided via EBSCO, www.epnet.com/academic/default.asp), Alt-Health Watch (an online database provided through EBSCO, www.epnet.com/academic/default.asp), CINAHL (Cumulative Index to Nursing and Allied Health Literature; an online database provided through EBSCO, www.epnet.com/academic/default.asp), College Source Online (www.collegesource.org/home.asp), ERIC (Educational Resources Information Center; www.eric.ed.gov), PubMed (www.ncbi.nlm.nih.gov/entrez/query.fcgi), and PsycINFO (www.apa.org/psycinfo).

World Wide Web Searches

The public search engine Google was also used to search the World Wide Web for information on relevant programs. Google was selected as the preferred search engine for this purpose as it uses text-matching software with a unique technology that allows it to quickly find the greatest number of relevant links, based on numbers of links to a target page and the quality of those links (www.google.com/technology/whyuse.html).

Search Inclusion Criteria

The objective was to find relevant programs in CAM/holistic health in degree granting institutions. The following inclusion criteria were used to refine the search process:

- Programs located in the United States
- Primarily on-site, not distance-learning programs
- Public or private institution of higher education, 2–4 year programs
- Institutions accredited by a Department of Education recognized agency
- Undergraduate, not graduate, continuing education, or postgraduate programs
- Programs offering a CAM/Holistic Health-related curriculum, not just one or two classes
- Programs culminating in a CAM/Holistic Health-related minor, AA, or BA/BS

- Programs actively enrolling students for a minimum of 1 year
- Not a certificate program (certificates often serve a non-matriculated audience)
- Not massage training, recreational therapy, counseling, ministerial programs, transpersonal psychology, stress management, long-term care, or other programs that use the term “holistic” but are not comprehensive CAM/holistic health programs
- Not a terminal undergraduate health profession program, such as a baccalaureate nursing degree.

Key terms searched

Key terms used to search databases and the Internet for relevant programs included: alternative medicine, baccalaureate, body, CAM, certificate, complementary and alternative medicine, degree, education, health, health education, higher education, holistic, holistic health, holistic health education, holistic medicine, integrative medicine, mind, mind-body, mind-body-spirit, spirit, and undergraduate.

RESULTS

Database searches

Searching the health and education databases produced marginal results. Problems with the results of the database searches included:

- Papers describing consumer use of CAM therapies or unrelated CAM research
- Papers describing graduate or postgraduate level CAM training
- The term Undergraduate referring to CAM content in medical school (years 1–4)
- Premedical education articles that did not elaborate on CAM
- The term holistic used in nursing programs, undergraduate and graduate, in reference to treating the whole person, not necessarily in relation to complementary and alternative healing methods or integrative medical practices
- No information on CAM/holistic health-relevant U.S. baccalaureate programs.

World Wide Web Searches

Initial searches using broad terms, such as holistic health, produced unmanageably large returns. The term CAM produced more than 3 million hits, because of the many uses of the term, including engineering applications. Holistic health generated approximately 1.46 million hits; complementary and alternative medicine, more than 800,000; and 359,000 for mind-body-spirit. Searches us-

ing the term CAM in conjunction with undergraduate, health, education, and other relevant terms produced 83,200 hits. After trying many combinations, a few search strings proved to be the most efficient, including a string using the terms: holistic health, minor, certificate, and undergraduate (5540 hits). Searches done with these strings produced a list of several educational programs that matched the inclusion criteria. Google searches proved to be very productive in locating undergraduate CAM/holistic health-related programs.

Problems with Google searches

Although Google was vastly superior for locating appropriate sites, there were limitations in this method as well. Google located many poorly matched sites. Reasons for mismatches included:

- Distance learning programs
- Continuing education programs for individuals with existing bachelors' degrees
- Graduate holistic health certificate programs, or masters' degree programs
- Undergraduate majors, such as health sciences, psychology, and kinesiology, offering one or two holistic health/CAM courses
- Multiple repeats of the same schools
- Non-target certificate programs (e.g., massage, stress management, recreational therapy)
- Programs in Canada, Australia, and Britain, such as the Complementary Health Sciences B.Sc. degree program at London's Middlesex University
- Programs that were designed primarily to fulfill prerequisites for entry into a professional CAM program, such as entry into an acupuncture masters' degree program. These courses were essentially part of the masters' degree program.
- The search term holistic often producing nursing programs or interdisciplinary general education programs that were not specifically health-related
- The search term CAM producing computer-aided design (CAD) programs.

Matches

Using the optimal search terms, several schools were located that offered interesting programs that matched some, but not all, of the inclusion criteria. Several comprehensive graduate programs in holistic health were also found. In terms of matching all inclusion criteria, the Internet search produced 5 programs: Arizona State University East, Bastyr University, San Francisco State University, Metropolitan State College of Denver, and Georgian Court College. These schools are listed in Table 1, with information on their curricula presented in the boxes.

TABLE 1. SCHOOLS MATCHED FOR ALL INCLUSION CRITERIA

<i>Institution</i>	<i>Program focus</i>	<i>Outcome</i>	<i>Requirements</i>
Arizona State University East Mesa, AZ	Human health	BA/BS	BA/BS: 45 credits Core courses—15 Concentration—12 Related courses—18
Bastyr College Kenmore, WA	Herbal sciences	BS	BS: 90 credits Core courses—85 Electives—5
San Francisco State University, Institute for Holistic Healing Studies San Francisco, CA	Holistic health	Minor BA, Health Education [Holistic Health track]	Minor: 22 credits Holistic health core—9 Emphasis areas—9 Anatomy/physiology—4
Metropolitan State College of Denver Denver, CO	Holistic health	BA, Special Major Minor	Minor: 21 credits
Georgian Court College Lakewood, NJ	Holistic health	Minor	Minor: 18 credits

DISCUSSION

Searching health and education databases for information on baccalaureate CAM/holistic health programs proved to be of limited utility. A public Internet search engine, however, located 5 programs that met all inclusion criteria—accredited American institutions offering undergraduate holistic health or CAM-oriented courses culminating in a minor, AA, or BA/BS degree. Of these institutions, 2 offered B.A. degrees with a clear holistic health/CAM orientation, 1 offered a student-designed B.A. and a B.A. in health education (both with holistic health tracks), and 3 offered minors in holistic health. Arizona State University East, San Francisco State University, Metropolitan State College of Denver, and Georgian Court College offered courses covering holistic health principles and courses examining CAM practices. Bastyr University

focused primarily on CAM content in its Herbal Sciences BS (see box on Bastyr University).

The term CAM did not produce desired sites. Holistic Health, by contrast, effectively generated several criteria-matched schools. This difference in search term efficacy may reflect the clinical/medical versus educational nature of the two words, CAM being more related to clinical/medical issues than Holistic Health. This result makes sense for searches at the baccalaureate level, where specific clinical/medical applications may be of less significance. Holistic health as a domain fits well within baccalaureate general education as it teaches principles of prevention and healing from an interdisciplinary and multi-cultural perspective, exposing students to many important concepts within a motivating theme. A curricular model, which combines holistic health and CAM courses, can contribute to a more expansive worldview while teaching applied skills useful for per-

Arizona State University East

Required courses for the BA and BS specialization in Human Health Studies: 15 credits from Core Courses, 12 credits from Concentration Courses, and 18 credits of related course work (45 semester credits).

<i>Course #</i>	<i>Course Title</i>	<i>Credits</i>
<i>Core Courses</i>		
HHS 100	Introduction to Holistic Health	3
HHS 300	Overview of Complementary Health Systems	3
HHS 302	Evidence-Based Complementary Health Modalities	3
HHS 400	Community-Based Complementary Health Services	3
HHS 405	Seminar in Holistic Health	3
<i>Concentration Courses</i>		
HHS 402	Work, Health, and the Family	3
HHS 403	Community Mental Health	3
HHS 484	Internship in Human Health Studies	1–12
HHS 494	Special Topics	1–4
HHS 497	Readings in Healthcare	3–6
HHS 498	Pro-seminar	1–6
HHS 499	Individualized Instruction	1–3

Bastyr University

Required courses for the BS in Herbal Sciences (90 semester credits).

<i>Course #</i>	<i>Course Title</i>	<i>Credits</i>
Core Courses		
BC 3124	Organic Chemistry for Life Sciences (Lec/Lab)	5
BC 3141	Anatomy & Physiology (Lec/Lab)	3
BO 3110	Foundations of Health	2
BO 3111	Herbal Sciences 1 (Lec/Lab)	3
IS 3101	Introduction to Natural Health Sciences	2
BC 3129	Biochemistry for Life Sciences 1 (Lecture)	4
BC 3131	Biochemistry for Life Sciences 1 (Lab)	1
BC 3142	Anatomy & Physiology (Lec/Lab)	4
BO 3101	Introduction to Botany (Lec/Lab)	3
BO 3112	Herbal Sciences 2	3
BC 3132	Biochemistry for Life Sciences 2 (Lecture)	4
BC 3131	Biochemistry for Life Sciences 2 (Lab)	1
BC 3143	Anatomy & Physiology (Lec/Lab)	3
BO 3105	Plant Identification (Lec/Lab)	3
BO 3113	Herbal Sciences 3 (Med making lab)	3
BC 4101	Disease Processes	3
BC 4121	Microbiology	3
BO 4114	Herbal Sciences 4 (Lec/Lab)	3
BO 4120	Herbal Drug Identification (Lec/Lab)	2
IS 3102	Introduction to Research Methods	3
TR 4114	Nutrition for Herbalists	4
BC 4131	Pharmacology Overview	3
BO 4115	Herbal Sciences 5 (Lec/Lab)	3
BO 4130	Ethnobotany	3
BO 4140	Business Practices in Herbal Sciences	2
BO 4101	Advanced Botany (Lec/Lab)	3
BO 4116	Herbal Sciences 6 (Lec/Lab)	3
BO 4125	Introduction to Herb/Drug Interaction	2
BO 4128	Quality Assurance/Quality Control	2
IS 4101	Seminar in Natural Health Sciences	2
Electives	(see below)	5

Current electives: Cascade Herb Experience, Herbal Medicine in Tuscany, Organic Gardening, Pharmacognosy, Bach Flower Remedies, Pharmacy of Flowers, Herbs and Ayurvedic Herbal Medicine, Plants in Ceremony. Student work placement is optional and may be taken for elective credits.

sonal and professional development. Indeed, 4 of the 5 schools located in this search used holistic health courses as a foundation, followed by CAM-specific courses.

The Holistic Health minor at San Francisco State University (SFSU), as an example, begins with a core of holistic health concepts. This is followed by advanced CAM courses, such as "Foundations of Biofeedback" or "Chinese Herbs and Nutrition," taught from a self-care perspective with evidence-based information on clinical relevance. A recent survey of SFSU students taking Holistic Health courses (Burke, unpublished data) revealed an overwhelming majority taking them for personal development as well as to fulfill general education units. It was also found that the courses had a notable self-reported impact on dietary and exercise habits, ability to cope with stress, and respect for other people and cultures. Students found these courses highly relevant to their lives compared to other courses, and 97% favored the creation of a Holistic Health major. The one program that did not follow this general education holistic health model, Bastyr

University, was a CAM-specific professional school, and their BS reflected this pre-professional orientation.

Currently there are few U.S. baccalaureate level programs offering training in holistic health or CAM practices. Introducing students to these concepts at the baccalaureate level would strengthen the education/research infrastructure specifically envisioned by NCCAM, and become an invaluable general education program option generally. The baccalaureate years, less encumbered by the many demands of graduate and postgraduate study, could prove to be an ideal ground for nurturing a new breed of scholar/clinicians, capable of making significant contributions in this emerging field. With the proper foundation in culture and language studies, courses in holistic health/CAM and basic sciences, and study abroad opportunities, students would enter graduate research and clinical programs with richer multi-cultural and interdisciplinary perspectives, well prepared to explore new vistas in human health and healing. Perhaps even more importantly, such courses would also provide essen-

San Francisco State University/Institute for Holistic Healing Studies

Required courses for the Minor in Holistic Health: 9 semester credits from Holistic Health Core Courses, 9 credits from Holistic Health Emphasis Areas, and 4 credits in human anatomy and physiology (22 semester credits).

<i>Course #</i>	<i>Course Title</i>	<i>Credits</i>
<i>Core Courses</i>		
HH 380	Holistic Health: Western Perspectives	3
HH 381	Holistic Health: Eastern Perspectives	3
HH 382	Holistic Health and Human Nature	3
<i>Emphasis Areas</i>		
<i>Western Perspectives</i>		
HH 430	Foundations of Biofeedback and Self-Regulation	4
HH 433	Introduction to Autogenic Training	3
PSY 594	Psychology of Biofeedback Process	3
HH 690	Psychophysiology of Healing	3
<i>Eastern Perspectives</i>		
HH 383	Holistic Health: Chinese Perspectives	3
HH 420	Chinese Body-Mind Energetics	4
HH 530	Chinese Herb & Nutrition Principles	3
HH 540	Imagery and Meditation in Healing	3
HH 621	Advanced Chinese Health & Healing	1-3
KIN 136	Elementary Hatha Yoga	1
KIN 236	Intermediate and Advanced Hatha Yoga	2
KIN 175	Elementary Tai-Chi Chuan	1
KIN 275	Intermediate and Advanced Tai-Chi Chuan	2
<i>Holism and Human Nature</i>		
HED 418	Environmental Health	3
HH 650	Anthroposophical Healing Studies	3
HH 670	Alternative Health Practices	3
HH 677	Art as Healing	3
HH 681	Holistic Health Internship	3
HH 699	Special Study	1-3
BIO 328	Human Anatomy/Physiology	4

Metropolitan State College of Denver

Required courses for the Holistic Health and Wellness Education Multi-Disciplinary Minor (21 semester credits).

<i>Course #</i>	<i>Course Title</i>	<i>Credits</i>
HES 1050	Dynamics of Health	3
HES 2750	Introduction to Holistic Health	3
HPS 1640	Physical Fitness Techniques and Programs	2
HSP 3750	Holistic Health and High-Level Wellness	4
NUT 2040	Introduction to Nutrition	3
Approved electives		3
Approved ethics course		3

Georgian Court College

Required courses for the Minor in Holistic Health (18 semester credits).

<i>Course #</i>	<i>Course Title</i>	<i>Credits</i>
HE210	Holistic Health: Past, Present, and Future	3
HE220	Eastern Approach to Nutrition and Movement	3
HE320	Alternative Healing Methods	3
HE330	Health, Humor, and Healing	3
HE335	Stress Management and Health	3
HE340	Eastern Views of Holistic Health	3
HE345	Native American Medicine	3
HE350	Special Topics in Holistic Health	3

tial training for the significant proportion of allied health professionals entering the workforce who end their education with baccalaureate terminal degrees.

Deepening the CAM education and research infrastructure through baccalaureate program development is an important next step. The creation of such an infrastructure must be based on the highest academic standards, and promote a critical analysis of holistic health/CAM concepts. A rigorous undergraduate curriculum composed of both basic sciences and the humanities, with the inclusion of specific courses exploring holistic health and CAM philosophies and practices, may prove to be a key element in a new golden age of medicine and healing.

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