ATTITUDES, EXPECTATIONS AND PLANS OF ENTERING MEDICAL
STUDENTS TOWARD COMPLEMENTARY AND ALTERNATIVE MEDICINE

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Abstract

This study examines the views of incoming medical students toward complementary and alternative medicine (CAM) and integrative medicine (IM). Additionally, their expectations for inclusion of CAM topics in their medical school education are examined. Their plans for incorporating CAM into their future medical practices are also examined. The relationship between these variables and a set of background variables including socioeconomic status, exposure to diversity and previous experience with CAM is also examined for correlation and predictive value.

Legitimacy provides a framework for this research to examine medical students' views on CAM and IM. Every healthcare profession is assigned a level of legitimacy by the public and other healthcare practitioners. These legitimacy levels vary greatly among the myriad of healthcare practices, and in part determine the participation levels of each healthcare profession in the greater healthcare system. The views of medical students toward CAM and IM, as measured by legitimacy scales developed for this research, provide insight into the question of the role of CAM and IM in the evolving U.S. healthcare system.

Incoming students to the Medical School at the University of Minnesota - Twin Cities Medical School were surveyed to provide the data for this analysis. Scales were developed from the survey items to form the basis for comparison among variables. In addition to several other background variables, a CAM Familiarity scale was developed as measure of student experience with CAM. Scales were also developed for each of four dependent variables. The CAM Legitimacy scale was developed as a measure of student

perceptions of CAM and its role in the healthcare market. The CAM Expectations scale

is a measure of student expectations for the inclusion of CAM topics in their medical

school curriculum.

IM is used to describe an approach to medical practice which emphasizes such

elements as the practitioner-patient relationship, care for the whole person, evidence-

informed care, and a team approach to care which draws on the strengths of many

healthcare professionals to achieve optimal health. The IM Legitimacy scale is an

indication of student views toward this approach to care. Lastly, the CAM Plans scale is

a measure of student intent to incorporate CAM into their future medical practices. One

hundred six medical students completed the survey out of 168 students who received the

survey, resulting in a completion percentage of 63 percent. Selected findings of the

survey are summarized here:

1) Higher levels of CAM use and familiarity are associated with a higher legitimacy

rating of CAM. In the case of CAM Use and CAM Legitimacy ($r = .46$, $p < .01$) and for

CAM Familiarity and CAM Legitimacy ($r = .29$, $p < .01$);

2) Higher levels of CAM use and familiarity are also correlated with student plans to

incorporate CAM into their future medical practices. In the case of CAM Use and CAM

Plans ($r = .43$, $p < .01$) and for CAM Familiarity and CAM Plans ($r = .23$, $p < .05$);

3) The linear regression model designed to explore the predictive value of student

characteristics on IM Legitimacy rating was statistically significant ($R^2 = .46$, $p < .01$). In

this model, CAM Familiarity had predictive value for IM Legitimacy ratings with a

standardized regression coefficient of .40 ($p < .01$).

4) The linear regression model designed to explore the predictive value of the intermediate outcome variable of CAM Familiarity, CAM Use, CAM Legitimacy and CAM Expectations on CAM Plans was statistically significant (R^2 = .76, p < .001). In this model, CAM Legitimacy had strong, positive predictive value for CAM Plans with a standardized regression coefficient of 0.78 (p < .001).

The study builds upon previous work examining attitudes toward CAM and considerations for inclusion of CAM topics in medical school curricula. Implications for medical school curricula and learning activities follow from this study. As medical school curricula adapt to the societal and student expectations, the manner in which health care is delivered will change, hopefully for the better.

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CHAPTER 1: INTRODUCTION

Since Hippocrates wrote and assembled the Hippocratic Corpus some 2,400 years

ago, healthcare and healthcare education have been in a constant state of flux, evolving

under the influence of countless external and internal forces. Factors such as legislation,

research, funding mechanisms, profit margins, public demand, pandemics, insurance,

educational-granting mechanisms, and lawsuits, along with a myriad of others, have

impacted healthcare and healthcare education in the United States.

The last several decades have witnessed unprecedented growth and change in how

healthcare is practiced and delivered in the U.S. "The sort of medicine that was practiced

in Boston or New York or Atlanta 50 years ago would be as strange to a medical student

or intern today as the ceremonial dance of the Kung San tribe would seem to a rock

festival audience in Hackensack" (Thomas, 1987, p. 6). This statement, made over 25

years ago, was certainly true at that time. The changes in healthcare have only

accelerated since then and make this statement even more significant today.

The perceived legitimacy of individual healthcare professions has had an impact

on the role each profession plays within the healthcare delivery system. Abbott, in his

widely acclaimed text, *The System of Professions*, refers to academic knowledge as the

factor which "legitimizes professional work by clarifying its foundations and tracing

them to major cultural values. In most modern professions, these have been the values of

rationality, logic and science. Academic professionals demonstrate the rigor, the clarity,

and the scientifically logical character of professional work, thereby legitimating that

work in the context of larger values" (Abbott, 1988, p. 54). Abbott contends that

academic sectors bring legitimacy to professions by connecting activities of the profession to the central values of society, which establishes the cultural authority of professional work. "Legitimation justifies both what professions do and how they do it" (Abbott, 1988, p. 184) and establishes that the profession produces culturally valued results in a culturally approved manner.

Bledstein (1976) in his text, *The Culture of Professionalism*, reviews the attainment of legitimacy from the perspective of strategic steps a group may take toward professionalization. He documents the steps taken by the medical profession to establish legitimacy in the eyes of the public and suggests the American higher education system has become an important mechanism referenced by the public when judging the legitimacy of various professions.

The legitimacy ratings assigned to healthcare practices by the public can have a dramatic effect on the popularity and acceptance of a set of healthcare practices. However, legitimacy ratings assigned by other healthcare providers could also limit the degree to which another set of healthcare providers is able to participate in the healthcare system. This is particularly true when those assigning the legitimacy ratings are among the most educated and respected of healthcare providers. Arguably the most educated and respected member of the healthcare community in the United States is the medical doctor. Given that legitimacy ratings are more easily created than changed, it is important to understand the factors that explain the origin and evolution of those legitimacy ratings.

In recent decades, a great deal of attention has been placed on the set of healthcare professions and practices known as complementary and alternative medicine (CAM). This paper and subsequent research examine the factors that influence incoming medical students' perceptions toward CAM and integrative medicine (IM). The National Center for Complementary and Alternative Medicine (NCCAM) of the National Institutes of Health (NIH) defines CAM as "those treatments and healthcare practices not widely taught in medical schools, not generally used in hospitals and not usually reimbursed by medical insurance companies" (National Center for Complementary and Alternative Medicine, 2012). Interesting to note is the fact that CAM is defined more by what it is not, than what it is. IM is "the practice of medicine that reaffirms the importance of the relationship between practitioner and patient, focuses on the whole person, is informed by evidence, and makes use of all appropriate therapeutic approaches, healthcare professionals and disciplines to achieve optimal health and healing" (Consortium of Academic Health Centers for Integrative Medicine, 2012).

Beginning medical students' views and legitimacy ratings of CAM and IM could affect their openness to incorporate elements of CAM and IM into their future medical practices. The willingness of medical doctors to recognize these practices will have an impact on the healthcare system overall. This is particularly true if those practices could improve the health of the populace, lower the cost of healthcare and improve the efficiency of the healthcare system.

Evidence of effectiveness of a particular set of health care practices is unlikely the only factor in a beginning medical student's sense of legitimacy surrounding those practices. Considering the need for efficient and effective practices in healthcare, an

understanding of the contributing factors to students' sense of legitimacy for any set of healthcare practices is of particular importance. By building an understanding of these factors, medical schools may be able to take steps to build, counter, or otherwise manage students' perceptions of legitimacy toward various approaches to patient care. Research studies and evidence of effectiveness of a therapy may only go so far to override a student's low legitimacy rating of that therapy. An improved understanding of the factors which explain how legitimacy ratings are formed could be an important resource in the education of medical students and the improvement of healthcare.

The role of a healthcare provider is to satisfy the public's desire for improved quality and length of life by promoting health within the framework of his/her particular profession. Prior to fully engaging in the practice of improving the health of the public, individuals who have the desire to pursue healthcare as a vocation must choose from among multiple career options. "Medical education is inextricably tied to the health service system, and when questions arise about service, questions about education must follow" (Bloom, 1988, p. 302). From massage therapist to pharmacist and from nutritionist to surgeon, dozens of professionals share in the goal of improving the health of the public. Of course, each of these vocational or professional paths involves post-secondary education. The length and scope of this education varies considerably depending on the particular role, job, vocation or profession. The education of healthcare practitioners ranges from seminar-trained nutritional counselors to surgeons with many years of specialized training. Among other factors, education and accreditation play key roles in the level of legitimacy a particular healthcare profession enjoys.

Statement of the Research Problem

Millions of Americans use some form of CAM and its use has increased dramatically in recent decades. A survey conducted by NCCAM in 2007 found that 38 percent of adults and 12 percent of children use some form of CAM (P. Barnes, Bloom, & Nahin, 2008). According to an Institute of Medicine (IOM) report (2005) on the use of CAM in the United States, Americans' visits to CAM providers now exceed visits to primary-care medical physicians. Annual out-of-pocket expenditures on CAM therapies are estimated to exceed $27 billion.

Given the enormous economic impact of CAM and the extent to which the public is using it to manage their health, there is a significant need to explore the role of CAM professions within the healthcare system. In particular, the relationship between CAM education and biomedical education is critical. The extent and manner in which CAM topics are addressed in mainstream medical education remains a topic of debate among medical educators and practitioners alike. Understanding the forces influencing the education of both mainstream and CAM healthcare providers is an important step toward the creation of policies to bring about positive changes (Houpt, Goode, Anderson, Aschenbrener, DeAngelis, Fortuner, Korn, Tartaglia, & Weinstein, 1997a).

The healthcare system in the U.S. is facing challenges and changes not heretofore seen. A recent report by the Institute of Medicine (IOM) estimated $750 billion per year are wasted due to unnecessary treatment, inefficiencies, paperwork and fraud (Yong, Saunders, & Olsen, 2010). Access to adequate and effective healthcare is a major concern for millions of Americans. Serious shortages of allopathic healthcare providers

are projected for the next decade and beyond. Costs for the individual and the economic impact are at an all-time high and rising, outpacing increases in income. The strain put on the system by an aging population is on the rise. From infant mortality to life expectancy, the U.S. trails much of the developed world in the most basic of healthcare outcome measures.

One element of change in the current U.S. healthcare system that is receiving much attention is a movement toward interprofessional care and education. A specific area of focus of interprofessional care and education involves the recent growth and popularity of CAM and IM among the public. This growth has lead to a perceived need to incorporate CAM topics into medical school curricula and throughout other healthcare settings. This is happening, in part, due to the significant increase in the numbers of patients accessing CAM modalities. Additionally, studies have indicated that patients are reluctant to discuss their CAM treatments with their medical doctors (D. Eisenberg et al., 1993). Initiatives have been launched to encourage patients to discuss their CAM treatment with their medical doctors, which is significant because many CAM approaches have been shown to have health benefits. At the same time, some may be detrimental to health when combined with mainstream medical approaches. However, in many cases, the physician may not know much about the therapy the patient is using and how it may interact with allopathic treatment. It is therefore important for basic information about CAM to be included in medical education so that when patients discuss their CAM treatment with the physician, he or she will have some knowledge about the risks, benefits and the potential for interaction with mainstream medical care.

CAM professions represent a major portion of the healthcare system and are being accessed by a large percentage of the public for a variety of healthcare needs. Clinical research into some CAM practices has demonstrated promising results. A systematic review of 338 economic evaluations of Integrative Medicine (IM) indicates many of these professions and practices offer cost savings to a financially strained system (Herman et al., 2012). A deeper understanding of CAM by the medical community could lead to increase efficiencies, expanded treatment options, better cost containment, improved communication among practitioners and better outcomes.

Medical doctors need to have at least a basic understanding of what the most common CAM professions offer in order for these outcomes to be realized. One way to achieve this goal is through inclusion of CAM topics in medical school curricula. A better understanding of the attitudes of incoming medical students toward CAM is needed to inform curriculum development in this area. For example, if the majority of incoming medical students are exceptionally skeptical about the effectiveness of CAM practices, educational activities designed to open the minds of the students may be beneficial. However, if a study of incoming medical students reveals openness to CAM therapies, time spent trying to convince students that CAM practices are viable may be time wasted or worse, may actually contribute to skepticism.

Of the 137 medical schools in the U.S., Barzansky and Etzel found that 98 (71.5 percent) offer courses on CAM related topics (2003). This is a significant increase from only five years earlier, when Wetzel found that 75 of 117 responding schools (64 percent) offered CAM courses (Wetzel, Eisenberg, & Kaptchuk, 1998). Another example illustrating this movement is the work of the Consortium of Academic Health Centers for

Integrative Medicine (CAHCIM). This group, comprised of 57 medical schools, is taking an active role in the promotion of CAM in the curriculum. The Academic Consortium for Complementary and Alternative Health Care (ACCAHC) is a consortium of CAM organizations which is focused on bringing attention to the CAM professions, including advocating, in cooperation with CAHCIM, for the inclusion of CAM topics in medical school curricula. While there is attention being focused on this phenomenon in medical schools, there remains a poor understanding of the views of incoming medical students regarding the legitimacy of CAM and their expectations of CAM topics in the curriculum. Knowledge about incoming medical students' baseline CAM-related experience, attitudes and expectations will inform the curriculum development process in medical schools, particularly as it relates to CAM topics.

Considering the growing healthcare crisis facing the U.S., it is critical that the most efficient and effective tools are employed in educating tomorrow's healthcare practitioners. Providers must be educated in the most effective approaches to support and maintain health as well as treat disease. Furthermore, the achievement of legitimacy by a profession within the healthcare community allows that group to contribute most effectively to the welfare of the population and the challenges that face the healthcare system. The attitudes of one group of healthcare providers toward another group and their practices will undoubtedly affect the collaboration between the two groups.

The specific goals of this study, which follow the body of this paper, include understanding the factors associated with the legitimacy ratings of entering medical students toward CAM and IM. By building an understanding of the factors associated

with incoming medical students legitimacy ratings of CAM and IM, medical schools may be able to design learning activities with these factors in mind.

Incoming medical students at the Medical School at the University of Minnesota - Twin Cities were surveyed to determine their views, expectations and plans relative to CAM and IM and to accomplish the goals of this study. Chapter three presents detailed methodology of the study. The specific research questions addressed by this study include are:

- What are the views of students newly admitted to medical schools regarding the legitimacy of CAM therapies and IM, and what aspects of their background are associated with differences in those views (e.g., their experiences with CAM therapies, gender, age, race/ethnicity and socioeconomic status)?
- What are the characteristics of incoming medical students associated with assigning different levels of legitimacy to CAM and IM?
- What is the relationship between medical students' attitudes and views of CAM and the expectations of medical students of exposure to CAM in the curriculum?
- What is the relationship between medical students' legitimacy rating of CAM and IM and their exposure to diversity?
- What is the relationship of various aspects of a newly admitted medical students' background with their future plans to incorporate CAM into their own medical practices?

The Importance of the Research

Kessler (2001) determined that the post-baby boomer generation (born between 1965 and 1979) was much more likely to have accessed CAM by the time they were 33 years old than either pre-baby boomers (born prior to 1945) or baby boomers (born between 1945 and 1964). If this trend has continued in younger generations, it may be that a higher percentage of today's incoming medical students have experienced CAM compared to earlier generations. This is the first generation of entering medical school students to be born into a "wired world" and connected 24 hours a day. They have experienced uncertainly about the economy throughout their formative years. They remain hopeful in a world full of old problems and new opportunities and believe they will eventually achieve their goals in life. They value lifelong learning, appreciate meaningful work and are expected to be a socially active generation (Sessa, Kabacoff, Deal, & Brown, 2007). Given that entering medical students are of generation Y or the millennial generation, an understanding of these students use, and attitudes toward CAM is essential. The extent of technological changes this new generation has experienced along with their distinct expectations and experiences as compared to earlier generations supports the need for a new analysis of incoming medical students. Changes have certainly taken place in the almost ten years since the last significant study of early medical student attitudes toward CAM was conducted (D. Lie & Boker, 2006).

First-hand experience with CAM is one of the best predictors of a favorable attitude toward CAM (Kreitzer et al., 2002, Lie & Boker, 2006, Frye, et al., 2006). Perhaps the medical doctors of tomorrow will be more open and accepting of CAM practices and more willing to integrate CAM therapies into their practices as a result of

their own exposure to CAM therapies at an earlier age as compared to past generations. The current study will help to answer this important question.

The medical students of today will be the providers of tomorrow. Their attitudes toward the legitimacy of CAM therapies and professions may impact their willingness to refer to and work with CAM providers, with the goal of providing better and more cost efficient care. The purpose of this study is to explore the variables associated with medical students' attitudes toward CAM therapies and IM, their expectations of inclusion of CAM therapies in their education and their plans to incorporate CAM into their own practices. The degree to which medical doctors are willing to include CAM in their patients' treatment plans will have an impact on the degree to which CAM professions affect the public health of the nation.

CHAPTER 2: REVIEW OF THE LITERATURE

This research reviews how legitimacy impacts the role professions play in the healthcare system, as well as how those professionals are educated. The integration of CAM topics into medical education is a product of the growing legitimacy of CAM professions. The first section provides a brief history of U.S. medical education. Undeniable progress has been made in how physicians are educated. However, medical education has struggled to adequately respond to calls for change. Many forces are impacting the U.S. healthcare system and the pressure on medical education to adjust continues.

The second section is a brief overview of CAM, including the most popular practices, definitions, philosophies, education, and practice models. An overview of CAM use and trends in the U.S. demonstrates the dramatic economic impact of this often-overlooked segment of the healthcare system. The third section is a historical overview of CAM education, leading into the current educational framework of CAM professions. This section also includes information regarding the accreditation of CAM educational institutions and a discussion on how the development of speciality accrediting bodies for various CAM fields lends credibility to affected professions. This summary of CAM and the trends around its use and education illustrate the need for this group of healthcare practices to progress into a more robust role in the healthcare system.

The fourth section is a summary of the trend toward including CAM topics in medical school curricula, and is followed by a fifth section which outlines the barriers, facilitators and recommendations surrounding this movement. A major factor behind this

movement is funding from the federal government. Examples of federally funded initiatives promoting the trend are provided. A recent significant change to federal healthcare legislation stands to impact current healthcare education even more. This legislation and significant economic factors are presented, adding context to the changes taking place in medical schools. The sixth section provides an overview of the current state of the healthcare system in the U.S. The final section details the various factors that boost or diminish the legitimacy of a profession. The pursuit of legitimacy is explored through the framework of isomorphic principles.

Brief History of U.S. Medical Education

The National Cancer Institute (NCI) of the National Institutes of Health (NIH) has defined allopathic medicine as "A system in which medical doctors and other healthcare professionals (such as nurses, pharmacists, and therapists) treat symptoms and diseases using drugs, radiation, or surgery; also called biomedicine, conventional medicine, mainstream medicine, orthodox medicine, and Western medicine." (National Cancer Institute - Dictionary of Cancer Terms, 2012)

Medical education during colonial times, like other forms of professional education, took place largely by apprenticeship (Brubacher & Rudy, 1997). The emphasis of this education was in the realm of practical application of skills. The duties of aspiring physicians progressed from washing bottles to mixing drugs and finally to providing direct patient care. By shadowing the physician, the apprentice would learn the essentials of patient care and eventually be elevated to the position of professional physician himself. While a theoretical dimension of practice was not entirely absent from

apprenticeship models of education at the time, it was limited to books that the training

physician may have had on hand. The apprenticeship model had all the advantages of

learning by doing, but there were clearly weaknesses in this model. First, the passing of

an unscientific and inconsistent body of knowledge between generations of practitioners

without a centralized repository for standards of practice was a clear system flaw.

Second, training physicians often lacked the skills and time to adequately teach their

aspiring apprentices. Third, the empirical nature of the training resulted in inconsistent

experiences among apprentices and a poor foundation in the theoretical elements that

would explain the practical side of practice (Brubacher & Rudy, 1997).

The first medical college in England was the Royal College of Physicians of

London, established in 1518 by a royal charter from King Henry VIII. Leading

physicians at the time were seeking a way to separate those qualified to practice medicine

from unqualified, poorly educated individuals engaged in malpractice. The founding

charter decreed the college would "curb the audacity of those wicked men who shall

profess medicine more for the sake of their avarice than from the assurance of any good

conscience, whereby many inconveniences may ensue to the rude and credulous

populace" (History of the Royal College of Physicians, 2012).

Medical education evolved in the United States as a result of British, German and

French roots until the end of the 19th century (Bloom, 1988). Early medical schools in

the U.S. operated independently of the rest of the institution and tended to be very

profitable. Given the profitability of the professional schools, the number of proprietary

medical schools burgeoned throughout the 19th century, and reached 160 schools by 1890

(Brubacher & Rudy, 1997). The lack of standards to which medical schools were held as

well as competition from continuing apprenticeship programs resulted in low and

inconsistent standards for admission and graduation. The limiting approach of both

apprenticeships and professional schools would eventually lead to the notion that optimal

medical education combines the theoretical, didactic elements of the classroom with the

practical, empirical elements of the apprenticeship.

A number of organizations and forces emerged during the 19th and 20th centuries

which dramatically influenced medical education and contributed to the legitimacy which

mainstream medicine enjoys today. Between 1847 and 1942, the creation of four

organizations radically changed the model of medical education in the U.S. These

organizations, detailed in the following pages, include the American Medical Association

(AMA), the American Association of Medical Colleges (AAMC), the Council on

Medical Education (CME), and the Liaison Committee on Medical Education (LCME).

Additionally, a landmark study and report by Abraham Flexner in 1910 (*The Flexner

Report*) fundamentally changed the face of medical education (Bloom, 1988).

The American Medical Association (AMA) was established by Nathan Smith

Davis in 1847. A year after being elected to serve in the New York Medical Society,

Davis advocated for the formation of an organization which would "elevate the standard

of medical education in the United States" (AMA - Our Founder Nathan Smith Davis,

2012). The principles on which the AMA was founded centered on the promotion of the

science of medicine through research, high ethical standards, the improvement of public

health and strong educational standards for the profession. At the founding meeting, the

first code of medical ethics was established along with the first standards for medical

education leading to the doctor of medicine degree. These steps certainly strengthened

the legitimacy of medical practice in the eyes of the public and other healthcare providers.

The Association of American Medical Colleges (AAMC) traces its roots to June, 1876, when representatives of 22 medical schools met to "consider all matters relating to reform in medical college work" (AAMC History, 2012). It was out of this convention that the Provisional Association of American Medical Colleges was formed. Their collective vision was to advance "medical education in the United States, and the establishment of a common policy among medical colleges in the more important matters of college management" (AAMC History, 2012). The AAMC ("provisional" was dropped from the title), remains to this day as medical education's premier professional association. The organization represents all 137 accredited allopathic medical schools in the United States and all 17 in Canada. The AAMC seeks to serve and lead "the academic medical community to improve the health of all" (About the AAMC, 2012).

The importance placed on educational standards by the AMA eventually prompted the creation of the Council on Medical Education (CME) in 1904. This move was a result of the need for an independent body focused on standards in medical education. One of the roles of the CME was to recommend educational standards and policies to the AMA. This newly formed body published the first standards for medical education in 1905. To this day, the CME remains the group responsible for the comprehensive review of all aspects of medical education, including continuing education. Related policies and procedures are recommended to the American Medical Association (AMA) and the greater medical community to ensure that an adequate

number of well-qualified physicians are available to meet the public need (American Medical Association - Council on Medical Education, 2012).

While the CME is very active in the study and evaluation of medical education including the promotion of high quality educational standards, it does not have accreditation authority for individual medical schools. This responsibility lies with the Liaison Committee on Medical Education (LCME) which is the single accrediting body for all medical schools operating in the U.S. and Canada. The AMA and the AAMC worked together to form the LCME in 1942. The LCME evaluates each accredited medical education program according to standards related to curriculum, organization, performance and function. The CME, among other related organizations, including the schools themselves, may have input into the accreditation standards (Liaison Committee on Medical Education, 2012).

One effect of the establishment of these four organizations was a shift of medical education from an unregulated, largely profit-driven system, to a formalized system operating out of well-established universities and hospitals. The curriculum at many schools expanded during this time to include foundational studies in basic sciences such as chemistry, biology and physiology, which was easier to accomplish in university settings with the capacity to offer such courses. Hence many medical schools gave up their independent status for the economies offered in larger universities by merging into those institutions. The University of Minnesota Medical School provides just such an example, established in 1888 after three of four private medical schools in Minneapolis gave up their charters and resources to create this public medical school.

While the aforementioned organizations had a powerful impact on medical education and the legitimacy of mainstream medicine, arguably none matched the impact of the *Flexner Report.* The report, published in 1910 by Abraham Flexner, was sponsored by the Carnegie Foundation for the Advancement of Teaching. Following extensive research into the existing models used in American medical education, the report included recommendations for sweeping and dramatic changes to the system. At the time of the report, medical education in the U.S. was fragmented, diverse and non-standardized. While some of the stronger schools, led by Harvard, had increased requirements for entry into their medical schools over the latter part of the 19th century, prerequisites for admission were still inconsistent, and in many cases nonexistent. Curricula were inconsistent, and assessment of student competence was inadequate. Much of the education was lecture-based, and clinical education was largely nonexistent. Many medical schools at this time were private, for-profit, proprietary institutions without affiliation with a university.

Flexner's report advocated for fewer schools, a standardized curriculum, and a minimum of two years of undergraduate study prior to admittance into medical school. Flexner concluded there were too many medical schools with weak standards for entrance, graduating too many doctors. He proposed a reduction in the number of schools from 155 to 30. "Thirty medical schools with an average enrolment of 300 and average graduation classes of less than 70, will be easily equal to the task" (Flexner, 1910, p. 146). Flexner recommended, "A two-year college training, in which the sciences are "featured," is the minimum basis upon which modern medicine can be successfully taught" (Flexner, 1910, p. 26). Flexner identified Minnesota as "perhaps the

first state in the Union that may fairly be considered to have solved the most perplexing

problems connected with medical education and practice except as to osteopathy"

(Flexner, 1910, p. 248). He praised the state for concentrating medical education within

the university and for having "got rid of rival schools, regular and sectarian" (Flexner,

1910, p. 248).

In the years leading up to the *Flexner Report*, the number of medical schools was

already in decline. The number had fallen from 160 in 1890 to 126 in the following

decade (Brubacher & Rudy, 1997, p. 63). This drop is credited to the publicity from the

Journal of the American Medical Association, which rated schools based on their

graduates' passing rates on state medical exams. Following this report, the AMA

instituted a rating system of medical schools based on site visits and ten basic criteria.

Flexner's more thorough subsequent study of the schools led to the immediate closure of

20 schools which chose to close rather than have to manage the public scrutiny that

would inevitably come following the release of the report. By 1915, the number of

medical schools had dropped to 95 and down to 85 by 1920. The proportion of these

remaining schools that scored in the highest category of the AMA's rating system

increased from 69 percent in 1915 to 89 percent in the later part of the 1920s (Brubacher

& Rudy, 1997, p. 63).

Medical education today shows evidence of Flexner's influence, along with the

marks of numerous other influential individuals and forces (Beck, 2004; Fogelman et al.,

1996; Funkenstein, 1978; Houpt, Goode, Anderson, Aschenbrener, DeAngelis, Fortuner,

Korn, Tartaglia, & Weinstein, 1997b). However, Bloom (1988) noted that despite radical

changes in medical practice, teaching and learning in medical education remained largely

unchanged during that same timeframe. He stated, "The teaching/learning experience remains remarkably similar, so similar that current medical students are startled by the mirrorlike familiarity of 30-year-old accounts of medical student life" (Bloom, 1988). Higher education, by its very nature, is slow to change in response to the demands of the rapidly shifting marketplace. Unfortunately, the field of medicine is not immune to this phenomenon. While the rapid growth of computer technology and the field of medical informatics since the late 1980s have helped medical education keep pace with bioscience and technology developments (Frisse, 1992; Haynes, Ramsden, McKibbon, Walker, & Ryan, 1989), concerns about teaching methods remain.

Christakis (1995) conducted an extensive review of 19 major reports published between 1910 and 1993 which advocated for the reform of medical education. Reforms were grouped into four categories: manner of teaching, content of teaching, faculty development and organizational factors. Christakis found the reports to be "extraordinarily consistent in the specific reforms proposed to correct the perceived deficiencies in medical education – to the point that the wording of some of the recommendations is identical." (p. 709) For example, the recommendation of increased integration between basic sciences and clinical education has appeared in five major reports since 1940. A recommendation of increased interdisciplinary teaching has appeared in eight major reports since 1932.

The Panel on the General Professional Education of the Physician and College Preparation for Medicine was created in 1981. In 1984 the panel published its report, *Physicians for the Twenty-First Century: The GPEP Report*. The report stated "a review of past efforts to modify medical education reveals that most of the problems identified in

the course of this project are not new. Institutions intermittently have changed their

curricula, but unfortunately little progress has been made toward a fundamental

reappraisal of how physicians are educated" (*Physicians for the Twenty-first Century,*

1984). This report has been referred to as the "New Flexner Report" (Bloom, 1988) and

called for medical faculties to "emphasize the acquisition and development of skills,

values and attitudes by students at least to the same extent that they do their acquisition of

knowledge." (*Physicians for the Twenty-first Century,* 1984). Prior to the report, the

overwhelming emphasis of medical schools had been on the acquisition of factual

knowledge (Kendall & Reader, 1988).

Efforts to reform medical education continued into the latter part of the 20th

century. In 1994, the Association of American Medical Colleges formed the Advisory

Panel on the Mission and Organization of Medical Schools (APMOMS) to explore how

changes in medical practice, science and public expectations would impact medical

education (Houpt, Goode, Anderson, Aschenbrener, DeAngelis, Fortuner, Korn,

Tartaglia, & Weinstein, 1997a). A range of general recommendations addressed issues

including faculty tenure and compensation, the appropriate size of the academic

enterprise, involvement of outside stakeholders in strategic planning, and expansion of

information technology resources. Recommendations regarding medical school

curriculum included modifications to undergraduate medical education and preclinical

education, and increased vertical integration of preclinical with clinic education

(Fogelman et al., 1996; Gewertz et al., 1997; Houpt, Goode, Anderson, Aschenbrener,

DeAngelis, Fortuner, Korn, Tartaglia, & Weinstein, 1997a; Inui et al., 1998; McCurdy et

al., 1997; Ralston et al., 1996). Notably lacking from the literature is a discussion of the

curricular impact of the views of incoming medical students toward various healthcare practices.

As discipline-specific elements of medicine and medical education were evolving, other developments in the broader higher education environment were also occurring. One such development with implications for medical education was the creation of the American Association of University Professors (AAUP) in 1915 (Brubacher & Rudy, 1997). In that same year, the AAUP published the Declaration of Principles on Academic Freedom and Academic Tenure. Twenty-five years later the AAUP published the 1940 Statement of Principles on Academic Freedom and Tenure. Academic freedom in medical education is critical to the integrity of medical education. This is evident when one considers the potential for inappropriate influence by college administrators, corporations, pharmaceutical companies, and insurance companies. For example, if a particular pharmaceutical company offered to make substantial financial contribution to a medical school in exchange for influence on the curriculum, faculty may be pressured by administration to comply. Without these principles outlined in the AAUP statement, medical education may be more responsive to economic pressures than to sound medical and public health research. Several medical associations including the American Association for Cancer Education, American Association of Colleges of Pharmacy, and the American Association of Physicists in Medicine officially endorsed the 1940 Statement of Principles on Academic Freedom and Tenure (American Association of University Professors, 2012).

Today, the four years that comprise medical school is divided into two two-year blocks. The first two years consists largely of basic sciences. During this time, students

are expected to amass a strong knowledge base in anatomy, physiology, pathology, chemistry, pharmacology and related subjects. The focus of the second two years shifts to a more clinical curriculum. During this phase, students spend a significant part of a typical day shadowing physicians in a clinical setting, honing clinical skills, and interacting with patients with a myriad of diagnoses. In recent years, clinical training experiences have been moved earlier and earlier in the medical student's education in response to a perceived need for clinical training to be integrated into the basic science curriculum (Haggerty & Burg, 1992). This integration has been promoted to emphasize to students the interconnectedness and scientific basis for clinical practice. The goal of this vertical integration of the curriculum is to blur the basic science foundations of the first two years with the clinical education focus of the second two years of medical school (Weinberger & Whitcomb, 2002).

While there certainly have been numerous pressures on medical education over its history, the attitudes, expectations and plans of entering medical students present an interesting "pressure from within" on the curriculum. These factors must be considered as curriculum and teaching methods are developed and improved. For example, if entering students have a limited appreciation for the impact that strong communication skills can have on a successful patient encounter, significant learning activities should be designed to affect that perception. This study builds on that concept and focuses on the attitudes, expectations and plans of entering medical students toward complementary and alternative medicine (CAM). By building an understanding of the factors associated with these views, medical schools may learn how best to incorporate CAM topics into the curriculum.

The evolution of medical education and practice continues today. The intersection of CAM with medical practice and the education of medical students is a topic of continued debate. Before examining the details of that intersection and related questions, an overview of common CAM practices, the education of CAM practitioners and the trends surrounding CAM in the marketplace is required.

An Overview of CAM and the Trends of Use

Many professions that operate on the margins of healthcare are categorized as complementary and alternative medicine (CAM). A lack of legitimacy is one factor that forces many of these practices to operate outside of mainstream, conventional, or allopathic medicine. Appendix B is a table of ten common CAM therapies and definitions.

Complementary medicine refers to the use of a CAM therapy together with conventional medicine. Complementary practices include those therapies that are thought to improve or add to the effectiveness of another treatment (National Center for Complementary and Alternative Medicine, 2012). For example, massage therapy may be added to the treatment of a patient with cancer to complement chemotherapy treatment by lowering the patient's pain and anxiety. Another example is the use of acupuncture along with anesthetics during surgical procedures to ease pain. These practices and their associated outcomes "complement" the more mainstream treatment plan delivered by an oncologist or anesthesiologist, in the aforementioned examples.

Alternative medicine refers to the use of a CAM therapy in place of conventional medicine (National Center for Complementary and Alternative Medicine, 2012).

Alternative healthcare includes practices that are used in place of more mainstream approaches to address a condition or disease. For example, a patient with chronic low back pain may opt for chiropractic treatment as an alternative to, or instead of, surgery to manage the condition. The use of homeopathy in place of drug treatments is another example of an alternative healthcare practice. Homeopathy is a whole medicine system that seeks to stimulate the body's ability to heal itself by administering very small doses of substances in highly diluted solutions that would otherwise cause disease (National Center for Complementary and Alternative Medicine, 2012).

In 1991, in an effort to organize and study alternative medicine practices, the U.S. Congress passed legislation that called for the National Institutes of Health (NIH) to create the Office of Alternative Medicine (OAM). The legislation put in place by Congress provided $2 million in funding to the newly formed office to "investigate and evaluate promising unconventional medical practices" (National Center for Complementary and Alternative Medicine, 2012). In 1998, the OAM was converted to the National Center for Complementary and Alternative Medicine (NCCAM), and is now considered "the Federal Government's lead agency for scientific research on the diverse medical and healthcare systems, practices, and products that are not generally considered part of conventional medicine" (National Center for Complementary and Alternative Medicine, 2012). This act of Congress elevated the organization to one of the 27 institutes and centers that make up the NIH. The creation of this organization elevated the legitimacy of CAM professions in general. Today, the NCCAM provides over $128 million in annual funding of research in the area of CAM practices (National Institutes of Health - Office of Budget, 2012). While this represents a small fraction of the over

$30 billion budget of the NIH, it is a significant increase from the paltry $2 million which the OAM started with in 1991.

The NCCAM categorizes CAM practices into one of two subgroups, natural products or mind and body practices. Natural products include biologically-based products such as herbs and dietary supplements. The myriad of herbs and dietary supplements that have grown in popularity recently provide examples of biologically-based products (St. John's Wort, Echinacea, and shark cartilage). Mind and body practices include such therapies as mind-body medicine, which focuses on the belief that the mind has the capacity to affect the various systems of the body. Additional examples include prayer, meditation, mental healing and energy medicine which attempts to affect health through the use of energy fields in and around the body. Practices such as chiropractic and massage therapy which are based on movement and manipulation of the physical body are also included in the mind and body practices division. (National Center for Complementary and Alternative Medicine, 2012).

In addition to clinical research of the above therapies, NCCAM engages in proactive initiatives to increase education and awareness in the medical community about CAM and the degree to which the public is accessing CAM services. In 2008, NCCAM launched an educational campaign titled "Time to Talk" which encouraged patients to discuss openly with their medical doctors the CAM care they were receiving with their physicians. This initiative was launched in response to studies that indicated patients were reluctant to discuss the types of CAM interventions they were receiving. Eisenberg (1993), in the first significant study to examine the phenomenon, found 83 percent of individuals who were seeking care for a serious medical condition from a CAM

practitioner were concurrently receiving care from a medical doctor for that same condition. However, almost three quarters (72 percent) of those individuals did not inform their medical doctor of their secondary treatment approaches (p. 249). An additional factor in patient reluctance to discuss CAM use with their doctor may be the doctor's attitude toward CAM therapies and their legitimacy. Perceptions of the legitimacy of CAM by medical doctors may have established roots prior to medical school and be related to factors heretofore unknown.

According to Eisenberg's landmark 1993 study in *The New England Journal of Medicine,*

1. Approximately 1/3 of Americans in 1990 were regular users of complementary medicine modalities,

2. more office visits were made to physicians practicing CAM than to primary care physicians and,

3. nearly 75 percent of patients who were utilizing these CAM modalities never told their primary care physicians.

Additionally, almost $14 billion per year was being spent out-of-pocket on nontraditional practices – mainly because insurance rarely reimburses for these services (D. Eisenberg et al., 1993). Follow-up studies have confirmed similar results (*The Landmark Report on Public Perceptions of Alternative Care,* 1998). Eisenberg conducted his own followup survey in 1997 and found that the probability of individuals visiting an alternative care practitioner increased from 33.6 percent in 1990 to 46.3 percent in 1997. The percentage of CAM users paying out-of-pocket for services did not change significantly during the time between the two surveys (64.0 percent in 1990 and 58.3 percent in 1997). A total of

427 million visits were made to CAM practitioners in 1990 compared to 629 million in 1997, again outpacing the number of visits made to all U.S. primary care physicians. Expenditures for CAM professional services increased 45.2 percent between 1990 and 1997 and were estimated at $21.2 billion in 1997 with at least $12.2 billion being paid out-of-pocket. Eisenberg's conservative estimate of the total out-of-pocket expenditures on CAM services in 1997 was $27 billion. This is comparable with all out-of-pocket expenditures for all U.S. physician services (Eisenberg et al., 1998).

Tindle et al. (2005) conducted a third follow-up to Eisenberg's 1997 survey to examine the trends in CAM use among U.S. adults between 1997 and 2002. They found that overall CAM use remained relatively stable between 1997 and 2002 with 36.5 percent of adults making use of at least one CAM therapy in 1997 compared with 35.0 percent in 2002. The study found that not all individual CAM therapies follow the overall trend of CAM use. For example, while overall CAM use remained steady between 1997 and 2002, the use of yoga and herbal therapy increased significantly during this period (from 3.7 percent to 5.0 percent and 12.1 percent to 18.6 percent respectively), while the use of chiropractic fell from 9.9 percent to 7.4 percent (Tindle et al., 2005).

Kessler et al. (2001) sought to examine trends in the use of 20 CAM therapies over the past half century (back to the 1950s at the time the survey was conducted) and found that the use of most CAM therapies has increased steadily during this time. The authors organized and reported the results by decade. The use of all but four therapies increased in the 1960s compared to pre-1960. Growth in four therapies, commercial diet programs, lifestyle diet therapy, megavitamin therapy, and self-help groups, stood out as exhibiting the most growth during this period. The 1970s saw an increase in use of all 20

therapies, with the most substantial increases for biofeedback, energy healing, herbal medicine and imagery. The 1980s exhibited more modest growth in the use of most CAM therapies with only two therapies (massage and naturopathy) outpacing their growth in the 1970s. The 1990s saw continued modest growth with 16 of the 20 therapies showing increased use compared to the 1980s.

Kessler et al. (2001) found that 67.6 percent of all interviewees had accessed at least one CAM therapy at some time in their lives and that the age at which lifetime CAM users first used CAM was correlated strongly to their generation. Pre-baby boomers (born prior to 1945) were more likely to be older when first making use of a CAM therapy, while baby boomers (born between 1945 and 1964) and even more so, post-baby boomers (born between 1965 and 1979) were likely to access CAM for the first time at a younger age. In examining all three of these cohorts, three out of ten pre-baby boomers, five out of ten baby boomers and seven out of ten post-baby boomers had used some type of CAM therapy by the time they were 33 years old. Post-baby boomer respondents had a higher rate of lifetime use by the age of 33 than pre-baby boomer respondents had by the age of 79. Given that younger generations are more likely to access CAM for the first time at a younger age, and the positive effect of CAM use on attitudes toward CAM, one wonders how today's entering medical students view CAM and the effect this may have on their expectations for CAM topics to be included in their medical school curriculum and their plans to incorporate CAM into their future practices.

Americans are spending more than ever before of their non-reimbursable healthcare dollars on CAM providers. The National Health Interview Survey (NHIS) is conducted annually by the Centers for Disease Control's National Center for Health

Statistics. The CAM supplement of this survey is included every five years. The most recent data available from this survey is from 2007. In 2007, U.S. adults spent $33.9 billion out-of-pocket to CAM practitioners and on CAM products, classes, and materials, which represents 1.5 percent of total healthcare expenditures in the U.S., and 11.2 percent of out-of-pocket healthcare expenditures. Self-care costs made up 64.8 percent ($22 billion). Self-care refers to forms of CAM that a person can perform alone, even if training from a book, video or experienced practitioner is required. Of the self-care category, non-vitamin, non-mineral products (products taken by mouth that contain a dietary ingredient other than vitamins and minerals, such as herbs) lead with $14.8 billion in out-of-pocket costs, which represents about 31 percent of the amount spent on pharmaceutical drugs in 2007 ($47.6 billion). Yoga, tai chi and qigong classes accounted for 12 percent ($4.1 billion), homeopathic medicine, 8.7 percent ($2.9 billion), and relaxation techniques, 0.6 percent ($200 million) of the total expenditures.

The estimated 354.2 million visits to CAM practitioners represented 35.2 percent ($12.4 billion) of the total, which compares to approximately four times that amount ($49.6 billion), of out-of-pocket expenses paid for conventional physician services. About three-fourths of out-of pocket costs and number of visits to CAM practitioners were to manipulative (e.g. chiropractic) and body-based therapies (e.g. massage therapy). Adults spent $121.92 per person for visits to CAM providers at an average cost of $29.37 per visit in 2007. Visits to practitioners of chelation therapy (a chemical process where a substance is used to bind metals or minerals so they can be removed from the body) and naturopathy (the use of nutrition, lifestyle counseling, and other natural remedies to access the natural healing power of the body) were among the highest per-visit cost, and

visits to chiropractors and osteopaths represented one of the lowest per-visit costs. (Nahin, Barnes, Stussman, & Bloom, 2009).

Prior to the 2007 NHIS, Eisenberg's 1997 survey provided the last estimates of cost and number of visits to CAM providers in the U.S. While the methodology and survey specifics differ, comparison of the results of the two surveys supports the conclusion that self-care therapies such as the use of natural products has increased while visits to CAM practitioners has decreased between 1997 and 2007. Number of visits to CAM practitioners has dropped about 50 percent between the Eisenberg survey in 1997 and the NHIS in 2007. Eisenberg reported 628.8 million visits to CAM practitioners in 1997, which was similar to the total number of visits to medical doctors and osteopaths (787.4 million). The 2007 NHIS indicates a substantial decrease in the number of visits to CAM providers (354.2 million), contrasted with a significant increase in the number of visits to medical doctors and osteopaths (902 million visits) in 2007. About half of the decrease in visits to CAM practitioners, are accounted for the decrease in visits to practitioners of relaxation techniques and energy healing therapies. From 1997 to 2007, visits to practitioners of relaxation techniques fell from 103.2 million to 28.9 million, while energy healers saw a decrease in visits from 40 million to 7.2 million.

According to another National Health Statistics Report, based on the same 2007 NHIS survey data, in 2007 almost four out of 10 adults had used some type of CAM in the past 12 months (Barnes, Bloom, & Nahin, 2008). Non-vitamin, non-mineral natural products (e.g. Echinacea, garlic, and Ginkgo biloba) were the most commonly used CAM therapies among adults. The most common users of CAM were women, those with higher levels of education, higher levels of income and those in their 50s. However,

people of all ages and backgrounds use CAM. Given the wide public acceptance and use

of CAM, it is important to understand how medical doctors perceive these professions

and therapies, when these attitudes were formed and what factors are associated with

those perceptions.

The Evolution of CAM Education

CAM education has undergone significant evolution throughout history. Indeed,

the very categorization of certain therapies as either CAM or mainstream influences the

setting in which it is taught. What might be considered CAM today may have been

considered mainstream in many cultures at some point. For example, the practice of

homeopathy today is considered a CAM modality. The practice is not taught in medical

schools, practiced in hospitals, or covered by medical insurance. However, homeopathy

flourished in the U.S. from the time it was introduced in 1825 to about 1900. At that

time, there were 22 homeopathic medical colleges and 20 percent of physicians used

homeopathy (*Clinicians' and Educators' Desk Reference on the Licensed Complementary

and Alternative Healthcare Professionals,* 2009). Resistance from conventional

medicine, punctuated by a negative review within the *Flexner Report*, which categorized

homeopathy with other sectarian medical practices that should be abandoned, contributed

to the relegation of homeopathy to a CAM practice (Flexner, 1910). While the total

number of homeopathic practitioners in this country is very difficult to ascertain due to

the various levels of practice and inconsistent regulation of practitioners, one estimate

puts the total at 8,500. Fewer than 1,000 of these practitioners are thought to be MDs

who have incorporated homeopathy into their practices (Rowe & Bell, 2007). This

would represent a small percentage (about one tenth of one percent) of medical doctors

practicing homeopathy today.

The closest Flexner came to recommendations around CAM education and

practice is a section of his report dedicated to what he refers to as the "The Medical

Sects." He distinguished modern medicine from sectarian practices by emphasizing that

medicine relies on science, facts, and observable, testable truths. Seeking to distance

modern medicine from medical sectarianism, he suggested that medicine "has learned

from the previous history of human thought that men possessed of vague preconceived

ideas are strongly disposed to force facts to fit, defend or explain them" (Flexner, 1910,

p. 156). He categorized the medical sects as those practices that are based on weak *a*

priori explanations, dogma and abstract general propositions not based in science. He

described the medical sectarians approach as "self-contradictory" in that the first half of

their medical education focuses on the scientific method and includes such topics as

anatomy, pathology and bacteriology. However, the second, clinical half of their

education is dedicated to "a novel principle" based not on science but "revelation"

(Flexner, 1910).

Flexner suggested that not only does the nascent chiropractic profession not

deserve the somewhat pejorative title of medical sect; they should be dealt with as

criminals. "The chiropractics, the mechano-therapists, and several others are not medical

sectarians, though exceeding desirous of masquerading as such; they are unconscionable

quacks, whose printed advertisements are tissues of exaggeration, pretense, and

misrepresentation of the most unqualifiedly mercenary character. The public prosecutor

and the grand jury are the proper agencies for dealing with them" (Flexner, 1910, p. 158).

Suggestions of this nature within such a significant report must have damaged this young profession's legitimacy in the eyes of mainstream healthcare providers and the public.

Flexner's recommendation that abolishment of the medical sects (CAM) was probably impossible to enforce by statute, but advocated for strict educational guidelines and licensing requirements to offer some protection to the public from these non-scientific practices. Referring to the medical sects, Flexner said, "The law may require that all practitioners of the healing art comply with a rigidly enforced preliminary education standard; that every school possess the requisite facilities; that every licensed physician demonstrate a practical knowledge of the body and its affections. From medical sects that can live on these conditions, the public will suffer little more harm than it is destined to suffer anyhow from the necessary incompleteness of human knowledge and the necessary defects of human skill" (Flexner, 1910, p. 166). This led to the demonization of many CAM professions and the subsequent exclusion of several professions from what was becoming standardized, mainstream medical education (Whorton, 1986). This analysis begs the questions the current study attempts to answer, namely, "To what degree does this pejorative view of the CAM professions exist in the minds of entering medical students?" and "What factors influence those views toward CAM and how are their views toward CAM correlate with their plans around incorporating CAM into their future practices?"

Much of medical education in the early 1900s included what would now be considered as CAM education, including massage therapy, homeopathy and naturopathy. Conversely, many medical professions that are now considered mainstream, once operated on the margins of healthcare. For example, patient support groups and

cognitive-behavioral therapy have made this move to the mainstream as outcomes research grew to support the purported claims of these approaches to certain medical conditions (Clark & Fairburn, 1997). Other marginal practices are actually gaining ground and popularity in the face of little of no evidence of benefit according to the literature. For example, Healing Touch is an energy-based therapy that uses gentle hand movements believed to balance and reset the energy field around the patient and accelerate healing of the mind, body and spirit. Healing Touch is widely accepted and practiced in hospital environments despite the fact that no scientific evidence of efficacy exists.

Massage therapy offers a good example of how a profession can shift from a mainstream practice to CAM status and back to the mainstream. Dr. Johann Mezger is credited with bringing massage therapy to the scientific community during the late 19th and early 20th century (Calvert, 2002, p. 93). During the early 20th century, massage therapy was practiced widely in the hospital environment. Nurses were educated in the practice of massage and the practice of massage therapy and related education was promoted in the *Journal of the American Nurses Association* (Biermann, 1907; Churchill & Hammond, 1915; Robb & Baetlett, 1901). This education and practice dropped off precipitously around the mid 1950s, largely due to the advent of pharmaceutical treatments and technical medical advances that made hands on time and therapy too expensive and not cost effective. Massage therapy was then relegated to the status of a CAM practice throughout the 1950s and 1960s (MacDonald, 2004). The shift of practice settings for CAM professions will continue to influence models of CAM education.

A significant difference in CAM education vs. mainstream medical education is the diversity of theories and approaches that encompass these professions. CAM professions have largely evolved in an environment devoid of regulation. This phenomenon has been well documented (Cant & Sharma, 1996; Clarke, Doel, & Segrott, 2004; Kelner, Wellman, Boon, & Welsh, 2002; Welsh, Kelner, Wellman, & Boon, 2004). Furthermore, these professions and approaches to healthcare have evolved in an environment where research and evidence are not valued or required to the extent of mainstream healthcare education. It is for this reason that the National Center for Complementary and Alternative Medicine (NCCAM) offered an R-25 series of grants to fund educational projects. R-25 grants (discussed later in additional detail) are designated for "support to develop and/or implement a program as it relates to a category in one or more of the areas of education, information, training, technical assistance, coordination or evaluation" (Types of NCCAM Grants, 2012).

The evolution of CAM education has also involved the addition of several components which allow the educational experience to more closely mirror more mainstream higher education and healthcare education best practices. Flexner (1910) pointed out that many medical sectarian (CAM) educational models have adopted the educational model of focusing on anatomy, physiology and the scientific method in the first half of the training, just as in more mainstream healthcare education. However, while mainstream medicine focuses on clinical education based in the science, Flexner suggested the nonmainstream medical sects rely on revelation and dogma for the second half of their training.

A specific example is found in chiropractic education, which has evolved from numerous short non-standardized programs with no prerequisites and no accrediting organization; to university-based programs that require a minimum of 90 semester credits of well-defined universally accepted prerequisites, licensing in all 50 states, national certification exams, a single Department of Education recognized accrediting body and extensive standardized curricula (3-4 years or 9-10 semesters). The elements of this evolution in chiropractic education are similar to those advocated by the *Flexner Report* for medical education.

Accreditation is another factor in the evolution of CAM education and the legitimacy of professions. The creation of U.S. Department of Education-recognized CAM specialty accrediting agencies has been an important development in the evolution of CAM education. There are five such CAM specialty accrediting organizations which set curriculum standards for the five licensed CAM professions. These accrediting agencies include the Council on Chiropractic Education (CCE), the Accreditation Commission for Acupuncture and Oriental Medicine (ACAOM), the Commission for Massage Therapy Accreditation (COMTA), the Midwifery Education Accreditation Council (MEAC) and the Council on Naturopathic Medical Education (CNME). Table 1 lists the number of accredited schools and programs from the five licensed CAM professions.

Table 1

Accredited CAM Programs

Discipline	Accrediting Agency	Number of Accredited Programs
Acupuncture and Oriental Medicine	ACAOM	60
Chiropractic	CCE	20
Direct-entry Midwifery	MEAC	9
Naturopathic Medicine	CNME	7
Massage Therapy	COMTA	89
Total accredited licensed CAM Programs		185

More difficult to determine is the number of non-accredited schools and programs teaching various unlicensed CAM modalities due to the lack of reporting requirements of these schools to any central agency. If a national professional organization exists representing the profession, numbers may be reported based on surveys done by that organization. For example, the American Massage Therapy Association reported in 2011 there were 1,108 massage therapy schools offering programs of 500 or more hours (*AMTA Massage Profession Research Report,* 2011). Not all massage therapy schools are required to be accredited. When a national organization representing one of these practices exists, it may be poorly funded and not accountable to any oversight body,

leading to numbers that are difficult to trust. When a national organization does not exist, reliable data are even more difficult to determine.

Chiropractic education began in 1896 with the opening of the Palmer School of Magnetic Cure in Davenport, Iowa. During the first 32 years of existence of chiropractic, approximately 150 schools had opened. By 1928, only 40 of these schools were still offering chiropractic education. These early schools were almost all for-profit and emphasized quantity of students over quality. High school graduation was typically not required for admission. B.J. Palmer, president of the Palmer School, emphasized the simple nature of chiropractic education, suggesting that no more than 18 months of education was needed to train chiropractors because too much education "constipates the mind" and closes students off to the simple truths of chiropractic (Keating, Cleveland, & Menke, 2004, p. 14).

In 1928, the American Medical Association (AMA) conducted secret inspections of chiropractic schools and reported its findings in the *Journal of the American Medical Association*. Its report did not hide the fact that the AMA was at best skeptical, at worst malevolent toward the chiropractic profession and the education of chiropractors, including referring to the profession as a cult. The analysis of the inspection concluded with 12 highly disparaging specific findings or comments. The conclusions: "very few of these schools have even one adequately trained teacher on the faculty," and "not one of these schools actually enforces a matriculation of even five minutes of high school study" and "there is not one of these schools that does not ignore or even avowedly oppose the scientific point of view and the facts of medical science accepted by the authorities of the entire civilized world" (1928, pp. 1734-1735). If this view of chiropractic education is

indicative of current views toward CAM in general by incoming medical students, it does not bode well for future relationships among medical doctors and CAM practitioners. The current study examines this issue.

Common unlicensed CAM therapies include ayurvedic medicine, yoga therapy, and homeopathy. The National Ayurvedic Medical Association (NAMA) is working with 30 schools offering various programs in Ayurvedic medicine to develop minimum standards for Ayurvedic education in the U.S. A significant challenge involves the development of standards that capture the diverse training methods and philosophies of the practice (*Clinicians' and Educators' Desk Reference on the Licensed Complementary and Alternative Healthcare Professionals,* 2009).

Allopathic or conventional medical healthcare education and CAM education have evolved over centuries, largely along separate trajectories (Pizzorno, 2002). The degree of interaction and overlap between convention medical education and CAM education has varied throughout history. The models of education employed in these two branches of healthcare have certainly been influenced by the differing levels of legitimacy enjoyed by their respective professions. The high level of legitimacy enjoyed by conventional medicine and medical schools results in part from the use of validated educational models, accreditation, and scientific research. CAM education has historically been lower on the legitimacy scale and not as accountable to governmental or accrediting agencies. This had the effect of broadening the educational models available to these professions. For example, becoming "certified" in a particular therapy through correspondence courses or through apprenticeship may have been possible for various CAM practices (e.g., chiropractic) but not for medical training (Johnson & Green, 2010).

The degree to which allopathic and CAM practitioners cooperate and integrate in practice may be affected by attitudes of students toward other healthcare paradigms as they enter their respective educational institutions. The current study explores this issue from the perspective of beginning medical students.

Integration of CAM Education in Medical School Curricula

Increasingly, medical schools are offering and in some cases requiring their students to learn about CAM therapies. The practice of incorporating CAM into the curriculum is becoming more common within medical schools (Bhattacharya, 2000; Maizes, Schneider, Bell, & Weil, 2002; Sampson, 2001; Wetzel et al., 1998). Wetzel et al. (1998) found that 64 percent of 117 responding schools were teaching CAM topics either as stand-alone elective courses or as part of required courses. Medical students are also learning about the practices of CAM providers. This is being done, in part, due to the significant increase in the numbers of patients accessing CAM modalities. In many cases, the physician may not know much about the therapy the patient is using and how it may interact with allopathic treatment.

Many of these CAM approaches have been shown to have significant health benefits, and yet are typically not included in mainstream medical education. For example, a recent study by Bronfort et al. (2012) showed that spinal manipulative therapy had a statistically significant advantage over medication for the treatment of non-specific neck pain. Other studies have suggested manipulative therapy as practiced by chiropractors is an effective treatment for neck and back pain (Gross et al., 2004). However, spinal manipulative therapy is not included in medical school curricula. A

standardized process is needed for evaluating and incorporating those CAM therapies which have been shown to be effective into mainstream medical schools and practices.

Brokaw et al. (2002) reported "The growing popularity of CAM is beginning to have an impact on medical education" (p. 877). His review of several surveys which examined the trend led him to conclude that "CAM has established a significant presence in the undergraduate medical curriculum" (Brokaw et al., 2002, p. 877). Other evidence of "integration" is the teaching of CAM therapies in medical schools. This trend is being championed by leaders at conventional academic medical centers and schools. Currently 57 centers and affiliated institutions make up the membership of the Consortium of Academic Health Centers for Integrative Medicine (CAHCIM). Each of these academic health centers offers CAM clinical training opportunities in the form of one or more of the following methods: medical student clinical electives, resident clinical electives, fellowship programs, training for allied health practitioners, distance education courses and continuing education conferences.

CAHCIM defines integrative medicine (IM) as "the practice of medicine that reaffirms the importance of the relationship between practitioner and patient, focuses on the whole person, is informed by evidence, and makes use of all appropriate therapeutic approaches, healthcare professionals and disciplines to achieve optimal health and healing" (Consortium of Academic Health Centers for Integrative Medicine, 2012). CAHCIM identifies two of its goals as:

1. Supporting and mentoring academic leaders, faculty, and students to advance integrative healthcare curricula, research, and clinical care and

2. disseminating information on rigorous scientific research, educational curricula in integrative health and sustainable models of clinical care.

CAHCIM's vision is "A comprehensive and compassionate health care system offering seamless integration of effective complementary and conventional approaches to promote healing and health in every individual and community" (Consortium of Academic Health Centers for Integrative Medicine, 2012).

CAHCIM began in 1999 with eight schools, expanded to 23 in 2003, 36 in 2006, 45 in 2009 and 57 in 2014 (*Clinicians' and Educators' Desk Reference on the Licensed Complementary and Alternative Healthcare Professionals,* 2009). This impressive and rapid growth (a seven-fold membership increase) of CAHCIM membership during its short 15-year existence, illustrates the strong trend toward increased recognition of the importance of educating medical professionals about CAM therapies. A tipping point may be approaching as the schools participating in CAHCIM outnumber the nonparticipating schools. This is particularly impressive when one considers the complexities and challenges associated with changing medical education (Bloom, 1988; Funkenstein, 1978). Nevertheless, an expression of commitment to an idea through membership in a consortium of schools is only a first step toward meaningful curriculum changes.

CAHCIM has proposed changes to educational standards to the Liaison Committee on Medical Education (LCME) to include integrative medicine competencies and has submitted test questions focused on integrative medicine for licensing and certification board exams. In May of 2003, CAHCIM published a set of core

competencies in integrative medicine for medical school curricula. This document

outlined the knowledge, values, attitudes and skills believed to be essential in the field of

integrative medicine. In this publication, CAHCIM outlined some of the challenges and

opportunities that schools may encounter in implementing these competencies. For

example, CAM therapies are not easily researched by analysis of their component parts.

This idea is counter to the foundation of conventional science and mainstream medical

education which typically examines individual parts to understand the whole. A second

significant challenge involves the lack of time in the curriculum to cover additional

material. This challenge could be managed to some degree by incorporating CAM

concepts into existing courses, rather than develop new courses to discuss CAM (Kligler

et al., 2004).

CAHCIM has studied and published several other articles outlining the barriers,

insights and challenges that institutions have encountered when implementing integrative

medicine curricula and competencies (Gaster, Unterborn, Scott, & Schneeweiss, 2007;

Gaylord & Mann, 2007; Haramati, Elder, Heitkemper, & Warber, 2007; Lee et al., 2007;

Sierpina, Schneeweiss, Frenkel, Bulik, & Maypole, 2007; Stratton, Benn, Lie, Zeller, &

Nedrow, 2007). Specific findings and recommendations of these publications will be

detailed later in this paper and will serve to guide the subsequent research.

Typically, CAM education in medical schools does not involve teaching to

competence for the medical students with the goal that they will provide CAM care

themselves. Rather the goal is that they will gain an understanding of provider modalities

goals, practices, contraindications, etc. A need to know how and when to refer to CAM

providers has also been identified as an important reason to include this content. This

requires at least a rudimentary knowledge of the theories and evidence behind the CAM

professions (Brokaw et al., 2002; Gaster et al., 2007; B. Kligler, Gordon, Stuart, &

Sierpina, 2000; B. Kligler et al., 2004). Important to consider as curriculum is designed

are the attitudes and expectations of entering medical students to this content in the

curriculum. Baseline levels of student knowledge about CAM would also be helpful to

curriculum designers.

Gaylord and Mann (2007) surveyed 15 participants in a major NCCAM funded

initiative focused on integrating CAM education into medical school curricula. They

asked about the rationale for incorporating CAM principles into their curricula and

summarized the results into ten themes. The themes were positive and supportive of the

movement toward inclusivity of CAM in the curriculum. Similarly, The Institute of

Medicine's panel on CAM use in the United States concluded that education about CAM

is needed for conventional medical practitioners and recommended "that health

profession schools (e.g., schools of medicine, nursing, pharmacy, and allied health)

incorporate sufficient information about CAM into the standard curriculum at the

undergraduate, graduate, and postgraduate levels to enable licensed professionals to

competently advise their patients about CAM" (*Complementary and Alternative*

Medicine in the United States, 2005, p. 248). Again, student attitudes and expectations

toward this content in the curriculum are important to consider as schools look toward

incorporating CAM related topics in the program.

Sampson (2001) acknowledged that there are several approaches to integrating

CAM topics into medical school curriculum. One approach is described as teaching

students *about* CAM practices. This approach does not claim or attempt to establish any

level of competency in terms of the physician actually being able to deliver a particular

CAM service. The emphasis in this curriculum is simply to help the students understand

the theories and goals behind the practice of certain CAM approaches. There may be

some discussion of when it may or may not be appropriate to refer patients to

practitioners of these approaches. A discussion of the level of evidence behind the

practice may also be included. A second approach involves an attempt to provide the

medical student with some level of competence in delivering care through a particular

CAM therapy or group of therapies. A third approach is to simply focus on giving

students the tools to critically evaluate all therapies (CAM or otherwise) without focusing

on one therapy or another. Finally, a fourth approach includes teaching the medical

students how they may access CAM therapies for their personal well being and self-care.

This last approach may have the effect of exposing medical students to CAM therapies

they might incorporate into their own practices and recommendations to their future

patients. There may not be a single model or approach that is appropriate for all CAM

therapies.

Educational integration: barriers, facilitators and recommendations. There

are differing opinions and significant controversy regarding the teaching of CAM

practices in medical schools. Opinions range from the belief that it is essential that

medical students learn about CAM practices to the feeling that there is no place for

practices that are not held to the same standards of research and evidence as other topics

in medical education. While there are clearly champions for CAM integration, others

approach the CAM movement with a significant amount of skepticism or cynicism.

Sampson presented a critical view of the trend, insisted that there is a double standard

when it comes to teaching CAM in medical schools and suggested that many schools are

teaching CAM without regard for the validity of the approach. Sampson surveyed 125

medical schools and found that of the 56 schools with courses about CAM, only nine

invited critical lecturers or took a critical approach to the topics (Sampson, 2001, p. 249).

In his analysis of these data, he advocated for limiting the teaching of medical students to

critical appraisal of the validity of any given CAM therapy and claims. Sampson (2001)

suggests that "most medical schools do not present CAM material in a form that

encourages critiques and analyses of claims" and presents "the reasons for the

unwarranted acceptance of CAM" despite "many CAM claims have been convincingly

disproved or remain unproved" (Sampson, 2001, p. 248). He expressed frustration at the

acceptance of CAM into the curriculum without being subjected to rigorous scientific

review, scrutiny and standards to which other areas are held.

Sampson references the efforts of CAHCIM toward integrating CAM elements

into the curriculum of their member institutions. While Sampson refers to the

Consortium's approach as a step in the right direction, he also suggests that their

approach of using evidence based analysis of clinical trials does not go far enough and is

not sufficient to establish validity. He emphasizes the importance of medical schools

teaching students to "analyze and critically assess the content validity of CAM claims"

(2001, p 250). Student receptiveness to any CAM related topics may hinge on their

familiarity with CAM, their attitudes toward CAM and their expectations of CAM topics

appearing in the curriculum. The current study examines these variables along with the

factors which may explain them.

Sierpina et al. (2007, pp. 947-948) identified "overcoming faculty resistance" and "lack of faculty familiarity with CAM topics" as barriers to implementing CAM topics into medical school curricula. They recommended dissemination of information about the program and providing plenty of faculty development activities as strategies to overcome these challenges. Lee et al. (2007) describe intensive faculty development efforts by the University of Michigan Medical School in the form of a year-long interdisciplinary Faculty Scholars Program toward educating faculty about CAM. The University of Washington School of Nursing created a one-month required "CAM Camp" course for all faculty interested in integrating CAM content into their courses.

Brokaw (2002) conducted a survey of 123 CAM course directors at 74 U.S. medical schools. Of these, 12 were not teaching the CAM courses anymore and were excluded from the analysis. Seventy-three of the remaining 111 CAM course directors representing 53 medical schools responded. Three quarters of the respondents reported that they taught an elective course and one third reported teaching a required class. The survey did not ask if the required content was part of a larger course or a standalone CAM course. Most courses were relatively short, fewer than 20 hours. One fifth of the courses were 60 hours or more.

These courses were offered through a variety of sponsors: dean's office, non-science units, clinical departments, and family medicine. In total, at least 12 distinct sponsoring departments were listed from the 53 medical schools. They point out that while CAM education has a significant presence in medical education, they did not report on the goals of the education (i.e. general background information or application of specific therapies). Most courses were of a survey nature and covered several CAM

topics on a superficial, exposure level. Few of the respondents (17.8 percent) placed an emphasis on scientific evaluation of the validity of the CAM therapy's claims. They also raised the question of whether this education is being taught in the context of critical appraisal based on scientific evidence of therapeutic value. This last concern has been expressed by other authors (*Complementary and Alternative Medicine in the United States,* 2005; Bondurant & Sox, 2005; Sampson, 2001).

Three quarters of the instructors in Brokaw's survey were identified as CAM practitioners or prescribers of CAM therapies. The range of CAM therapies covered in these classes included those which enjoy more mainstream status (e.g. chiropractic) as well as those with no evidence of therapeutic value (e.g. Therapeutic Touch). The authors posit that the inclusion of a particular CAM course may have more to do with the knowledge or relationship that the instructor has with a therapy or therapist than the actual evidence for the therapy. They state that one of the major rationales to teach CAM is for physicians to be aware of the potential harm that a therapy may cause their patients. This is particularly important given the extensive use of CAM use by the American public. Other considerations for the inclusion of CAM topics in medical school curricula are the attitudes of incoming medical students toward CAM and their expectations for such topics to be included in their education.

Based on the finding of their study, Brokaw et al. (2002), offer three suggestions for developers of medical school CAM curriculum.

> 1. Emphasize a critical evaluation of the scientific literature. Students should be familiar with the rules of causal influence and be able to critical appraise the evidence when considering all therapies (CAM or allopathic).

2. Enlist the involvement of basic science departments, particularly

faculty with expertise in experimental design and statistical analysis.

3. Avoid advocacy of unproven therapies. CAM proponents' conviction

and enthusiasm should not substitute for rigorous evidence. "The teaching of

CAM is too important to be left solely in the hands of CAM enthusiasts" (Brokaw

et al., 2002, p. 881). They make the case that CAM course should be held to the

same standards as other courses, including curriculum committee approval.

Wetzel et al. (1998) also put forward three recommendations for medical school

CAM curriculum. They suggest that coursework include first, a critical review of the

evidence-based information about individual modalities, second, experiential components

that allow students to deepen personal understanding and be better prepared to advise

patients and third, strategies to enhance professional communication with non-physician

healers and patients. Experiential components should be designed only after schools

have a good understanding of incoming students' exposure and familiarity with CAM.

The current study will contribute to that understanding.

Maizes et al. (2002) distinguish between integrative medicine and CAM by

defining integrative medicine much more broadly than CAM. Maizes states that

integrative medicine emphasizes the relationship between physician and patient and

integrates the best of both CAM and allopathic approaches to care. She applauds the

technological advancements in modern medicine but also points out one of the major

downsides of the technologic solutions to disease. This approach to disease care often

leave the patient feeling like a "widget" without acknowledgment of the relationships and

social, and emotional elements which are integral parts of the patient experience. Maizes

suggests that knowledge of CAM therapies may assist the physician in taking a more holistic approach to patient care. Graham-Pole (2001) suggests a holistic approach is optimal because it emphasizes a healthy lifestyle in all dimensions, emphasizes communal as well as personal health and promotes the idea that the physician should be a model of optimal health. Maizes also makes the point that while the addition of CAM therapies would be an improvement over the current system, what is really needed is comprehensive educational reform that teaches the medical student to combine the best approaches of evidence based healthcare, be it CAM or allopathic. This is how she defines integrative medicine. Baseline data showing student attitudes toward a holistic, integrative approach to patient care would be helpful when designing this curriculum.

Frye et al. (2006) considered it essential to find out what students were learning based on the efforts that were being taken to include CAM in medical school education. Their survey examined student attitudes toward CAM, preferred ways of learning about CAM and their use of CAM therapies for self-care. The researchers asked survey respondents about attitudes toward learning about CAM topics, anticipated usefulness of learning methods, knowledge of, and experience with types of CAM therapies. Students were also asked how likely they would be to refer a patient to a practitioner of the CAM therapies in each of the five categories once they are in practice. Incoming students' experience with CAM therapies and attitudes toward CAM would be useful as CAM learning experiences are designed.

Student attitudes toward CAM were generally positive and that minority and economically disadvantaged students were more likely to use CAM than other students. This is in contrast to what the NCCAM found in its 2007 National Health Interview

Survey (NHIS) of the general population where CAM users tend to have higher levels of education and higher income. Additionally, the only ethnicity in the general population to use CAM more frequently than White (43.1 percent) is American Indians (50.3 percent) (Barnes et al., 2008). While this study examined differing levels of CAM use by different ethnic groups, interesting to understand is the possible effect of exposure to diversity on attitudes toward CAM and use of CAM.

Frye et al. (2006) found that 85 percent of the 152 students agreed or strongly agreed that they should learn to communicate with their patients about CAM therapies. This same percentage of respondents felt they should learn about alternative therapies directly from CAM practitioners. Ninety percent agreed that it was a suitable medical education topic. Students provided positive responses toward their personal use and experience with CAM therapies. Seventy-five percent indicated their future practices would likely include a wellness focus, the inclusion of herbs and supplements, as well as modeling a healthy lifestyle. Ninety-two percent listed lectures as their preferred method of learning about CAM therapies followed by hands-on experience with alternative medicine therapies. Frye suggested that additional studies are required to understand the stability of the scores. Students who had direct personal experience with CAM tended to be more knowledgeable about CAM. This suggests that experiential learning methods may be an effective way to teach medical students about CAM. The current study will also address the relationship between experience with CAM and knowledge of CAM.

At a 2009 Institute of Medicine Summit, "Integrative Medicine and the Health of the Public," Mary Jo Kreitzer, Ph.D., RN, Founder and Director of the Center for Spirituality and Healing at the University of Minnesota, suggested that while progress has

been made in medical and nursing education, such as the movement of integrative health content from elective to core curriculum, there is much to be done (Schultz, Chao, & McGinnis, 2009). Kreitzer offered that a shift in focus in healthcare education toward health rather than a disease orientation is a critical next step in the evolution of medical education. Krietzer recommended that a depth of exposure is needed in health topics such as wellness, nutrition, exercise stress management and other lifestyle issues. Finally, Kreitzer offered that healthcare education should involve systematic interdisciplinary education, as opposed to the silos in which most practitioners learn today. Kreitzer referenced Christensen (2009) when she suggested that disruptive innovation from outside healthcare education is needed to promote the necessary changes. Following this point, Kreitzer expressed that "leaders within any particular field tend to be victims and not initiators of disruption, due to their resistance to change and their failure to perceive its advances" (Schultz et al., 2009, p. 120).

Johnson et al. (2008) conducted a survey of CAM knowledge among 1299 health educators in the U.S. with a response rate of 39 percent (501 respondents). The survey sought to establish health educators' knowledge of CAM therapies, as well as specific aspects of individual CAM therapies. Not surprisingly, they found that health educators tended to be more knowledgeable of CAM therapies that were more common in the marketplace. For example, of the 501 survey respondents, a large majority indicated having basic knowledge about the relatively common therapies of chiropractic (475); massage therapy (474) and dietary supplements (427), while fewer showed familiarity with less widely practiced therapies such as Osteopathy (393), Ayurveda (194), Qi Gong

(223), naturopathy (216) and Reiki (258). Definitions of therapies are included in

Appendix B.

Johnson et al. (2008) reported results based on multiple characteristics of the

health educators including education, employment setting, ethnicity and gender.

Respondents with a doctoral degree were more knowledgeable of the definition of CAM

and the scientific evidence regarding its safety and efficacy. Male respondents were

more knowledgeable about the concepts of alternative medicine and dietary supplements

while female respondents were more familiar with the complementary medicine and the

practice of acupuncture. Asian and White respondents were less familiar as compared

with other groups about the benefits of acupuncture for treating certain conditions. White

respondents were least knowledgeable of the definition of CAM, while Hispanic

respondents appeared to lack knowledge on more items than other ethnicities. Regarding

employment settings, respondents who worked in a college or university were most

knowledgeable about the concepts of CAM while those who worked in a secondary

school or business were least knowledgeable. The various factors associated with CAM

knowledge among health educators suggest a need for a similar examination of these

factors among incoming medical students. This would contribute to a complete

understanding of baseline CAM attitudes and knowledge data of both educator and

student.

The level of acceptance of CAM procedures as appropriate to be included in

medical education is dependent upon the amount and quality of the research that supports

the efficacy of the profession, modality or approach. Unfortunately there is significant

disagreement about the extent to which research exists for CAM therapies. For example,

in Sampson's (2001) report on the need for educational reform in teaching alternative therapies, he defines CAM therapies as "anomalous practices for which claims of efficacy are either unproven or disproved" (2001). Starting from this position, it is difficult to make a strong case for the need to teach medical students the value and legitimacy of CAM practices. Three months later in the same journal, Graham-Pole (2001) presented what seems to be the converse position. He noted that "Evidence-based studies have shown significant benefits for several modalities, notably acupuncture, art and music therapies, biofeedback, botanicals, chiropractic, homeopathy, massage therapy, meditation, prayer, and yoga" (Graham-Pole, 2001, p. 662). To which of these seemingly opposing positions do incoming medical student subscribe? The current study seeks to answer this question and will help curriculum designers know if they need to design learning activities to overcome existing views or if learning activities will have the advantage of building from existing positive perceptions of CAM.

A significant focus of the strategic plan of NCCAM is the funding of grants with both clinical and educational foci. Over the past decade, NCCAM has created a grant program designed to promote a culture of research and evidence as the basis for education and practice in CAM modalities. This initiative builds on an important trend in CAM education: the inclusion of principles of evidence-based practice into the programs. One group of educational grants is the R-25 grants. Beginning in 2000, NCCAM awarded 15 education project grants to fund initiatives focused on elevating the education of CAM within mainstream health profession training. The grantees included 12 medical schools, one nursing school, an interdisciplinary center and the American Medical

Student Association (see Table 2). The grants required a focus on the scientific and

evidence based principles for which Flexner advocated.

The initial R-25 grant program supported the development and integration of

CAM educational resources and programs into allopathic education. For example, The

Center for Spirituality and Healing at The University of Minnesota received a five-year,

$1.6 million R-25 grant from NCCAM in 2000. The Center worked closely with

Northwestern Health Sciences University and other institutions and Twin Cities area

CAM practitioners to achieve the grant's goals of providing CAM exposure to the

medical, nursing and pharmacy students at the University of Minnesota.

Table 2

Initial R-25 Grantees

Children's Hospital (Boston)
Georgetown University
Maine Medical Center
Oregon Health & Sciences University
Tufts University Boston
University of California, San Francisco
University of Kentucky
University of Michigan at Ann Arbor
University of North Carolina Chapel Hill
University of Texas Medical Branch at Galveston
University of Washington (two grants)
Rush University Medical Center Nursing School
University of Minnesota Center for Spirituality and Healing
American Medical Student Association Foundation

In 2005, the principal investigators from each of the 15 grantee institutions met to discuss and summarize what was accomplished and what was learned from these projects. Sierpina et al. (2007) summarized lessons learned, conclusions and recommendations in a 2007 edition of *Academic Medicine* largely dedicated to the topic of the 15 R-25 grants. The lessons learned regarding barriers and strategies to overcome these barriers were grouped across six themes: 1) integration into the existing curriculum, 2) visibility, 3) faculty development, 4) leadership, 5) accessible and reliable reference resources, and 6) long term sustainability. Appendix C is a table from Sierpina article which details the barriers and strategies for overcoming those barriers associated with each of the six themes. One important recommendation was that CAM content should be woven into existing courses, rather than to create stand-alone courses. "The integrated approach helps to create increased visibility, develop faculty skills and buy-in, identify leadership, and provide access to credible resources" (2007, p. 950). The group also discussed options regarding the timeline for incorporating CAM content into the curriculum. An incremental approach or single major revision are two options that each have associated challenges.

Kreitzer et al. (2009; 2008) surveyed the 15 R-25 participants to identify competencies they felt were important to include in CAM curriculum for doctors and nurses. From this survey, five competency themes emerged: "1) awareness of CAM therapies and practices, 2) the evidence base underlying CAM therapies, 3) CAM skill development (primarily focused on cultural competence skills to enhance patient communication about CAM use, but relatively little on specific CAM treatment skills),

4) self-awareness and self-care (particularly mind-body approaches to alleviating stress),

and 5) CAM models and systems" (Kreitzer et al., 2009, p. 33).

In a report commissioned for the Institute of Medicine (IOM) Summit on

Integrative Medicine and the Health of the Public in 2009, Kreitzer et al. (2009)

recommended actions to "address how the health of the public may be served by

incorporating an integrative health perspective into health professions education and

workforce planning, deployment, and utilization." Among these recommendations was,

"Bold innovation and reform is needed in health professions education that will expand

the focus of education from the treatment and management of disease to one that includes

a focus and emphasis on wellness" and "At a minimum, this should include content on:

(among other topics) knowledge, principles, practices, and processes that facilitate the

integration of conventional biomedical care with CAM" (2009, p. 44).

While several studies have reviewed the need for and barriers to incorporating

CAM topics into medical school programs, a missing element is a complete

understanding of incoming students' exposure to CAM, their attitudes toward CAM

therapies and their expectations for the inclusion of CAM topics in their medical school

education. The student characteristics associated with these attitudes and expectations

including age, socioeconomic status, exposure to diversity, and parental educational level

will inform instructional and curricular designers.

Recent Changes and the Current State of Healthcare in the U.S.

There are numerous significant forces influencing the healthcare system in the

U.S. Clinical research expansion and associated new knowledge, public demand for

certain services, shifting economic and political environments, changes in insurance regulations, competition, economic factors, healthcare market forces and general societal trends have all played roles in influencing the trends and practices of healthcare and healthcare education. Arguably, at no time throughout history has healthcare and healthcare education undergone such radical changes as seen in the past few decades. The Institute of Medicine highlights this trend in a 2001 report "*Crossing the Quality Chasm: A New Health System for the 21st Century*." A statement from the report:

> Medical science and technology have advanced at an unprecedented rate during the past half-century. In tandem has come growing complexity of health care, which today is characterized by more to know, more to do, more to manage, more to watch, and more people involved than ever before. Faced with such rapid changes, the nation's healthcare delivery system has fallen far short in its ability to translate knowledge into practice and to apply new technology safely and appropriately. And if the system cannot consistently deliver today's science and technology, it is even less prepared to respond to the extraordinary advances that surely will emerge during the coming decades (*Crossing the Quality Chasm: A New Health Care System for the 21st Century,* 2001, p. 1).

According to the Bureau of Labor Statistics, healthcare practitioners and technical occupations (involved directly in patient care) employ 7,514,980 individuals (Bureau of Labor Statistics - Occupational Employment Statistics, 2012). Healthcare support occupations (aides and healthcare assistants) account for 3,954,070 jobs in the U.S. (Bureau of Labor Statistics - Occupational Employment Statistics, 2012). During the 18-month period from December 2007 to June 2009, employment in the healthcare industry

grew by 428,000 jobs. During this same period, other non-farm employment was down more than 7.5 million jobs (Wood, 2011).

As healthcare employment increases, healthcare costs are also on the rise. In 2009, $2.5 trillion total was spent in the U.S. healthcare system (Schultz et al., 2009). The current trend is expected to drive healthcare expenditures to $4.3 trillion by 2017 (Keehan et al., 2008). According to the Milliman Medical Index (2012), the total healthcare costs for a typical family of four has increased by $5,259 between 2009 and 2013 to $22,030. Perhaps the most disturbing aspect of this trend is the Dartmouth Institute for Health Policy and Clinical Practice's determination that higher spending can actually lead to poorer patient outcomes (Fisher, Goodman, Skinner, & Bronner, 2009).

The U.S. Supreme Court recently ruled the Patient Protection and Affordable Care Act (PPACA) constitutional; a significant development in the ongoing evolution of the U.S. healthcare system (Patient Protection and Affordable Care Act, 2009). Some of the provisions of the PPACA are supportive of bringing CAM providers into the healthcare delivery system which will have an impact on the level of legitimacy enjoyed by these professions. For example, the law specifies that health insurance companies "shall not discriminate with respect to participation under the plan or coverage against any healthcare provider who is acting within the scope of that provider's license or certification under applicable State law" (Patient Protection and Affordable Care Act, 2009, p. 97). Furthermore, much of the language of the PPACA speaks to the values of CAM professionals including primary prevention through helping people establish and maintain good health and balance. For example, the law established a National Prevention, Health Promotion and Public Health Council which charges 17 distinct

cabinet level departments and agencies with joint responsibility for wellness and health promotion. In June, 2012, this group released the National Prevention Council Action Plan. This plan references wellness and health promotion throughout the document, two values which are at the core of most CAM professions. Additionally, the plan identifies federal action to "research complementary and alternative medicine strategies to determine effectiveness and how they can be better integrated into clinical preventive care." (*National Prevention Council Action Plan: Implementing the National Prevention Strategy,* 2012) An increased focus on CAM through this federal plan as part of a larger effort of the government will likely have a significant impact on the legitimacy of CAM practices and how both medical practitioners and CAM practitioners are educated in the future.

A reciprocal relationship exists between industry and education. Colleges and universities seek to provide education and graduates with the knowledge, skills and abilities that are best suited to the ever changing needs of the economy, consumer demand, and job market. The ability of educational institutions to keep up with the needs of the marketplace will reflect directly on their ability to attract students and boast a high placement rate for their graduates. As the healthcare system shifts under the influence of various internal and external forces, so too must the education of healthcare providers adapt to the changing environment.

Additionally, various internal (e.g., student and faculty expectations and requests for CAM education) and external forces (e.g., grants from the NCCAM for the integration of CAM into medical education) have influenced allopathic and CAM education, in some cases pushing them apart and in other cases drawing them together

(Flexner, 1910). A number of forces over the last decade have led to a convergence of these trajectories and provided various models of cooperation in what is now considered a significant integrative healthcare movement.

Integrative Medicine (IM) is the term that has emerged to capture the essence of this convergence. In February of 2009, the IOM convened a Summit on Integrative Medicine and the Health of the Public. The IOM describes integrative medicine as "orienting the health care process to create a seamless engagement by patients and caregivers of the full range of physical, psychological, social, preventive, and therapeutic factors known to be effective and necessary for the achievement of optimal health throughout the life span. Integrative medicine envisions a health care system that focuses on efficient, evidence-based prevention, wellness, and patient-centered care that is personalized, predictive, preventive and participatory" (Schultz et al., 2009). This term highlights the idea that healthcare is shifting from a competitive model toward a cooperative model with the patient at the center. In this model, the concept of "alternative" medicine essentially disappears and the idea that patients must choose among healthcare alternatives is abandoned. The Summit, held in Washington D.C., drew over 600 academic leaders, scientists, educator clinicians and policy makers to examine the scientific basis of the practice and its potential to improve healthcare in the U.S. The complementary element in this model remains as practitioners of various approaches cooperate and complement the other's treatment approach. In this model, practitioners work together, rather than compete, for the betterment of the patient.

Legitimacy and a Framework for Study

Every healthcare field or discipline strives for legitimacy. As mentioned earlier in this paper, legitimacy justifies what professions do and how they do it. More specifically, legitimate professions produce culturally valued results in a culturally approved manner (Abbott, 1988, pp. 184-185). A highly legitimate profession conforms to widely accepted and acknowledged standards and is supported by legal mechanisms including, its official status defined by law. Legitimacy affords the members of professions the ability to provide their skills and services with a reasonable expectation of respect and compensation commensurate with their education and training. Official legitimacy, or legal status of a healthcare profession, comes in numerous forms. Educational standards and recognition of those standards by independent organizations can certainly affect the level of legitimacy that a profession or field enjoys. For example, the existence of a specialty accrediting agency recognized by the Department of Education is one form of legal recognition. Examples of such Department of Education recognized accrediting agencies include the Commission on Massage Therapy Accreditation (COMTA) and the Commission on Accreditation in Physical Therapy Education (CAPTE). Statutes which require insurance companies to reimburse services provided by a member of a healthcare profession are another form of legal recognition. Professional licensure at the state level is yet another form of legal recognition that adds to the legitimacy of a profession.

An example from the healthcare field of how government funding can affect legitimacy can be found in the formation of the National Center for Complimentary and Alternative Medicine (NCCAM). The creation of this center under the National Institutes

of Health (NIH), and the dedication of significant resources to the center, not only gave immediate recognition for an entire segment of healthcare, but also created a funding mechanism for research into various practices in complementary and alternative medicine. For example, the 2001 NCCAM R-25 CAM education grants of approximately $1.5 million each to fund efforts to incorporate CAM education into the curricula of medical schools, nursing schools, the American Medical Student Association and a family practice residency program (Sierpina et al., 2007), were instrumental in improving the legitimacy of CAM.

While a single act of Congress may have a swift and dramatic impact on educational and professional legitimacy, legitimacy can also come about through multi-pronged, slow and diverse means. For example, the student affairs profession in higher education is one that has experienced a rather clear rise in legitimacy over the past century. In the early 1900s, the field of student affairs was all but unknown and had limited legitimate status as a profession. The establishment of advanced training programs was critical to the legitimacy of this growing field. In 1914, the first graduate degree was awarded in the area of student affairs from the Columbia University Teachers College in New York, New York (Barr & Dessler, 2000). The American College Personnel Association (ACPA) was founded in 1924 and created a central body for the establishment of educational and professional standards for the profession. A growing body of research throughout the 20th century, which supported the principles of student affairs, gave credibility to the foundation on which the profession is based. A further boost to the legitimacy of this emerging profession came in the form of a report published in 1937 by a committee appointed by the American Council on Education. The report,

"Student Personnel Point of View" (Amos, 1937) outlined the services, policies and procedures that characterize a comprehensive student affairs program. The report laid the foundation for consistency in the student affairs field. The ACPA now claims over 8,500 members representing 1,500 institutions from around the world. The ACPA provides outreach, research and development in support of student affairs programs. The ACPA website now lists some 157 accredited masters and/or doctoral level programs in the United States (American College Personnel Association, 2012). This field grew from relative obscurity to a highly regarded profession with significant legitimacy within approximately 100 years with the development of many supportive elements.

Educational methods and standards influence the degree of legitimacy a healthcare profession enjoys. Short, non-standardized, non-recognized, non-accredited programs with a short history are viewed with greater skepticism than programs which are well-established with a long history and are based on well-researched best practices of education and healthcare. For example, iridology is the practice of examining the iris (the colored portion of the eye) as a means to diagnose other systemic problems in the body. Iridology is practiced either as a sole practice or in association with other alternative practices by various CAM practitioners. The color and patterns of the iris are believed to correspond with parts of the body. Reportedly, alterations in these colors and patterns provide insight into the health of the corresponding body area (Knipschild, 1988). The practice is not licensed, recognized or regulated by any government agency. Insurance plans are not required to, and do not reimburse for iridology services. There are no widely accepted standards for the various iridology certification courses offered by a variety of organizations. Research evidence does not support the practice of iridology

as a viable diagnostic tool. Consequently, iridology today is very low on the legitimacy scale.

Conversely, much further along on the legitimacy continuum is the practice of physical therapy. Physical therapy as a profession has existed for some 100 years, and has endured a slow pathway to the level of legitimacy it enjoys today (Swisher & Page, 2005). Prior to the First World War, medical personnel who subscribed to the principles of physical therapy were viewed by their colleagues "with suspicion mingled with pity" (Kovacs, 1942, p. 155). The principles upon which physical therapy is based have been used by other healthcare providers (e.g. massage therapy) for centuries. Physical therapists are licensed in all 50 states and continuing education is a requirement of continued licensure. There are clear educational standards which are established and applied by a single accrediting agency, the Commission on Accreditation in Physical Therapy Education. In the early days of the profession, physical therapists were trained at the certificate level. Today, the profession has established educational levels up to the Doctor of Physical Therapy degree standard. The profession has worked to identify specific competencies associated with entry-level physical therapists and assistants through physical therapists trained at the doctoral level. Rigorous and continuing scientific research supports the principles upon which physical therapy is based. These various elements combine to place the physical therapy profession high on the legitimacy scale today. The legitimacy ascribed to CAM by incoming medical students may be affected by their experience with CAM therapies as well their knowledge of the education associated with particular CAM professions.

Welsh et al. (2004) recommend that inclusion of medical science in the curriculum of CAM programs is an important step in increasing the legitimacy of a profession. The movement from occupation to profession has been called the professionalization process. Studies have focused on two aspects of this journey to legitimacy. First, "professional dominance" is achieved through "quasi-monopoly" status by way of professional regulation which typically includes title protection and a legal outlining of a scope of practice. Second is the achievement of "consulting status," where members of the field work to gain the trust and support of the public, which accesses their services.

Progress toward professional legitimacy often occurs as a result of tireless efforts of representatives and advocates of the profession. Professional organizations may lobby lawmakers for more inclusive legislation, more equitable insurance reimbursement, and professional regulation and standards that characterize a legitimate profession. Research findings that demonstrate support for a profession's methods also boost the level of legitimacy that a profession enjoys. Educational standards, research findings, licensure and increasing use of CAM therapies all contribute to the legitimate status of many CAM practices. These factors are also influencing the trend toward inclusion of CAM topics into medical school curricula. The perception of legitimacy of CAM by the medical students themselves may also influence this trend and illustrate the need for the current study.

Undergraduate students take general education courses together, regardless of their major. As students specialize into their various departments and professional training, there is a tendency for silos to develop around the training programs. Nowhere

has this been more evident than in the health sciences. Medical students have not

historically trained alongside nurses, physical therapists or dentists. CAM professional

training programs have also followed this model of "silo" education. Chiropractors have

not traditionally trained beside acupuncturists. Massage therapists have not trained with

naturopaths (practitioners who use nutrition, lifestyle counseling, and other natural

remedies to access the natural healing power of the body).

This model is changing as efforts backing interprofessional education emerge.

One example is the R-25 education grants from NCCAM, with the goal of integrating

CAM education into medical school curricula. A second example can be found in

organizations such as the Academic Consortium for Complementary and Alternative

Healthcare (ACCAHC) and Consortium of Academic Health Centers for Complementary

and Integrative Medicine (CAHCIM), who routinely partner and offer conferences

designed to encourage and teach educators and practitioners to teach and think outside of

their own profession's paradigm. That a majority of medical schools now include some

degree of CAM education in their curricula is a testament to the gradual breakdown of a

silo approach in education. While a myriad of forces can inhibit organizational change,

forces also exist to stimulate organizational change. Expectations of incoming medical

students for CAM topics in their medical education may provide just such force for

positive organizational change.

Legitimacy is often ascribed to organizations that conform to common or widely

accepted principles and practices in their field. Isomorphism is the tendency of

organizations to become more like each other. This tendency is particularly likely when

organizations are in the same field. DiMaggio and Powell (1983) describe three

mechanisms through which isomorphic change occurs. First, coercive isomorphism refers to the isomorphism that is brought on by external pressures or forces, such as a government mandate or stipulations of a grant upon which an organization is dependent.

Second, mimetic isomorphism occurs when one organization is attempting to mimic or become more like another organization in the same field, such as a university adopting policies of another highly successful institution. This may occur due to a perceived superiority or desirability of a practice of the mimicked organization. If the practices of one group of institutions are perceived to be more legitimate or successful, others are likely to adopt those practices (DiMaggio & Powell, 1983).

Finally, normative isomorphism occurs when professionals bring a set of shared beliefs, values, ideas and norms from their training into the workplace. The professionalization of a particular CAM practice through the standardization and legitimization of the work they do would be considered a form of normative isomorphism (DiMaggio & Powell, 1983). Regardless of the mechanism, isomorphic forces lead to a larger group of organizations practicing in similar ways and enjoying a greater level of legitimacy.

DiMaggio and Powell (1983) contend that there is often efficiency, improved reputation and legitimacy to be gained by being similar to other organizations in the field. They go on to posit that similarity among institutions grant those institutions a level of legitimacy. As more institutions adopt a certain practice, the level of legitimacy afforded to that practice and to the group of institutions grows. Institutions that engage in practices considered outside the norm of that field do not enjoy a similar level of

legitimacy. For example, Swedish massage is a system of massage used by hundreds of massage therapy schools as the basis for massage education. Swedish massage is characterized by fundamental stokes or massage movements such as effleurage (superficial gliding strokes), pétrissage (kneading strokes) and tapotement (drumming or tapping movements). The high percentage of massage schools that use this approach lend the practice and those institutions a certain level of legitimacy. Massage schools that do not conform to this norm lack legitimacy.

Berger et al. (1998) propose a similar framework for understanding how legitimacy can grow based on the attitudes and opinions of those around the individual assigning legitimacy. They suggest that cultural beliefs begin the process of legitimation of another individual or group. In order for that legitimacy to take hold and grow, it must be supported by others who provided consensual validation of that the individual or group is deserving of a high legitimacy rating. A normative effect can then cause an expansion of legitimation to a large group.

DiMaggio and Powell's isomorphism model provides a possible framework for understanding the trend of more medical schools offering CAM education in the curriculum. As CAHCIM membership has grown from eight to 57 since 1999, isomorphic principles may be at play as more medical schools join this movement. To the extent that high quality, prestigious medical schools are CAHCIM members, mimetic isomorphism may influence other schools to join the organization in an attempt to appear more like them. If a majority of medical schools become members of CAHCIM, a tipping point may be reached when CAHCIM membership is considered best practice. This could be considered a form of coercive isomorphism as the pressure to conform to

this "best practice" approach builds. Finally, over time as more and more physicians

graduate and move into practice from the growing number of CAHCIM member schools,

their attitudes toward the CAM practices they were exposed to will find their way into the

practice of medicine in the community; an example of normative isomorphism.

Another explanation and possible framework for understanding the forces that

have moved medical schools to adopt CAM elements into their curricula is to concept of

satisficing, explained by March and Simon (March & Simon, 1958, p. 162). They

suggest that because it is not possible to explore all possible options, risks, benefits and

rewards in any given situation, organizations tend to choose the first option that is

sufficient to meet the needs of the organization. Furthermore they suggest that

organization create "programs" that fit their way of doing things. These programs tend to

become the norm for the organization and, deviation from the program requires

expenditure of energy and resources. Because resources are scarce, it becomes much

easier and more likely that the organization will simply stick with the program and the

satisficing solution until forces require or demand a change.

An example of how the concept of satisficing may relate to CAM education

finding its way into medical school curricula is thus illustrated. If a medical school

curriculum committee were to review Eisenberg's 1993 study illustrating the dramatic

patterns of CAM use by the public, they may see a need to respond with educational

materials for their medical students. Awareness of incoming medical students' high level

of expectation for inclusion of CAM topics in the curriculum may further prompt the

need for CAM related educational activities. Given an already overcrowded curriculum,

the faculty may insert a weekend requirement to complete an online learning module

about common CAM practices. Without additional resources, pressures or energy to change the "program," the weekend requirement becomes the practice of the school until other forces require a change.

Relevant Studies and Deficiencies

Kreitzer et al. (2002) surveyed 263 faculty (145/263 or 55 percent response rate) of the University of Minnesota Medical School, School of Nursing and College of Pharmacy as well as 364 students (228/364 or 63 percent response rate) in their fourth year of undergraduate medical school, the fourth year of the Baccalaureate nursing program and fourth year of the Pharmacy Doctorate program. The survey asked questions about attitudes, use, training and intentions to incorporate CAM into their future practices.   The authors found that medical students were more likely to a consider using CAM therapies than were their faculty. Additionally, medical students expressed interest in learning more about every CAM topic than did their faculty. This finding is consistent with studies that have indicated that younger individuals are more likely than older individuals to access CAM therapies (Kessler et al., 2001). Kreitzer et al. (2002) found that both personal use of CAM and training in CAM by medical school students had a positive effect on attitudes toward CAM and the perception that CAM topics should be included in allopathic education. The current study of medical students prior to starting their medical education will serve as an important complement to Kreitzer's work.

General awareness of CAM professions in clinical and educational settings has grown. Some studies addressing the topic of CAM topics in medical school curricula are

descriptive in nature and simply outline the course content and nature of the training available to medical students (Bhattacharya, 2000; Maizes et al., 2002; Sampson, 2001; Wetzel et al., 1998). Other researchers have focused on reasons to incorporate CAM topics into medical school curricula (Brokaw et al., 2002; Gaster et al., 2007; B. Kligler et al., 2000; B. Kligler et al., 2004).   Gaylord and Mann (2007) reviewed the grant proposals of the 15 medical institutions which received a National Center for Complementary and Alternative (NCCAM) funded R-25 grants awarded for five-year periods (with the exception of one three-year grant) between 2002 and 2008. The projects related to the grants were designed to promote the incorporation of CAM topics into the curriculum with the goal to learn more about their rationales for the development of CAM education initiatives. The results were summarized into ten themes, which were positive and supportive of the movement toward inclusivity of CAM in the curriculum.

Lie and Boker (2004) identified a need for an instrument to evaluate medical students' attitudes toward CAM and measure learner outcomes around CAM topics. They created the 10-item CAM Health Belief Questionnaire (CHBQ) and administered it simultaneously to three separate cohorts of medical students between the fall of 2002 and the spring of 2003 in order to test the validity and reliability of the instrument. The questionnaire was developed to measure learner outcomes relative to CAM topics, baseline attitudes of medical students toward CAM and the factors that may have formed them. The CHBQ makes use of a seven-point rating scale allowing responses that range from one (absolutely disagree) to seven (absolutely agree). Three of the ten items were purposely designed as reverse scored items to minimize the acquiescence response set.

Lie and Boker (2006) found that medical students had generally positive attitudes toward CAM and a high rate of self-reported use of CAM. They also found that short learning activities during the first year of medical school did not have additional impact on the already positive attitudes of medical students toward CAM. The survey was administered in the fall terms of 2003 and 2004 to 170 first-year medical students within six weeks of starting the program and before they had received any CAM instruction. The survey was also administered to two separate cohorts of second-year medical students in the spring and winter terms of 2002, after they received a three-hour didactic experience around CAM topics. The current research adds to their findings by capturing data from students who have had no exposure to medical school education.

Baugniet et al. (2000a) compared the attitudes of 442 fourth-year health professional students (i.e., medical, physiotherapy, occupational therapy, nursing and pharmacy) at the University of Toronto and the University of Western Ontario and found that medical students had the least positive view of CAM practices. The medical students reported having no discussion of CAM topics in their training. Most students in this study agreed that practitioners should have "some knowledge about the most common CAM therapies" (2000, p. 180). This would suggest that they would agree that education about CAM topics should be included in their curriculum. The authors make the point that patients are bombarded by conflicting information about CAM therapies from various sources. If conventional healthcare providers have little to no exposure to these topics during their training, patients may also receive contradictory advice from them.

Interest in the topic of perceptions of medical students and health professionals toward CAM is not limited to North America. Furnham and McGill (2003) compared the

attitudes toward CAM of 311 first-year and third-year medical students from two different British medical schools. The authors found that first-year students overall had a more open and eager attitude toward learning about CAM therapies than did their third-year counterparts. In Singapore, Yeo et al. (2005) surveyed 555 first-year through fifth-year medical students about their attitudes toward CAM and found 92 percent of students feel CAM includes ideas and methods from which conventional medicine could benefit. Ninety-one percent of respondents felt that CAM would play an important role in their future medical practice and 86 percent expressed a desire to know more about CAM. Hopper and Cohen (1998a) conducted a similar survey of Australian medical students and found attitudes toward various therapies varied greatly. Therapies which scored high in the knowledge area also scored high in perceived usefulness, desire for further education about and intended patterns of referral after graduation. This suggests that the more students learn about a therapy, the more likely they will see it as having value and to refer patients in the future to receive the therapy.

The Association of American Medical Colleges (AAMC) conducts a survey of all recent graduates of medical schools in the U.S. and Canada (Medical School Graduate Questionnaire, 2012). The 2012 survey was completed by 13,681 graduates out of 17,319 (79 percent response rate). One item on the survey asks "Do you believe that your instruction in the following areas was inadequate, appropriate, or excessive?" One of the 56 subheading topics was "Complementary and alternative medicine." Sixty-four percent of respondents reported that instruction in this area was appropriate, while 31.7 percent responded "inadequate" and 4.4 percent responded "excessive." By comparison, students responded "inadequate" more frequently in eight other topic areas. Students

responded "inadequate" instruction most frequently to the topic "medical

licensure/regulation" (64.3 percent). CAM education appears to evoke a polarizing effect

among medical school graduates as this is the only curriculum topic area which appeared

in the top 13 topics covered "inadequately" and topics covered "excessively" (*Medical*

School Graduation Questionnaire: All Schools Summary Report, 2012). This is

reflective of the overall debate surrounding CAM topics in medical school curricula. On

this same survey, 9.4 percent of graduates disagreed with the statement, "I am confident

that I have the knowledge and skills to: Assess the health practices of a patient using

alternative therapies." This was second only to "Use telemedicine," at 22.2 percent, as

the area graduates reported feeling least confident (*Medical School Graduation*

Questionnaire: All Schools Summary Report, 2012).

The Matriculating Student Questionnaire (MSQ) is administered annually by the

AAMC to all entering medical students in the U.S. (*Matriculating Student Questionnaire:*

All Schools Summary Report, 2012). No items or questions on the MSQ refer to

students' experience with CAM therapies or the expectation of the inclusion of CAM

topics in their medical education.

I could find no studies which surveyed accepted medical students prior to starting

medical school. Several studies included descriptive analyses of medical school curricula

that include CAM education modules. While these analyses are interesting, they do not

help better understand students and what characteristics are associated with openness to

CAM education. Studies that outline reasons to train future medical doctors about CAM

draw what seem to be logical conclusions about why CAM education is important. A

reasonable next step to build on these studies is determining the attitudes of incoming

medical students toward CAM and IM and how those attitudes may affect their

willingness to learn about CAM and to work with CAM practitioners after completing

their medical training. Chapter three will detail the methodology of the current research

designed to build understanding of the attitudes, expectations and plans regarding CAM

and IM.

CHAPTER 3: METHODOLOGY

The purpose of this research is to examine the attitudes, expectations and plans relative to CAM and IM of incoming medical students. This chapter outlines the methodology used to answer the research questions and includes detail regarding the surveyed population, approval process, survey instrument development, conceptual framework, summary of variables and development of final scales. Data analysis procedures including characteristics of the sample are outlined at the conclusion of this chapter.

Method and Population

To accomplish the goal of this study, a quantitative analysis was conducted through a structured survey (Appendix A) administered to the entire fall 2013 incoming first-year medical students (N=168), at the University of Minnesota Medical School.

Approvals

Prior to administration of the survey, approval to proceed with the study was received from the University of Minnesota Institutional Review Board and Human Subjects (Appendix D). Approval to proceed with the survey was also received from Dr. Majka Woods PhD, Assistant Dean for Assessment, Curriculum and Evaluation for the Medical School, who is responsible for the approval and administration of surveys to incoming medical students.

Survey Instrument Development

Based on guidelines for developing reliable and valid measures, a survey instrument was developed to address the research questions. Reliability refers to the accuracy of the instrument and the consistency of responses to survey items. Validity refers to how well the survey measures what it is intended to measure (Messick, 1989). Several surveys were referenced in the development of the survey for the proposed study. Each of the following sections briefly describes studies and corresponding surveys that were referenced in the development of the survey instrument for the current study. Included in each section is a description of how each survey influenced the current study and survey and how questions were modified from those surveys for use in the current study.

CAM Health Belief Questionnaire

Lie and Boker (2004) developed the CAM Health Belief Questionnaire (CHBQ), which was reviewed during the development of this survey. The CHBQ was administered to three separate cohorts of medical students at the University of California, Irvine, between the fall of 2002 and the spring of 2003. The survey includes a list of CAM therapies and asks respondents if they have 1) used the therapy, 2) would recommend using it, and 3) if they have or would consider recommending it to patients. Another section of the CHBQ addresses what resources the respondent has heard of or made use of relative to CAM information. The CHBQ also asks respondents ten items designed to measure students' opinions about CAM therapies in general. Examples of these items include, "Complementary therapies include ideas and methods from which

conventional medicine could benefit." and "Complementary therapies are a threat to public health." (reverse coded). Possible responses range on a seven-point scale from one (absolutely disagree) to seven (absolutely agree).

Cronbach's coefficient alpha represents an estimate of the reliability of a survey and was calculated at 0.75 for the CHBQ. An alpha value of between 0.7 and 0.8 is widely considered acceptable for comparing groups (Bland & Altman, 1997; Cronbach, 1951). Five of the ten items from the CHBQ were adapted and incorporated into the current survey as measures of medical student beliefs and opinions regarding CAM therapies (legitimacy variable). Item-total correlation for the ten times ranged from 0.23 to 0.57 and were statistically significant ($p < .0005$), indicating that all items appear to work well together as pieces of this survey's CAM legitimacy scale. The validity coefficient is a measure of how closely a question measures what it is designed to measure (Messick, 1989). The validity coefficients for the 10 items on the CHBQ ranged from 0.25 to 0.57 and were statistically significant ($p < .0005$). The validity coefficients for the five items included in the current survey were 0.57, 0.32, 0.44, 0.53 and 0.33. Validity coefficients between 0.21 and 0.35 are considered good and over 0.35, very good. The five items which did not directly refer to CAM therapies were not included in the current survey.

Complementary and Alternative Medicine Survey

The Complementary and Alternative Medicine Survey (CAMS) was developed by Anne Frye et al. (2006) at the University of Texas Medical Branch (UTMB) through one of the original R-25 grants (discussed previously) to assess changes in student attitudes

over time as they learned about CAM topics. The CAMS was constructed and refined by UTMB faculty members. Fifteen third-year medical students completed the CAMS and provided feedback. Finally, all UTMB medical students enrolled in a third-year clerkship during the 2000-2001 academic year were invited to complete the CAMS.

Approximately 70 percent of those invited to complete the survey did so (152 respondents). Factor analysis of the pilot test data indicated that the CAMS is likely to provide valid and reliable data to assess student orientation toward CAM. Unlike the current research, the CAMS survey was designed to measure changes in attitudes as a result of CAM instruction over time. While the CAMS informed the current study, only one question from the CAMS was adapted and incorporated into the current survey. That question is "The range of practice of physicians ought to include treatments that integrate natural therapies such as supplements, herbs, and other over-the-counter products." Based on input from peers during the survey finalization phase, the question was shortened and simplified to, "The scope of medical practice should include CAM therapies."

Integrative Medicine Attitude Questionnaire

The Integrative Medicine Attitude Questionnaire (IMAQ) was developed to measure health care and medical student attitudes toward CAM and integrative medicine approaches to health (Schneider, Meek, & Bell, 2003). Similar to the CHBQ, the IMAQ utilizes a seven-point scale ranging from one (absolutely disagree) to seven (absolutely agree) for the 33 items that make up the survey instrument. As an example of an item from the IMAQ is, "Physicians should be prepared to answer patient's questions

regarding the safety, efficacy, and proper usage of commonly used botanical medicines such as Saw Palmetto, St. John's Wort, Valerian, etc."

The survey was distributed to 296 attendees of the American Holistic Medical Association (AHMA) Annual Conference during the summer of 2000. The survey was also mailed to 574 internists. Twenty percent of those surveys were completed and returned. While the recruitment process was not ideal, given the significantly different populations and procedures used, analysis suggests that the IMAQ can be considered a valid and reliable instrument for determining differences in attitudes toward CAM. Overall Cronbach's alpha for the 33 item scale of the IMAQ was calculated at 0.89. The majority of questions on the IMAQ were relevant only to experienced healthcare providers. However, two questions relating to patient satisfaction and outcomes were adapted for use in the current survey. The IMAQ item, "Patients whose physicians are knowledgeable of multiple medical systems and complementary and alternative practices, in addition to conventional medicine, do better than those whose physicians are only familiar with conventional medicine." was simplified to, "Patients whose medical physicians are knowledgeable of CAM (i.e., Chiropractic, Acupuncture, Homeopathy, etc.) have better health outcomes than patients whose physicians are not familiar with CAM." for the current survey. The IMAQ item, "Physicians knowledgeable of multiple medical systems and complementary and alternative practices, in addition to conventional medicine, generate improved patient satisfaction." was simplified to, "Medical physicians knowledgeable of CAM (i.e., Chiropractic, Acupuncture, Homeopathy, etc.) have more satisfied patients than physicians who are not familiar with CAM." for the current survey.

Matriculating Student Questionnaire

The Association of American Medical Colleges (AAMC) administers the

Matriculating Student Questionnaire (MSQ) to all entering medical students in the U.S.

(*Matriculating Student Questionnaire: All Schools Summary Report,* 2012). No items or

questions on the MSQ refer to student experience with CAM therapies or the expectation

of the inclusion of CAM topics in their medical education. However, the format and

content of three questions on the MSQ relative to exposure to and acceptance of diversity

were included on the current survey. These questions were: 1) Before coming to medical

school, how much interaction did you have with people in each of the following groups?

(followed by a listing of diverse racial groups, people with different religious beliefs, gay

lesbian or bisexual individuals, and individuals with disabilities.); 2) The perspectives of

individuals from racial and ethnic groups different than my own were often brought into

my undergraduate coursework, and 3) My knowledge or opinion of others were

influenced or changed by becoming aware of different perspectives. The last two

questions were followed by a seven-point scale ranging from strongly disagree to

strongly agree. Survey items pertaining to parental income, career intentions, intended

work setting, and where the student plans to work were also taken from the MSQ.

The U.S. is becoming more diverse. While college and university campuses have

not kept pace representatively with the racial demographic changes nationwide, campuses

are also increasingly diverse. Increasing diversity on campuses has an impact on student

openness and attitudes toward diversity (Pascarella, Edison, Nora, Hagedorn, &

Terenzini, 1996). According to the Summary Report of the Matriculating Student

Questionnaire (MSQ), the percentage of entering medical students expressing the intent

to work primarily with minority populations has increased from 14.3 percent in 2008 to 17.0 percent in 2012 (*Matriculating Student Questionnaire: All Schools Summary Report,* 2012). This question was not included on the 2013 version of the MSQ. Given increasing diversity in this country, it will be important to explore correlations between exposure to diversity and the dependent variables related to CAM. Previous studies have indicated that legitimacy ratings of CAM therapies can vary based on racial and ethnic backgrounds (Bausell, Lee, & Berman, 2001). For these reasons, questions were included on the survey to quantify variables around student exposure and acceptance of diversity.

Medical School Graduate Questionnaire

The AAMC also administers the Medical School Graduate Questionnaire annually to all graduates of U.S. medical schools (*Medical School Graduate Questionnaire,* 2012). Many questions on this survey are designed to assess student satisfaction with various elements of their education and their feelings of preparedness related to various areas of the curriculum. One question related to physician assessment of health practices of patients using CAM was adapted for use in the current survey. This question was, "For each of the following items, indicate the degree to which you expect medical school will prepare you to: Assess the health practices of a patient using CAM therapies," followed by followed by a seven-point scale ranging from strongly disagree to strongly agree.

Cooperative Institute Research Program Freshman Survey

On an annual basis, the Cooperative Institute Research Program (CIRP), housed within the Higher Education Research Institute (HERI) administers the CIRP Freshman Survey (CIRP Freshman Survey Overview, 2013). The selection options from the CIRP Freshman Survey for respondent's race/ethnicity and parental education levels were used in the current survey.

Survey Piloting and Finalization

Additional questions were developed to quantify variables specific to the current study. Questions were developed using simple, clear, concise language. Efforts were taken to maximize reliability and validity of the items in the survey instrument. This included using survey items that have previously been tested through surveys referenced earlier in this chapter. Additionally, the survey was reviewed by the researcher's colleagues for feedback on their clarity and understandability. The survey instrument was pilot tested by administration of the survey to six individuals at the researcher's institution, Northwestern Health Sciences University. Each pilot study participant was asked to provide feedback regarding the applicability of the survey items, their clarity, any additional items they feel would be helpful, as well as any general comments or suggestions. Feedback from the pilot group regarding format and ease of use of the survey instrument was also requested. Feedback received from the pilot study was used to make final modifications to the survey.

Variables of the Study

This study examines the CAM related legitimacy ratings, expectations and plans of incoming medical students. This section details the variables derived from the survey instrument along with an explanation of coding used for certain variables. For purposes of data analysis, several background variables were recoded into (0) or (1) coding. The recoding that was done for each variable is detailed for each variable in this section. Several demographic variables were collected through the survey for inclusion in the analysis to examine possible contributing effects on the dependant variables.

Independent Variables

Gender. The variable *gender* was coded 0 for male and 1 for female. No survey respondents selected transgender, which was offered as an option.

Age. No recoding was performed for the variable *age* which students recorded their age in number of years as an open-ended response.

Race/ethnicity. Students were asked to select the race/ethnicity that most closely described them from a list of options. The provided options included: White/Caucasian, African American/Black, American Indian/Alaska native, Asian American/Asian, Native Hawaiian/Pacific Islander, Mexican American/Chicano, Puerto Rican, Other Latino and Other. The variable *Race* was coded 0 for White/Caucasian and 1 for all others.

Marital status. Students were asked to select from the following option with regard to their current marital status: Never married, Separated, Divorced, Widowed,

Engaged, Married/Domestic Partner. The variable *Marital Status* was coded 0 for never married and 1 for all others.

Type of Undergraduate Institution. Students were asked to indicate whether they attended a public or private institution for their undergraduate education. The variable *Undergraduate Type* was coded as 0 for public institution and 1 for private institution.

Undergraduate Major. An open-ended option was available for the survey question which asked students to report their undergraduate major. Responses were then grouped into majors in the natural sciences (e.g. biology, chemistry) and all others (e.g. English, psychology, sociology). The variable *Major* was coded 0 for natural sciences and 1 for all others.

MCAT Score. No numerical recoding was performed for the variable *MCAT* which students recorded as an open-ended response. The overall MCAT score is the sum of three scored multiple-choice sections, each with a maximum possible score of 15. The highest possible score for the MCAT is 45. Some of the survey respondents included their writing sample score which ranged from J (lowest) to T (highest). Since fewer than half of the sample reported this writing sample score, it was disregarded for the purpose this study.

Parental Education. Survey items asked students about the highest level of formal education of each of their parents. Students were offered the following options, which were coded numerically as indicated into eight categories: Junior high/Middle school or less (1), Some high school (2), High school graduate (3), Postsecondary school

other than college (4), Some college (5), College degree (6), Some graduate school (7) and Graduate degree (8).

Parental Income. Students were asked to report their parents' combined gross income for last year by selecting one option from a provided ten-point scale of income ranges. The item and scale is shown here: "Regardless of your dependency status, please indicate your parents' combined gross income for last year:"

Less than $10,000
$10,000 - $19,999
$20,000 - $29,999
$30,000 - $39,999
$40,000 - $49,999
$50,000 - $74,999
$75,000 - $99,999
$100,000 - $249,999
$250,000 - $499,999
$500,000 or more

Coding for the *Income* variable was 1 for "Less than $10,000" through 10 for "$500,000 or more.

Exposure to Diversity Variables: Exposure to Diversity, Undergraduate Diversity and Diversity Opinion. To establish an index for exposure to diversity, survey respondents were asked to indicate how much interaction they had with people in each of the following groups: Asians, Blacks/African Americans, Native Americans/American Indians, Hispanics/Latinos, Whites/Caucasians, People with different religious beliefs, Gay/Lesbian or Bisexual individuals, Individuals with Disabilities, and Individuals from outside of the United States. For each of the groups students selected none, little, some substantial, which were coded as 1 through 4

respectively. The sum of each student's responses provided an index for the *Exposure to Diversity* variable, which could range from a low of nine to a high of 36.

One survey item addressed the degree to which diversity was included in their undergraduate education. Students were asked to use a seven-point scale ranging from "strongly disagree" (coded as 1) to "strongly agree" (coded as 7) in response to the statement, "The perspectives of individuals from racial and ethnic groups different than my own were often brought into my undergraduate coursework." The variable *Undergraduate Diversity* will be quantified by the number associated with each option on the scale (1-7).

A second diversity related survey item, using the same seven-point scale and coding asked students to respond to the statement, "My knowledge or opinion of others was influenced or changed by becoming aware of different perspectives." Corresponding numerical values (1-7) will constitute the variable *Diversity Opinion*.

CAM Background Variables: CAM Use and CAM Familiarity. A key point of interest for this survey was students' background experience with CAM and their familiarity with CAM. Therefore, the survey included items designed to quantify these two student experiential characteristics. Students were presented with a list of 14 CAM therapies and were asked to indicate if they had or had not personally used the therapy. The CAM therapies specified in the survey were selected by first including therapies practiced by the licensed CAM professions (acupuncture, chiropractic, massage therapy, and naturopathy). Other therapies were added to the list based on a review of the common CAM therapies identified by the National Center for Complementary and

Alternative Medicine (NCCAM). Some therapies were excluded based on very low

recognizability on previous surveys. Prayer is sometimes considered a CAM therapy, but

was excluded from this survey because it was considered a variable which could

complicate the analysis by virtue of the idea that prayer is considered in much broader

terms than a CAM therapy by many individuals. An open option "other" is included so

participants could enter a CAM therapy not included on the list. Participants were also

asked to rate their general familiarity with CAM. Baugniet, Boon, and Ostbye (2000a)

found that higher knowledge of a CAM therapy is correlated with higher perceived

usefulness of the therapy.

The *CAM Use* variable was determined by summing each survey participant's

coded responses to the 14 CAM therapies, where "No, I have NOT USED this therapy,"

was coded as 0 and "Yes, I have USED this therapy," was coded as 1, resulting in a

possible value for this variable range from a low of 0 to a high of 14. The *CAM*

Familiarity variable was quantified by using the numerical code associated with the

student response to five-point scale. This options on this scale ranged from "Not at all

familiar" (coded as 1), to "Extremely familiar" (coded as 5) resulting in a range of

possible for the *CAM Familiarity* variable from a low of 1 to a high of 5.

Dependent Variables

General Plans Variables: Career Intentions, Practice Setting and Plan Underserved. Information was collected regarding students' general career plans following medical school. Questions were included which address general career intentions, plans regarding future practice geographical setting and plans to practice in geographically underserved area.

Students were asked to select from the following options regarding their career intentions for the period immediately after their medical education is complete: Full-time academic faculty (teaching, research), Full-time clinical practice (non-academic), Part-time academic faculty (teaching, research), Part-time clinical practice (non-academic), Other, and Undecided. For the purpose of analysis and to create the *Career Intentions* variable, Full-time clinical practice (non-academic) and Part-time clinical practice (non-academic) combined were coded as 0. All others responses were coded as 1.

Students were asked to indicate the setting in which they plan to work after completion of their medical education. The following were presented as options: Large city (population 500,000 or more), Suburb of a large city, City of moderate size (population 50,000 to 500,000), Suburb of a moderate size city, Small city (population 10,000 to 50,000-other than suburb), Town (population 2,500 to 10,000--other than suburb), Small town (population less than 2,500), Rural/unincorporated area, and Undecided or no preference. To create the *Practice Setting* variable, Undecided responses were excluded, large city was coded as 0 and all other responses were coded as 1.

Finally, students were asked about their plans to practice in a geographically underserved (e.g., rural or inner city) area. Students had the option to respond Yes, No, Undecided, or Do not plan to do clinical practice. To create the *Plan Underserved* variable, Yes was coded as 0 and all other options were coded as 1.

Dependent CAM and IM Variables: CAM Legitimacy, CAM Expectations, IM Legitimacy and CAM Plans. This section details the process used to develop survey scales designed to measure the dependent CAM and IM target variables. A series of items was included to measure students' general beliefs, attitudes and opinions toward CAM, and to establish a legitimacy rating of CAM. As mentioned previously in this chapter, five of these items were adapted directly from the CHBQ. Another set of five questions was designed to determine students' expectations for CAM topics to be included in their medical school education. One question in this section was adapted from the AAMC Graduate Questionnaire. Five questions were included to measure students' general attitudes and opinions toward Integrative Medicine (IM). These questions were created by disarticulating the definition of IM as put forward by CAHCIM into four component parts (focus on doctor-patient relationship, a focus on the whole person, evidence informed practice, using all appropriate treatment approaches) and creating a question referencing each of the four parts. An example of one of these items is, "Responsible patient care includes focusing on the relationship between the doctor and patient." A fifth item, "Responsible doctors maintain good relationships with health professionals whose approach to patient care differs from their own" was added to address the concept of working with other practitioners, which is somewhat implied, but not explicit in the CAHCIM definition of IM.

Another series of three questions was included to assess to what extent the students intend to incorporate elements of CAM into their future medical practice. For example, one of these three items read, "I plan to incorporate the use of CAM therapies into my future medical practice." Items referenced in this section used the seven-point response options ranging from "strongly disagree" to "strongly agree".

Figure 1 is a visual representation of the conceptual framework and relationships among the variables. As illustrated, the independent variables relationship to the dependent variables of *CAM Legitimacy*, *IM Legitimacy* and *CAM Expectations* are examined. Additionally, the relationship of the independent variable *CAM Plans* to the *CAM Legitimacy*, *IM Legitimacy* and *CAM Expectations* variables is examined.

Figure 1: *Conceptual Framework of the Research Design*

INDEPENDENT   **DEPENDENT**

VARIABLES   **VARIABLES**

Characteristics of Entering Medical School Students

| Use of CAM Therapies |

| Familiarity with CAM |

| Gender |

| Race/Ethnicity |

| Age |

| Marital Status |

| Exposure to and Acceptance of Diversity |

| Size of Town Where Grew up |

| Undergraduate Major |

| Public versus Private Undergraduate |

| MCAT Score |

| Parental Education Level |

| Parental Income |

Beliefs and Opinions of CAM (CAM Legitimacy Variable)

Beliefs and Opinions of IM (IM Legitimacy Variable)

Expectations for CAM Topics in Medical School (Expectations Variable)

Plans for Future Medical Practice (Plans Variable)

Survey Administration

Once finalized, the survey was distributed to all 168 first year medical students from the University of Minnesota Twin Cities through the Medical School learning management system on August 12, 2013. The survey was administered through the Web-based survey tool, Qualtrics, and included a cover letter (Appendix E), which explained the purpose of the survey, information regarding Institutional Review Board (IRB) approval and assurances regarding the anonymity of their responses. Dr. Majka Woods followed up with survey participants through email and in person by visiting the classroom encouraging participants to complete the survey. These steps significantly improved what had been an initially low response rate. Of the 168 medical students who received the survey, 125 students accessed the survey. Of those who accessed the survey, 19 respondents were excluded because they did not complete enough of the survey to be considered in the analysis. This left 106 respondents and a 63 percent response rate. Appendix A is a copy of the survey instrument.

Exploratory Factor Analysis and Finalization of Dependent Variables

After all survey responses were received, exploratory factor analysis was performed on the resultant data to understand the correlations among sets of related items from the survey comprising the dependent variables. The goal of factor analysis is to determine the number of underlying factors affecting responses or variables. Factor analysis also leads to a quantification of association of each variable with the factors. Exploratory factor analysis was performed on various sets of related items on the survey.

Given that 100 is typically considered the minimum sample size to conduct this type of

analysis, this survey's 106 responses was deemed adequate.

All survey items used to determine the indices for the target variables described in

this section use the following seven-point scale and numerical coding: Strongly Disagree

(1), Disagree (2), Somewhat disagree (3), Neither agree or disagree (4) Somewhat agree

(5), Agree (6), Strongly agree (7). For each of the items in the survey, students were

presented with a statement and asked to choose the appropriate response, based on their

level of agreement with the statement. As described in the following sections, statistical

analysis was used to finalize the grouping of the items into scales representing each of the

CAM and IM areas of interest. Table 3 is a summary of the final set of scales along with

the number of items constituting the scale for that construct. Cronbach's Alpha for each

variable is also included.

Table 3

Summary Indexed Outcome Variables

Variable	Number of Survey Items Included	Cronbach's Alpha
CAM Legitimacy	11	.89
CAM Expectations	5	.82
IM Legitimacy	6	.75
CAM Plans	3	.76

CAM Legitimacy Variable: Exploratory Factor Analysis and Reliability Analysis

Exploratory factor analysis of the original seven items designed to represent the CAM Legitimacy scale resulted in a Kaiser Meyer Olkin (KMO) measure of sampling accuracy of 0.832 (above 0.6 is considered adequate). Bartlett's test of sphericity for these seven items was significant. Cronbach's alpha for this set of items was 0.871.

While these tests suggest a viable set of items for the variable from a statistical point of view, a review of the survey items suggested that four items originally intended for the *CAM Plans* variable, may be better suited for inclusion with the *CAM Legitimacy* variable. These four survey items (29, 30, 31, and 32) did not ask the students about their individual plans; rather they asked about the impact of knowledge of CAM on a hypothetical medical practice and the scope of medical practice relative to CAM. I added these four items to the proposed index and found the KMO measure of sampling accuracy for this new *CAM Legitimacy* variable (original seven items plus these four items from the "plans" section of the survey) to measure legitimacy was 0.846 and Bartlett's test of sphericity to be significant. Cronbach's alpha for this set of items was 0.892. The mean of these 11 items will constitute the *CAM Legitimacy* variable.

CAM Expectations Variable: Exploratory Factor Analysis and Reliability Analysis

The KMO measure of sampling accuracy for the original five items intended as a measure of medical students' expectations of inclusion of CAM topics in their medical education is 0.742 and Bartlett's test of sphericity is significant. The resultant rotated factor matrix, using principal axis factoring and the Varimax with Kaiser normalization rotation method suggests that one factor may be underlying the first three items and

another factor responsible for the last two items. Further examination of the items themselves revealed that the first three items reflect more passive CAM-related activities the future doctor may conduct in his or her office (assessing patients' use of CAM, understanding risks and benefits of CAM, and communicating with patients about CAM). The last two items reflect a higher level of commitment to CAM and involve more active CAM-related activities (coordinating patient care with CAM practitioners and personally delivering CAM therapies). Cronbach's alpha for this set of five items was 0.816. The average of these five items (five items responses summed and divided by five) will constitute the *CAM Expectations* variable.

Integrative Medicine Legitimacy Variable: Exploratory Factor Analysis and Reliability Testing

The KMO measure of sampling accuracy for the original five items intended to measure legitimacy ratings of the components of integrative medicine as defined by the Consortium of Academic Health Centers for Integrative Medicine (CAHCIM) was 0.610 and Bartlett's test of sphericity is significant. The rotated factor matrix, using principal axis factoring and the Varimax with Kaiser Normalization rotation method does not clearly indicate distinct and separate factors underlying and explaining the items. Cronbach's alpha for the original set of five items was 0.543.

Further item review revealed that two items from the "*CAM Plans*" set of questions reference the students' plans to incorporate principles of integrative medicine (IM) into their future practices (items 24 and 25). Plans to incorporate these principles reflect a higher legitimacy rating of these principles and therefore these two items were

included in the *IM Legitimacy* variable. Including these two items created a seven-item (16, 17, 18, 19, 20, 24, and 25) index. Cronbach's Alpha for these seven items is 0.718. The component matrix resulting from Principal Component Analysis suggests the item which references "evidence" (Responsible patient care should include treatment that is informed by the evidence) may be an outlier from the other items in this group. Eliminating the item that references "evidence" increased Cronbach's Alpha to 0.75. An average of the remaining six items (16, 17, 19, 20, 24, and 25) will constitute the variable *IM Legitimacy*.

Factor analysis of these six items making up the *IM Legitimacy* variable indicates a two factor solution and strong correlation among four of the items and the two remaining items. It appears a common factor explains item 19: "Optimal health and healing is best achieved by making use of all appropriate treatment approaches, including CAM," and item 20: "Responsible doctors maintain good relationships with health professionals whose approach to patient care differs from their own." These items are closely related in underlying meaning in that making use of all appropriate treatment approaches may require that a doctor maintain good relationships with other practitioners.

Factor analysis suggests the remaining four items (16, 17, 24, and 25) are linked through a common underlying factor. These four items refer to closely related core elements of the doctor's relationship with the patient and the importance of focusing on the whole person. Items 16 and 17 ask the student about their values related to these principles and items 24 and 25 ask about their plans regarding these elements of patient care.

CAM Plans Variable: Exploratory Factor Analysis and Reliability Analysis

Originally, nine items (24 through 32) were included to represent the *CAM Plans* variable. These items were intended to measure medical students' plans to incorporate aspects of IM and CAM into their future practices. The KMO measure of sampling accuracy for this original set of items was 0.748 and Bartlett's test of sphericity was significant. Cronbach's alpha for the original set of nine items was 0.82.

While this alpha rating suggests a high degree of reliability among these nine items, two of the items (24, 25) refer to the student's plans relative to IM and have been included with the *IM Legitimacy* variable. Furthermore, factor analysis suggests these two items are highly correlated with each other and are outliers from the other seven items, suggesting they are explained by a factor which does not have a strong influence on the other items. These two items were eliminated as elements of the *CAM Plans* variable and, as detailed in the IM Legitimacy section previously, were included in the index for *IM Legitimacy* variable.

As detailed previously, four of the original nine items in this section (items 29, 30, 31, 32) were determined to be more closely aligned with the *CAM Legitimacy* scale and were included as components of that variable. These four items did not ask about the students plans; rather they focused on the impact of knowledge of CAM on a hypothetical medical practice and the scope of medical practice relative to CAM. Therefore, these four items were excluded from the *CAM Plans* variable.

Factor analysis indicates that the remaining three items (items 26, 27, 28) are highly correlated and explained by a single factor. These three remaining items clearly

ask about the students' individual plans relative to incorporating CAM into their future

medical practices. Cronbach's alpha for these three items is 0.76. The mean of these

three items will constitute the *CAM Plans* variable.

Characteristics of the Sample

This section presents the descriptive findings from the survey beginning with a

detailed overview of the sample. Table 4 is a summary of the background characteristics

of the sample including means and standard deviations where applicable. The average

(mean) age of survey completers was 24.48 and ranged from 21-34. The median age was

24. Slightly more than half of the sample were female (N=56). Most of the sample (77.4

percent) reported a race of White/Caucasian followed by Asian American/Asian at 14.2

percent, African American/Black at 4.7 percent and Other Latino at 3.8 percent. Ninety-

nine of the 106 survey completers revealed their Medical College Admission Test

(MCAT) scores which ranged from 25 to 40, where a maximum score of 45 is possible.

The average (mean) of the scores was 32.84. Sixty-four percent of the sample attended a

private undergraduate institution and 84 percent of the sample has never been married.

Table 4

Characteristics of the Sample

Variable	N	Percent	Mean	SD
Age	104		24.48	2.76
Gender				.50
Male	50	47.2		
Female	56	52.8		
MCAT score	99		32.84	2.96
Father's Education Level	106		6.59	1.70
Mother's Education Level	106		6.33	1.79
Where grew up				
Large city	14	13.2		
Suburb of a large city	32	30.2		
City of moderate size	19	17.9		
Suburb of a moderate size city	16	15.1		
Small city	12	11.3		
Town	4	3.8		
Small town	5	4.7		
Rural/unincorporated area	4	3.8		
Parental Income Level (N=99)			7.39	1.82
Less than $10,000	1	1.0		
$10,000 - $19,999	2	2.0		
$20,000 - $29,999	2	2.0		
$30,000 - $39,999	4	4.0		
$40,000 - $49,999	6	6.1		
$50,000 - $74,999	6	6.1		
$75,000 - $99,999	11	11.1		
$100,000 - $249,999	47	47.5		
$250,000 - $499,999	14	14.1		
$500,000 or more	6	6.1		

Table 4 continued

Variable	N	%	Mean	SD
Undergraduate Institution				
Public Institution	38	35.8		
Private Institution	68	64.2		
Marital Status				
Never Married	89	84		
Separated	1	.9		
Divorced	1	.9		
Engaged	2	1.9		
Married/Domestic Partner	13	12.3		
Race/Ethnicity				
White/Caucasian	82	77.4		
African American/Black	5	4.7		
American Indian/Alaska native	--	--		
Asian American/Asian	15	14.2		
Other Latino	4	3.8		
Career Intentions				
Full-time academic faculty	8	7.5		
Full-time clinical practice	69	65.1		
Part-time academic faculty	8	7.5		
Part-time clinical practice	3	2.8		
Other	4	3.8		
Undecided	14	13.2		
Setting where intend plans to work				
Large city	44	41.5		
Suburb of a large city	10	9.4		
City of moderate size	24	22.6		
Suburb of a moderate size city	3	2.8		
Small city	2	1.9		
Town	2	1.9		
Small town	1	.9		
Rural/unincorporated area	--	--		
Undecided or no preference	20	18.9		
Plans to practice in geographically underserved area				
Yes	35	33.3		
No	21	20.0		
Undecided	49	46.7		

Data Analysis

The online survey tool, Qualtrics, was used to administer and collect survey data. Survey day was then downloaded into an SPSS version 21 database for further analysis. Statistical analysis tools within SPSS were used to summarize descriptive findings data into frequency tables, including means and standard deviations of variables of interest where applicable. A Pearson product-moment correlation coefficient table was also constructed for all variables of interest to explore and illustrate possible relationships between pairs of variables.

Regression analysis was used to determine the relationships among the variables included in the study. In particular, the effect of the independent variables on dependent variables was assessed. The effect of background demographic variables (socioeconomic status, age, prior experience with CAM, exposure to diversity, etc.) on CAM legitimacy ratings, expectations of inclusion of CAM topics in medical school, and on future plans to incorporate CAM in practice was evaluated to determine which factors explain the greatest variance in the dependent variables. Finally, regression analysis was used to determine the effect of *CAM Legitimacy*, *CAM Expectations* and *IM Legitimacy* on the main dependent variable of *CAM Plans*.

Diagnostic tests were run check for multicollinearity among the independent variables for each regression model. No problems of collinearity were detected. The highest level of variance inflation factors (VIF) for any dependent variable was 2.67 for *father's education level*. A VIF value of less than 3.0 for all independent variables is considered desirable and eliminates concerns regarding collinearity among the

independent variables. Additionally, no independent variable in any of the regression

models exhibited a tolerance level of less than 0.2, which also suggests no collinearity

concerns.

CHAPTER 4: RESULTS

This study examined the background factors associated with medical students'
use and familiarity of CAM therapies, their legitimacy ratings for CAM and integrative
medicine as well as their expectations for CAM related curriculum and plans to integrate
elements of CAM into their future medical practices. Descriptive findings are presented
first with each of the variables of interest represented through a frequency table. Means,
standard deviations and for each appropriate variable are reported. Next, a correlation
table to assess relationships among variables included in the study is presented. Finally,
analytic findings from the regression analysis are shown toward the end of this chapter.

Descriptive Findings

This section presents the descriptive findings for each of the background
independent variables and the dependent variables. Students were presented a list of 14
common CAM therapies and asked to indicate whether or not they had used each therapy.
Table 5 indicates the number and percentages of students who have used each of the 14
CAM therapies presented in the survey. Percentages ranged from a high of 67.6 percent
for yoga to a low of 4.7 percent for hypnosis and naturopathy. The mean was 23.76
percent of students ($SD = 20.33$). Ninety-four (88.7 percent) respondents indicated that
they had used at least one of the 14 CAM therapies listed. Only one respondent indicated
that he had used all 14 therapies, and indicated in the "Other" textbox, "I have actually
used everything listed on this list at one time or another." Only 12 (11.3 percent)
respondents indicated that they had not used any of the listed therapies.

Table 5

Previous Use of CAM Therapies

Therapy	Yes		No	
	N	Percent	N	Percent
Yoga	71	67.6	34	32.4
Massage Therapy	54	50.9	52	49.1
Meditation	48	45.3	58	54.7
Herbal/Botanical/Supplements	47	44.3	59	55.7
Chiropractic	33	31.1	73	68.9
Acupuncture	20	18.9	86	81.1
Homeopathy	15	14.2	91	85.8
Imagery	13	12.3	93	87.7
Tai Chi/Qi Gong	12	11.3	94	88.7
Culturally Based Healing Practices (e.g., Curanderismo, Tibetan Healing Practices)	11	10.4	95	89.6
Biofeedback	10	9.4	96	90.6
Energy Healing Practices (e.g., Therapeutic Touch, Reiki, Polarity)	8	7.5	98	92.5
Hypnosis	5	4.7	101	95.3
Naturopathy	5	4.7	101	95.3

CAM Familiarity

One survey item asked students to respond to the following item "Please indicate your general familiarity with CAM by checking the appropriate response," using a five-point scale. The scale presented possible responses ranging from "Not at all familiar" to "Extremely familiar." Response percentages were as follows: not at all familiar, 14.2; slightly familiar, 38.7; somewhat familiar, 35.8; moderately familiar, 9.4; extremely familiar, 1.9. The mean familiarity rating was 2.46 ($SD = .92$)

Previous Exposure to and Acceptance of Diversity

Students were asked to report on a four-point scale the degree of interaction they had with diverse groups prior to coming to medical school. Table 6 presents the student responses including the means and standard deviations for each group. Not surprisingly, students reported having the most interaction with Whites/Caucasians, with 97.1 percent of survey respondents indicating substantial interaction prior to coming to medical school ($SD = .17$). The group with which students had the least interaction was Native Americans/American Indians with 17.9 percent of respondents reporting no prior interaction with this population and only 6.6 percent reporting substantial interaction ($SD = .81$).

Table 6

Diversity Exposure

Before coming to medical school, how much interaction did you have with people in each of the following groups?	Response									
	None		Little		Some		Substantial			
	N	%	N	%	N	%	N	%	Mean	SD
Asians	--	--	9	8.5	42	39.6	55	51.9	3.43	.65
Blacks/African-Americans	--	--	15	14.2	51	48.1	40	37.7	3.24	.68
Native Americans/ American Indians	19	17.9	54	50.9	26	24.5	7	6.6	2.20	.81
Hispanics/Latinos	--	--	20	19.0	42	40.0	43	41.0	3.22	.75
Whites/Caucasians	--	--	--	--	3	2.9	102	97.1	3.97	.17
People with different religious beliefs	--	--	3	2.8	33	31.1	70	66.0	3.63	.54
Gay, Lesbian, or Bisexual individuals	2	1.9	8	7.5	37	34.9	59	55.7	3.44	.72
Individuals with disabilities	2	1.9	29	27.4	42	39.6	33	31.1	3.00	.82
Individuals from outside of the U.S.	--	--	6	5.7	34	32.1	66	62.3	3.57	.60

Two questions on the survey, adapted from AAMC Matriculating Student

Questionnaire, and included in the current survey built on the previous topic of diversity

by asking students about their experience with diversity during their undergraduate

education and how their "knowledge or opinion of others was influenced or changed by

becoming aware of different perspectives. Students indicated their agreement with these

two questions on seven-point scale ranging from "strongly disagree" to "strongly agree"

Table 7 summarizes the student responses to these two questions. A strong majority of

students (84.0 percent) at least somewhat agreed that the perspectives of diverse groups

were often brought into their undergraduate coursework. An even stronger majority of

students (92.5 percent) at least somewhat agreed that their "knowledge or opinion of others was influenced or changed by becoming aware of different perspectives."

Table 7

Acceptance of Diversity

	Response														
	Strongly Disagree		Disagree		Somewhat Disagree		Neither Agree or Disagree		Somewhat Agree		Agree		Strongly Agree			
Item	N	%	N	%	N	%	N	%	N	%	N	%	N	%	Mean	*SD*
The perspectives of individuals from racial and ethnic groups different than my own were often brought into my undergraduate coursework.	2	1.9	5	4.8	4	3.8	5	4.8	25	23.8	34	32.4	30	28.6	5.55	1.45
My knowledge or opinion of others was influenced or changed by becoming aware of different perspectives.	-	-	-	-	3	2.8	5	4.7	16	15.1	47	44.3	35	33.0	6.00	.97

Dependent Variables

As described in detail in Chapter 3, four dependent variables were created to be examined in the regression analysis. Those scale title and number of items in each scale were as follows: *CAM Legitimacy*, 11 items; *CAM Expectations*, five items; *IM Legitimacy*, six items and; *CAM Plans*, three items. Table 8 is a summary of the items included in each of the dependent variables including the means and standard deviations for each survey item as well as the overall scale variable.

Table 8

Means and Standard Deviations for Outcome Variables and Associated Individual Survey Items (N=106)

Scale	Mean	*SD*
Item		
CAM Legitimacy	4.52	.88
Complementary and alternative therapies include ideas and methods from which conventional medicine could benefit.	5.33	1.22
Complementary and alternative therapies are a threat to public health.[a]	3.15	1.46
Treatments not tested in a scientifically recognized manner should be discouraged.[a]	4.10	1.43
Most complementary and alternative therapies stimulate the body's natural therapeutic powers.	4.19	1.14
Effects of complementary and alternative therapies are usually the result of a placebo effect.[a]	4.14	1.21
Complementary and alternative therapies have an important role in the healthcare system.	4.76	1.26
The use of CAM therapies should be discouraged because they are not based on scientific evidence.[a]	3.20	1.34
Medical physicians knowledgeable of CAM (i.e., Chiropractic, Acupuncture, Homeopathy, etc.) have more satisfied patients than physicians who are not familiar with CAM.	4.45	1.05
Patients whose medical physicians are knowledgeable of CAM (i.e., Chiropractic, Acupuncture, Homeopathy, etc.) have better health outcomes than patients whose physicians are not familiar with CAM.	4.25	.99
Knowledge about CAM therapies will be important to my future success as a physician.	4.96	1.22
The scope of medical practice should include CAM therapies.	4.44	1.43

Table 8 continues

Table 8 continued

Scale	Mean	SD
Item		
CAM Expectations	4.62	1.01
I expect to be trained to assess patients' use of CAM therapies.	4.86	1.28
I expect to be trained to understand the risks and benefits of the most common CAM therapies.	5.56	1.20
I expect to be trained to communicate effectively about CAM therapies with patients.	5.30	1.19
I expect to be trained to coordinate patient care with practitioners of CAM therapies.	4.38	1.44
I expect to be trained to personally deliver some CAM therapies in my future practice.	3.06	1.49
IM Legitimacy	6.29	.58
Responsible patient care includes focusing on the relationship between the doctor and patient.	6.46	.78
When treating patients, doctors should focus on the whole person, not just the specific disease.	6.52	.83
Optimal health and healing is best achieved by making use of all appropriate treatment approaches, including CAM.	5.75	1.20
Responsible doctors maintain good relationships with health professionals whose approach to patient care differs from their own.	6.15	.81
When providing patient care, I plan to focus on my relationship with patients.	6.42	.78
When providing patient care, I plan to focus on the whole person, not just the specific disease.	6.49	.69
CAM Plans	4.10	1.24
I plan to incorporate some CAM therapies into my future medical practice.	4.08	1.67
I plan to recommend the use of some CAM therapies to my future patients.	4.54	1.41
I plan to discourage my patients from using any therapy that has not been proven to be safe and effective by research.[a]	4.30	1.43

[a] Reverse coded items

[b] Responses coded from 1 (strongly disagree) to 7 (strongly agree)

Analytic Findings

This section details the analysis of the survey data to relationships among the variables. The two statistical procedures that were used during this step included correlation analysis and regression analysis. First, a correlation matrix was created to explore the possible relationships among all background and outcome variables. Table 9 is the Pearson product moment correlation matrix which displays the correlations among all of the variables.

Several of the student characteristics exhibited correlations which were notable, although not directly associated with the research questions. Not surprisingly, mother's level of education was strongly and significantly associated with father's level of education. Both mother and father's level of education were positively and strongly correlated with parental income level. Father's level of education was also associated with higher reported scores on the MCAT. Also not a surprise was the finding that age was positively correlated with marital status. Older students were more likely to have been married or engaged.

The level to which students' undergraduate eduction included perspectives of diversity was positively correlated with parental income level and students' reported interaction with diverse populations prior to medical school. Perspective of diversity in undergraduate education was negatively correlated with student age. In other words, older students reported lower levels of diversity inclusion in their undergraduate education. Perhaps this finding could be explained by increased emphasis on diversity education in undergraduate education in recent years, thereby disproportionately affecting

Table 9: *Correlation Table*

Scale Item	CAM Use	CAM Fam.	CAM Leg.	CAM Exp.	IM Legit.	CAM Plan	Father Ed.	Mother Ed.	Income	Age	MCAT	Div. Exp.	UG Div.	Div. Opin.	Major	Gender	Career Int.	Race	Marital	Grew up	UG type	Pract. Set.
CAM Fam.	.49**																					
CAM Leg.	.46**	.29**																				
CAM Exp.	.01	.01	.28**																			
IM Legit.	.06	.22*	.46**	.15																		
CAM Plan	.43**	.23*	.86**	.29**	.45**																	
Father Ed.	.13	.15	.03	-.05	.00	.09																
Mother Ed.	.31**	.16	.11	-.03	.19	.15	.59**															
Income	.06	.13	.05	.01	.11	.12	.42**	.39**														
Age	.32**	.16	.03	-.08	.04	.06	-.03	.03	-.13													
MCAT	-.07	-.01	-.29**	-.01	-.08	-.19	.22*	.18	.18	-.07												
Div. Exp.	.11	.18	-.01	-.21*	-.10	-.06	.12	.07	-.14	.09	-.08											
UG Div.	-.20*	.01	-.18	.11	.04	-.12	.09	.05	.28**	-.29**	.19	.22*										
Div. Opin.	.09	.13	.09	-.01	.25*	.04	.19*	.18	.08	.12	.02	.12	.22*									
Major	-.03	.05	-.25*	-.17	.09	-.15	.13	.08	-.06	.18	.01	.11	.16	.09								
Gender	.14	-.12	.17	.02	.07	.21*	-.03	.17	.16	.00	-.23*	.00	.00	.02	-.09							
Career Int.	.16	.29**	-.02	-.16	.03	-.06	.08	.08	.01	.16	.13	.09	-.11	.17	-.08	-.04						
Race	.04	.05	.18	.02	.07	.07	-.04	-.08	-.19	-.10	-.28**	.12	-.07	.09	.02	.06	.06					
Marital	.11	.06	.00	-.12	-.09	-.03	.00	.08	-.08	.48**	-.05	.10	-.19	.16	.09	.05	.03	-.05				
Grew up	-.13	.01	.06	-.08	.11	.01	.04	-.07	.00	-.14	-.06	-.10	.01	-.06	-.06	-.03	-.15	-.12	-.13			
UG type	.06	.16	.09	.09	.12	.09	.15	-.02	.17	.02	.07	-.05	.30**	.06	.08	.00	-.16	-.35**	.01	.12		
Pract. Set.	-.13	-.09	.05	.05	.03	.00	-.30**	-.08	.01	-.18	.01	-.39**	-.25*	-.19	-.16	.02	-.23*	-.15	.04	.22*	.08	
Underser.	.23*	.02	.26**	.02	.25*	.26**	.16	.09	-.08	.20*	-.30**	-.03	-.19	.16	.11	.15	.07	.34**	.07	-.08	-.06	-.19

*Correlation is significant at the 0.05 level
** Correlation is significant at the 0.01 level

younger students. Students who attended private undergraduate institutions also indicated higher levels of diversity inclusion in their undergraduate education.

Students who reported their knowledge or opinion being influenced or changed by becoming aware of different perspectives, were positively correlated with father's level of education and the degree to which diverse perspectives were brought into their undergraduate education.

Students who indicated intent to practice in a large city were associated with higher levels of father's education, higher levels of exposure to diverse populations, increased diverse perspectives in undergraduate education and appear less likely to have indicated intent to enter clinical practice following medical school. Also, students who grew up in a large city were more likely to indicate intent to practice in a large city.

The correlation matrix also suggests that higher scores on the MCAT were achieved by White/Caucasian students, male students and those who did not plan to practice in a geographically underserved area. White/Caucasian students were also more likely to have attended a private undergraduate institution as compared to their non-white counterparts. Non-white respondents were more likely to indicate intent to practice in a geographically underserved area.

The correlation matrix revealed several interesting findings relative to the primary areas of interest and dependent variables of *CAM Use*, *CAM Familiarity*, *CAM Legitimacy*, expectations for CAM content in medical school, legitimacy ratings of IM and plans to incorporate CAM into future medical practices. Table 10 is a subset of the complete correlation matrix and illustrates correlations among the CAM and IM variables

only. Not surprisingly, *CAM Familiarity* was positively and significantly correlated with *CAM Use* ($r = 0.49$, $p < 0.01$). *CAM Familiarity* was also positively and significantly correlated with *CAM Legitimacy* ($r = 0.29$, $p < 0.01$) and *IM Legitimacy* ($r = 0.22$, $p < 0.05$). This suggests the more familiar students are with CAM, the higher they are likely to rate it on the legitimacy scale. In addition to positive significant correlation with *CAM Familiarity* ratings, students who reported higher levels of *CAM Use* were also more likely to report higher legitimacy ratings of CAM ($r = 0.46$, $p < 0.01$) and plans to incorporate CAM into their practices ($r = 0.43$, $p < 0.01$). Frye et al. (2006) found a similar relationship between personal use of alternative therapies and interest in referring future patients to CAM practitioners ($r = 0.45$, $p < 0.001$).

Table 10

Correlations Among CAM and IM Specific Variables

Scale Item	CAM Use	CAM Familiarity	CAM Legitimacy	CAM Expectations	IM Legitimacy
CAM Familiarity	$.49^{**}$				
CAM Legitimacy	$.46^{**}$	$.29^{**}$			
CAM Expectations	$.01$	$.01$	$.28^{**}$		
IM Legitimacy	$.06$	$.22^{*}$	$.46^{**}$	$.15$	
CAM Plan	$.43^{**}$	$.23^{*}$	$.86^{**}$	$.29^{**}$	$.45^{**}$

*Correlation is significant at the 0.05 level
** Correlation is significant at the 0.01 level

CAM Use was also positively correlated with mother's level of education ($r = 0.31$, $p < 0.01$) and student age ($r = 0.32$, $p < 0.01$). Students who were more familiar with CAM were also less likely to declare intent to enter clinical practice upon completion of medical school ($r = 0.29$, $p < 0.01$).

CAM Legitimacy was positively and significantly correlated with Expectations of CAM topics in medical school ($r = 0.28$, $p < 0.01$), *IM Legitimacy* ($r = 0.46$, $p < 0.01$), and very strongly correlated with plans to incorporate elements of CAM into their own medical practices ($r = 0.86$, $p < 0.01$). Students, who thought highly of CAM, expect to be taught more about it and planned for CAM to have a role in their future practices. MCAT scores showed a negative correlation with *CAM Legitimacy* ($r = -0.29$, $p < 0.01$). That is to say, students who scored lower on the MCAT were more likely to give CAM a higher ranking on the legitimacy scale. However, students who indicated an undergraduate major in the natural sciences (biology, neurology, genetics, etc.) rated CAM higher on the legitimacy scales as compared to those students who majored in the social sciences or humanities ($r = -0.25$, $p < 0.05$). Finally, students who rated CAM higher on the legitimacy scale were more likely to indicate intent to practice in a geographically underserved area ($r = 0.26$, $p < 0.01$).

Eighty-nine (84.8 percent) respondents indicated somewhat agree, agree or strongly agree with that they expect to be trained to communicate effectively about CAM therapies with patients. Students who expected to be trained in various elements of CAM were also more likely to indicate intent to incorporate elements of CAM into their medical practices ($r = 0.29$, $p < 0.01$) and also indicated lower levels of exposure to diverse populations prior to entering medical school ($r = -0.21$, $p < 0.05$).

IM Legitimacy ratings were positively correlated with plans to incorporate CAM elements into practice ($r = 0.45$, $p < 0.01$). There was also a positive association between integrative medicine ratings and the degree to which students indicated their knowledge or opinions were influenced or changed by becoming aware of different perspectives ($r = 0.2$, $p < 0.05$). Finally, students who entered higher *IM Legitimacy* ratings also were more likely to express plans to practice in geographically underserved areas ($r = 0.25$, $p < 0.05$).

The *CAM Plans* variable was positively correlated with *CAM Legitimacy* ($r = 0.86$, $p < 0.01$) and *IM Legitimacy* ($r = 0.45$, p < 0.01) and *CAM Expectations* (r $= 0.29$, p < 0.01) variables. Additionally, the *CAM Plans* variable was also positively associated with a declared intent to practice in a geographically underserved area ($r = 0.26$, $p < 0.01$).

Regression Analysis

This section details the findings of four models of linear regression analysis, which were conducted in an effort to answer the research questions of this study. Characteristics of students were regressed separately on the *CAM Legitimacy* variable, the *CAM Expectations* variable, the *IM Legitimacy* variable and the *CAM Plans* variable. Additionally, the *CAM Use* variable, *CAM Familiarity* variable, *CAM Legitimacy* variable, the *IM Legitimacy* variable and the *CAM Expectations* were regressed on the *CAM Plans* variable.

Effects of Student Characteristics on CAM Legitimacy. The first regression model that was conducted to answer the first research question, which sought to discover

the student characteristics associated with higher ratings of *CAM Legitimacy*. The

dependent variable in this regression model is *CAM Legitimacy*, which is represented by

the mean of 11 survey items related to elements of CAM legitimacy. The resulting

indexed *CAM Legitimacy* score was regressed on all student characteristic variable

including *CAM Use* and *CAM Familiarity*, two background variables of particular

interest. Table 11 includes a summary of the findings of that regression analysis. This

model explained approximately 41 percent of the variance ($R^2 = 0.413$) in a student's

legitimacy rating of CAM. The model was significant ($p = .037$), however, no single

student characteristic was statistically significant. One variable, *Undergraduate Major*

was at $p = 0.053$.

Effects of Student Characteristics on CAM Expectations. The second model

was designed to examine predictive quality of student characteristics on expectations of

student for inclusion of CAM topics in their medical school curriculum. The dependent

variable in this model is *CAM Expectations*, and is represented by the mean score of five

survey items which addressed the students' expectations of CAM-related content in their

medical school curriculum. Each of the five items used a seven-point scale for responses

ranging from "strongly disagree" to strongly agree." Table 12 is a summary of the

findings of this regression model, which was not statistically significant ($R^2 = .244$,

$p = .604$) and does not have predictive value. No single student characteristic in this

model illustrated predictive value at a statistically significant level. The adjusted R^2

value for this regression model was -0.032.

Table 11

Model 1: Standardized Regression Coefficients for CAM Legitimacy Regressed on

Student Characteristics

			CAM Legitimacy (N=101)		
Variable	F	R^2	B	t-value	p-value
Constant	1.888	.413	6.363	2.787	.007
Age			-.119	-.682	.498
Race			.014	.098	.922
Gender			-.014	-.110	.913
Marital Status			-.056	-.394	.695
Where Grew up			-.012	-.102	.919
Public/Private UG			.174	1.277	.207
MCAT Score			-.131	-.968	.338
U-grad Major			-.229	-1.979	.053
Father's Education			-.047	-.260	.796
Mother's Education			.009	.055	.956
Income			.097	.651	.518
Diversity Exposure			-.072	-.504	.617
Undergrad			-.199	-1.212	.231
Diversity Opinion			.104	.809	.422
CAM Familiarity			.258	1.853	.070
CAM Use			.245	1.700	.095
Career Intentions			-.169	-1.291	.203
Practice Setting			-.057	-.406	.687
Plan Underserved			.132	.921	.362

Table 12

Model 2: Standardized Regression Coefficients for CAM Expectations Regressed on

Student Characteristics

Variable	F	R^2	CAM Expectations (N=103)		
			B	t-value	p-value
Constant	.883	.244	6.194	2.144	.037
Age			-.132	-.664	.510
Race			.036	.223	.825
Gender			-.039	-.281	.780
Marital Status			.016	.097	.923
Where Grew up			-.126	-.932	.356
Public/Private UG			.143	.931	.356
MCAT Score			.155	1.012	.316
U-grad Major			-.245	-1.894	.064
Father's Education			-.169	-.819	.417
Mother's Education			.032	.169	.867
Income			.024	.143	.887
Diversity Exposure			-.170	-1.039	.303
Undergrad			.008	.045	.964
Diversity Opinion			-.067	-.463	.645
CAM Familiarity			.254	1.628	.110
CAM Use			-.096	-.601	.551
Career Intentions			-.224	-1.520	.134
Practice Setting			-.061	-.379	.706
Plan Underserved			.181	1.125	.266

Effects of Student Characteristics on IM Legitimacy. The third model was designed to examine predictive value of student background characteristics on legitimacy ratings of IM. Table 13 is a summary of the findings of this regression model. In this model, the dependent variable of *IM Legitimacy*, represents the degree to which the student ascribes legitimacy to the various components of IM (the importance of the relationship between practitioner and patient, a focus on the whole person, evidence-informed, makes use of all appropriate therapeutic approaches). The *IM Legitimacy* variable is the mean of six survey items all representing elements of IM and scored on the seven-point scale from "strongly disagree to strongly agree." This model was statistically significant ($p = .008$) and explained approximately 46 percent ($R^2 = .460$) of the variation in the legitimacy scores of students relative to IM. The adjusted R^2 value for this regression model was 0.263. Several individual independent background variables demonstrated predictive value at a significant level as demonstrated by their associated *p*-values in this model.

Effects of Student Characteristics on CAM Plans. A fourth regression model was designed to examine predictive quality of student characteristics on student plans to incorporate principles of CAM in their medical practices. The dependent variable in this model, *CAM Plans*, is a scaled numerical representation of students' intent to incorporate elements of CAM into their future medical practices. The mean of three survey items, designed to measure student intent around this topic represents the *CAM Plans* variable. An example of one of these items is, "I plan to recommend the use of some CAM therapies to my future patients." Student responses to each of these items were represented on a seven-point scale ranging from "strongly disagree" to "strongly agree."

This model, summarized in Table 14, was not statistically significant (R^2 = .339, p = 0.154) and does not have predictive value. The adjusted R^2 value for this regression model was 0.102.

Table 15 is a summary of the first four regression models illustrating the standardized regression coefficients across the models. The model using *IM Legitimacy* appears to be the strongest of the four models with significance at the p = 0.008 level and several independent variables showing predictive value at a significant level.

Effects of CAM and IM Specific Variables on CAM Plans. The final linear regression model was intended to explore the explanatory value of the CAM and IM specific variables: *CAM Familiarity*, *CAM Use*, *CAM Legitimacy*, *IM Legitimacy*, and *CAM Expectations* on students' plans to incorporate CAM into their future medical practices (*CAM Plans*) as described in the previous section. Other background variables were specifically excluded from this model to determine if a model that only includes CAM and IM specific variables would have explanatory power for *CAM Plans*. Additionally, the previous regression model, which used *CAM Plans* as the dependent variable regressed on other background variables, did not show significant explanatory power.

This model, a summary of which is provided as Table 16 was statistically significant ($p < .001$) and explains approximately 76 percent of the variance (R^2 = .762) in student plans to incorporate elements of CAM into their future medical practices. Regarding the individual explanatory value of each of the variables in the model, students' CAM legitimacy ratings illustrated strong, positive predictive value for CAM plans (B = -2.203, $p < .001$). The adjusted R^2 value for this regression model was 0.749.

Table 13

Model 3: Standardized Regression Coefficients for IM Legitimacy Regressed on Student

Characteristics

Variable	F	R^2	IM Legitimacy (N=105)		
			B	*t*-value	*p*-value
Constant	2.334	.460	4.262	3.028	.004
Age			.142	.857	.395
Race			-.027	-.195	.846
Gender			-.100	-.858	.395
Marital Status			-.285	-2.094	.041
Where Grew up			.112	.981	.331
Public/Private UG			.248	1.911	.061
MCAT Score			.041	.316	.753
U-grad Major			.078	.715	.478
Father's Education			-.552	-3.166	.003
Mother's Education			.415	2.602	.012
Income			.151	1.061	.293
Diversity Exposure			-.078	-.568	.572
Undergrad			-.130	-.834	.408
Diversity Opinion			.272	2.238	.030
CAM Familiarity			.404	3.094	.003
CAM Use			-.354	-2.635	.011
Career Intentions			-.147	-1.181	.243
Practice Setting			-.080	-.600	.551
Plan Underserved			.321	2.358	.022

Table 14

Model 4: Standardized Regression Coefficients for CAM Plans Regressed on Student

Characteristics

| Variable | F | R^2 | CAM Plans (N=105) | | |
			B	t-value	p-value
Constant	1.429	.339	6.438	1.850	.070
Age			-.070	-.386	.701
Race			-.050	-.332	.741
Gender			.078	.606	.547
Marital Status			-.032	-.215	.830
Where Grew up			-.026	-.207	.836
Public/Private UG			.082	.579	.565
MCAT Score			-.061	-.434	.666
U-grad Major			-.156	-1.298	.200
Father's Education			-.025	-.130	.897
Mother's Education			-.018	-.101	.920
Income			.099	.639	.526
Diversity Exposure			-.090	-.593	.556
Undergrad			-.133	-.780	.439
Diversity Opinion			-.054	-.404	.688
CAM Familiarity			.269	1.879	.066
CAM Use			.250	1.695	.096
Career Intentions			-.176	-1.281	.206
Practice Setting			-.069	-.470	.640
Plan Underserved			.190	1.270	.210

Table 15

Standardized Regression Coefficients for CAM Legitimacy, IM Legitimacy, CAM Expectations and CAM Plans Regressed on Student Characteristics

Variable	CAM Legit (N=101)	CAM Expect (N=103)	IM Legit (N=105)	CAM Plans (N=105)
Age	-.12	-.13	.14	-.07
Race	.01	.04	-.03	-.05
Gender	-.01	-.04	-.10	.08
Marital Status	-.06	.02	-.29*	-.03
Where Grew up	-.01	-.13	.11	-.03
Public/Private UG	.17	.14	.25	.08
MCAT Score	-.13	.16	.04	-.06
U-grad Major	-.23	-.25	.08	-.16
Father's Education	-.05	-.17	-.55**	-.03
Mother's Education	.01	.03	.42*	-.02
Income	.10	.02	.15	.10
Diversity Exposure	-.07	-.17	-.08	-.09
Undergrad Diversity	-.20	.01	-.13	-.13
Diversity Opinion	.10	-.07	.27*	-.05
CAM Familiarity	.26	.25	.40**	.27
CAM Use	.25	-.10	-.35*	.25
Career Intentions	-.17	-.22	-.15	-.18
Practice Setting	-.06	-.06	-.08	-.07
Plan Underserved	.13	.18	.32*	.19
R^2	.41*	.24	.46**	.34
Adjusted R^2	.19*	-.03	.26**	.10

* Significant at the 0.05 level
** Significant at the 0.01 level

Table 16

Model 5: Standardized Regression Coefficients for CAM Plans Regressed on CAM Familiarity, CAM Use, CAM Legitimacy, IM Legitimacy, and CAM Expectations

Variable	F	R^2	CAM Plans (N=105)		
			B	t-value	p-value
Constant	58.426	.762	-2.203	-3.092	.003
CAM Familiarity			-.029	-.475	.636
CAM Use			.099	1.508	.135
CAM Legitimacy			.780	11.290	.000
IM Legitimacy			.085	1.430	.156
CAM Expectations			.034	.629	.531

CHAPTER 5: DISCUSSION, IMPLICATIONS AND CONCLUSIONS

This chapter presents a summary and discussion of the findings of this study. Additionally, the implications of this study for theory, policy and practice are presented. Lastly, limitations of the study of the study are presented followed by recommendations for further research and conclusions.

The study was designed to ascertain the views of beginning medical school students toward CAM and IM since previous studies (Baugniet, Boon, & Ostbye, 2000b; Chez, Jonas, & Crawford, 2001; Frye et al., 2006; Hopper & Cohen, 1998b; P. Johnson et al., 2008; M. Kreitzer et al., 2002; D. Lie & Boker, 2006; Loh, Ghorab, Clarke, Conroy, & Barlow, 2013; Yeo et al., 2005) had focused on students' views after some experience in medical school.

The goal of this study was to provide quantitative analysis of incoming medical students' views, expectations and plans regarding CAM and IM. Several surveys used in similar studies and had been demonstrated valid and reliable were used in the development the survey used in the current study. The survey was administered to the incoming cohort of medical students at the University of Minnesota in August, 2014. Of the 168 students who received the survey, survey data were obtained from 106 students.

Independent variables including student background characteristics were collected through the survey. Two independent variables of particular interest were *CAM Use* and *CAM Familiarity*. Four main scales were developed to represent the four dependent variables of interest included *CAM Legitimacy*, *CAM Expectations*, *IM Legitimacy* and *CAM Plans*. The survey contained 43 items, 25 of which contributed to one of the four

dependent variable scales.   These scales were found to be valid and reliable using statistical analysis. Upon collection of the data, analysis ensued and included summarizing the descriptive findings of the survey, correlation analysis of all variables, and multiple regression analysis to determine predicative value of the dependent variables on the independent variables of interest.

Summary of Findings

Four separate linear regression models were used to determine the effects of 19 background variables on each of the following dependent variables: *CAM Legitimacy* rating, expectations for CAM topics in medical school, *IM Legitimacy* rating, and plans to incorporate elements of CAM into future medical practices. A final linear regression model was conducted, examining the effects of *CAM Legitimacy* rating, Expectations for CAM topics in medical school and *IM Legitimacy* rating on plans to incorporate elements of CAM into future medical practices.

Two of the 19 background variables of particular interest were: *CAM Use* and *CAM Familiarity*. Students were asked to indicate which CAM therapies they had used from a list of 14 common CAM therapies. A *CAM Use* scale variable was determined by summing the coded scores from the student responses (Yes = 1, No = 0). The possible range for the *CAM Use* variable was 0 to 14. The mean value for this scale was 3.32 ($SD = 2.73$) suggesting a relatively low level of prior experience with CAM, at least with the list of therapies listed.

CAM Familiarity was determined through student responses to a single survey item: "Please indicate your general familiarity with CAM by checking the appropriate

response." Student responses were obtained on a five-point scale ranging from "not at all familiar" to "extremely familiar." The mean of 2.46 ($SD = .92$) suggests that on average the cohort of students is between slightly (2) and somewhat (3) familiar with CAM.

Discussion

The following discussion is based on the data analysis from the survey. Student legitimacy ratings of CAM are correlated with student plans to incorporate elements of CAM into their future medical practices ($r = 0.86$, $p < 0.01$). Additionally, the regression model in which *CAM Plans* was regressed on the CAM and IM specific variables (Model 5), CAM legitimacy ratings illustrated strong, positive predictive value for CAM plans ($B = .780$, $p < .001$). The overall model was statistically significant ($p < .001$) and explains approximately 76 percent of the variance ($R^2 = .762$) in student plans to incorporate elements of CAM into their future medical practices.

This finding is not surprising in that one would expect students to foresee their involvement in practices to which they ascribe a high level of legitimacy. If cooperation among healthcare professionals is to become a reality, perceived legitimacy of the affected professions will certainly contribute to that goal. Legitimacy does not come from nothing, however. The current study suggests that, at least in the case of CAM, legitimacy rating of a practice or profession is correlated with familiarity with ($r = .29$, $p < .01$), and use ($r = .46$, $p < .01$) of that therapy. By exposing medical students to CAM therapies early and often, their views of the practices as legitimate may increase and the likelihood that they will plan to communicate and work with CAM professionals in the future may also increase. Of course, care must be taken to consider the role of evidence

for the effectiveness of various practices in any effort to increase the legitimacy ratings of various therapies in the minds of medical students.

An interesting finding from the regression model which examined the predictive value of student characteristics on *IM Legitimacy* ratings (Model 3), is that *father's education* level and *mother's education* level show predictive values, but in the opposite direction. *Father's education* is a negative indicator of *IM Legitimacy* ($B = -.55$, $p < .01$) and mother's education is a positive indicator ($B = .42$, $p < .05$) of *IM Legitimacy*. This may be a function of the mother being a traditional role of guiding health care decisions for the family. A more educated mother may be more aware of the importance and significance of integrative medicine and may pass that appreciation on to her family.

This is related to a finding from the 2007 National Health Interview Survey (NHIS) which found that CAM users tend to have higher levels of education. A reasonable assumption may be that a mother's level of CAM use is likely to be correlated with her children's level of CAM use. While the NHIS found that those who categorized themselves as White use CAM more than other ethnicities except American Indians, the current study did not show a relationship linking ethnicity to CAM use. Students who reported higher levels of CAM use were more likely to indicate intent to practice in a geographically underserved area ($r = .23$, $p < .05$), but also reported lower levels of diversity being brought into their undergraduate coursework ($r = -.20$ $p < .05$).

Survey responses to the individual items making up the *IM Legitimacy* scale suggest strong agreement for all aspects of IM (focus on the relationship with the patient, evidence-informed care, care for the whole person and incorporation of all appropriate

treatment approaches). The overall mean for these six items, intended to measure student legitimacy rating of IM, was 6.29 on a seven-point scale from "strongly disagree" to "strongly agree." The one element of IM that had the least support from the medical students was "Optimal health and healing is best achieved by making use of all appropriate treatment approaches, including CAM." The mean response for this item was 5.75 on the seven-point scale. Excluding the phrase "including CAM" may have affected student responses to this particular item.

The current study indicates that *CAM Use* has a positive correlation with *CAM Legitimacy* ($r = 0.46$, $p < 0.01$), as does *CAM Familiarity* ($r = 0.29$, $p < 0.01$). This finding is similar to comparable studies which show use and familiarity of CAM is associated with a more positive view of CAM in general. (Kreitzer et al., 2002, Lie & Boker, 2006, Frye, et al., 2006, Baugniet, Boon, & Ostbye, 2000). For example, Baugniet, Boon, and Ostbye (2000a) found that higher knowledge of a CAM therapy is correlated with higher perceived usefulness of the therapy. Their study, which compared the perceived usefulness of various CAM therapies among different groups of healthcare students in their fourth and final year, led them to suggest that differing personalities, values, and social and communication skills may be responsible for differing views of the usefulness of CAM therapies. They also suggest that the differing style and content of the different healthcare schools may contribute to differing views of usefulness among the students. The current study, by design, did not account for differing types of healthcare education, but was unique in that the data were collected before the students began their medical education.

A number of the previous studies examined the views of medical students at various stages of their training (Baugniet, Boon, & Ostbye, 2000; Frye, Sierpina, Boisaubin, & Bulik, 2006; Furnham, & McGill, 2003; Kreitzer, Mitten, Harris, & Shandeling, 2002). The findings from the current study are unique in that they reflect the perspectives of students who have not yet begun their medical school training. Kessler et al. (2001) found that individuals of more recent generations were more likely to have accessed CAM at an earlier age compared to past generations. While not a contradiction of those findings, the current study did show a positive relationship between CAM use and age (i.e., older students in the sample reported a higher level of CAM use than their younger counterparts). Of course, the younger students may surpass the older students' level of use when they get to the same age.

Of the respondents, 84.8 percent of respondents expected to be trained to communicate effectively about CAM therapies with patients. This finding closely mirrors a finding in a study by Frye et al. (2006) which indicated 85 percent of medical students agreed or strongly agreed that they should learn to communicate with their patients about CAM therapies. While medical students expect to be trained in some aspects of CAM therapies and practice, a majority of medical students stopped short of the expectation that they be trained to deliver some CAM therapies directly in their practices. Only 17.0 percent of students agreed at any level with the statement "I expect to be trained to personally deliver some CAM therapies in my future practice."

An underlying question raised by the present study is what contributes to a medical student's sense of legitimacy around CAM or any other set of healthcare practices. Indeed, what contributes to any individual's perception of legitimacy of any

set of customs, beliefs, theories or practices? This study appears to show a relationship between use and familiarity with CAM and a student's perception of legitimacy of CAM as a set of healthcare practices. *CAM Use* shows a positive and significant correlation with *CAM Legitimacy* ($r = 0.46$, $p < 0.01$), as does *CAM Familiarity* ($r = 0.29$, $p < 0.01$). Certainly other factors beyond use may be at play. For example, learned levels of acceptance and familial and parental behaviors may affect how willing students are to grant practices a high level of legitimacy. Understanding the contributing factors to the perception of legitimacy of CAM is of particular importance given the relationship between perceived legitimacy and intentions to incorporate elements of CAM into future medical practices.

Implications for Theory

The current research indicated that familiarity and experience with topics or practices is associated with expectations for inclusion of those topics and practices in future related educational experiences. Furthermore, this familiarity and experience is associated with an increase in intention to include these topics and practices in future professional activities. Our experience, exposure and familiarity with topics tend to influence how we see the world around us, the degree of legitimacy we assign to various practices and our future actions as they apply to that practice. Development of the theories around the contributing factors to perceptions of legitimacy of CAM, IM, or any other set of practices could have significance for the recruitment and education of future medical doctors.

Berger et al. (1998) proposed a multilevel conceptual framework of legitimacy and suggest that cultural beliefs begin the process of an individual assigning legitimacy to another individual or group. In order for legitimacy to take hold, the assigning of legitimacy must be supported by others who provided consensual validation of that the individual or group is deserving of a high legitimacy rating. This is reminiscent of DiMaggio and Powell's theory of normative isomorphism, which suggests legitimacy grows when professionals bring a set of shared beliefs, values, ideas and norms from their training into the workplace (1983).

The current study suggests that an increased level of legitimacy is assigned to CAM practices when the individual assigning the legitimacy has experience with the CAM practice. The theories put forward by Berger et al. (1998) and DiMaggio and Powell (1983) suggest that legitimacy that results from exposure and familiarity with a practice may be boosted when peers are seen to value and support the practice as well. One could imagine how the collective legitimacy assigned to CAM practices an entire cohort of medical students could change dramatically based on this isomorphic normative effect.

The path to professionalization, outlined by Bledstein (1976) in *The Culture of Professionalism*, suggests the legitimacy of CAM professions may depend on the success of CAM advocates who reference science and evidence as justification for legitimate status and professionalization. Bledstein theorizes the higher education system enhances the legitimacy of professions. Accordingly, formal integration of CAM into mainstream higher education may have a positive effect on the legitimacy enjoyed by the CAM professions.

Implications for Policy

Medical students expect to be trained in some aspects of CAM therapies and practice. The findings could be used by medical school instructional designers and curriculum developers through a more comprehensive understanding of incoming student expectations. Regardless of whether curriculum developers choose to use student topic expectations to directly populate the curriculum with those topics, they can and should use the understanding of student expectations to manage those expectations.

Evidence-informed practice should ultimately guide all healthcare education and practice. Several CAM institutions have recently adopted efforts, through NIH funded programs, to make evidence a significant focus of their education (M. J. Kreitzer & Sierpina, 2008). Much of this has occurred in partnership with mainstream medical institutions. Both CAM-focused institutions and their mainstream medical counterparts should continue efforts to make evidence a central guiding principle when designing curriculum.

Medical education has been very slow to change, even in the face of repeated calls for change. Since Flexner's 1910 report on the state of medical education (Flexner, 1910), many studies and reports have called for change in medical education. In spite of repeated and noncontroversial calls for change in many of the same areas over the years, the small changes that have occurred have been few and have been slow to come about. This tendency is highlighted by the Christakis (1995) review of 19 reports published between 1910 and 1993, which advocated repeatedly for many of the same reforms over the course of 83 years. However, a growing body of knowledge around the perspectives

and characteristics of incoming medical students should be added to the list of evidence to consider, when policy makers are considering changes to the way medical education is structured and delivered. The growth of CAM legitimacy, a growing body of evidence for its use as well as growing energy around IM should provide impetus to accelerate the inclusion of CAM topics into medical school curriculum.

Implications for Practice

The findings of this study have implications for medical school recruiting and curriculum development. Each new cohort of medical students begins medical school with innumerable and increasingly diverse background experiences, expectations and plans. An understanding of these variables and their correlations with each other could inform the process of curriculum development.

One way to collect and distribute data about incoming medical students use, familiarity and legitimacy ratings of CAM may be to include relevant questions on the Matriculating Student Questionnaire of the AAMC. This would provide important student background information about CAM for consideration by faculty in all medical schools. Medical school faculty could then use this readily accessible background information about their incoming cohort to determine how they CAM topics will be addressed in the curriculum. These findings may help faculty assess student expectations and readiness to learn about CAM based on background variables. Faculty could use these findings to inform curriculum development and learning activities around the topic of CAM and integrative medicine.

The current study indicates the majority of incoming medical students have expectations that they will learn to communicate about CAM, consult with patients as well as CAM practitioners. Eighty-four percent of students expect that they will be taught to communicate about CAM therapies, and 54.7 percent expect that they will be taught to coordinate care with CAM practitioners. They expect that they will learn to understand the risks and benefits of the most common CAM therapies. Almost 87 percent of survey respondents agreed with the statement, "I expect to be trained to understand the risks and benefits of the most common CAM therapies." While differences of opinion exist as to how to best teach about individual CAM practices and the level of competence students should be expected to attain (general familiarity through competence in delivering a CAM therapy), medical school faculty and administrators certainly should agree that teaching students about the risks and benefits of the most common CAM therapies is appropriate. This is particularly evident given the expectations of medical students for this content as well as the broad use of these CAM therapies by their future patients and the potential impact on patients' health. Additionally, medical students should learn to communicate and coordinate care with CAM practitioners. Communication and coordination with patients and their CAM practitioners can only improve care and ultimately improve patient outcomes and improve the health care system.

Medical school curriculum committees should ensure CAM approaches to care are included where appropriate, which will ensure medical students expectations of understanding the risks and benefits of CAM therapies will be included in their education. However, while the expectations of incoming medical students should be

considered when designing curriculum, these expectations must not be considered on the same level as scientific evidence of efficacy of topics and content for medical school curriculum. In some cases, incoming medical students' experience and familiarity with a particular CAM practice and expectation of inclusion in the curriculum may need to be addressed with direct and deliberate curriculum content intended to help the student "unlearn" irrational beliefs. For example, students' experience and familiarity with iridology, which refers to the unscientific practice of looking at the colored portion of the eye as a diagnostic tool, may represent a need to discredit the practice through an examination of the evidence. As has been suggested by others (Bondurant & Sox, 2005; Sampson, 2001), a practice of educating students to think critically and evaluate each health care practice through a critical assessment of the evidence surrounding the practice may be the best way to educate students about CAM therapies.

Limitations of the Study

The limitations of this study include the sample size and possible nonresponse bias. While the sample size of 106 incoming medical students (out of 168 students surveyed and 63 percent response rate) was sufficient to conduct the analysis and reach some conclusions, there are limitations associated with these numbers. Medical students who participated in the present study may not be representative of entering medical students of other medical schools across the country.

The nonresponse bias may have resulted in a data set which does not represent the views of all incoming medical students in the medical school which served as the setting in the current study. The differing positions held by the medical community regarding

CAM may be reflected in the incoming students and could have affected their willingness to complete the survey. For example, a student who objects strongly to the use of CAM or perhaps had a bad past experience with CAM, may have had a strong negative emotional response when receiving the survey and was therefore less inclined to complete it. Students who support CAM and have had positive personal experiences may have felt very happy to complete the survey and express their support for CAM. The degree to which this happened would affect the validity of the results.

Another limitation of the study is in regards to the analysis conducted on the resulting data set. Linear regression analysis was conducted using the entire set of independent variables together. An alternative approach would have involved a stepwise approach to the regression analysis, beginning with the variables which were hypothesized, from a theoretical perspective, to be of particular interest. This approach could have begun using variables that approached significance in the bivariate correlation analysis. Adding variables to the model in this stepwise fashion may have resulted in a more efficient model with explanatory power based on a smaller number of predictive variables.

Directions for Further Research

This study suggests a need for further research in a number of areas and leads to additional research questions. An expansion of the study design to other medical schools and areas of the country would be useful. A larger sample size with incoming students from across the country would help to verify or refute the findings of this study. International studies would be help determine if the findings of this study are unique to

the United States and perhaps influenced by the very distinct health care environment and cultural consideration in this country.

The focus of this study was on a one-time view of how incoming medical students perceive CAM. A longitudinal study examining how the views of medical students evolve as they progress through medical school and into medical practice would provide an interesting extension of this research. This study focused on a limited number of independent predictive variables associated with students' views toward CAM. Future research could expand this list of background variables to explore other possible factors which influence students' views of CAM. Qualitative research, including focus groups and structured interviews, may help identify additional underlying factors which may be at work.

A natural extension of this study could involve an examination of the characteristics of the top 15 percent of the medical student respondents compared to the bottom 15 percent of medical student respondents. What are the characteristics of medical students who rate CAM as very high on the legitimacy scale as compared to those medical students who rate it very low on the legitimacy scale? This may be another way to discover those additional factors most strongly associated with strong feelings toward CAM in one direction or the other.

Another area for future study may involve replicating the current study with other groups of entering healthcare students (e.g., those entering nursing, physical therapy and pharmacy). This line of study would mirror somewhat the study done by Baugniet, Boon, and Ostbye (2000a) which examined the perceived usefulness of various CAM

therapies by students enrolled in educational programs representing a number of different healthcare fields.

There are inherent limitations in the quantitative design of the current study. The two factors of legitimacy and CAM, which are at the core of this study, are concepts that are somewhat difficult to capture in a structured survey and subsequent quantitative analysis. A qualitative study design may help answer the question of how legitimacy develops around a field such as CAM. A qualitative design, including semi-structured interviews and focus groups of incoming medical students, may help identify factors that could be included on future large scale quantitative studies. Interviews and focus groups may also help identify potential misunderstandings and other barriers to assigning legitimacy to the CAM professions. For example, a negative past experience with a CAM practitioner may be revealed in interviews in a way that would not be captured on a survey and quantitative analysis.

Conclusions

While various studies report fluctuation over the years, conservative estimates put the number of annual visits to CAM providers over 300 million. Medical students expect to learn about certain aspects of CAM therapies. They expect to be trained to communicate with patients about CAM and they expect to be trained to coordinate care with practitioners of CAM therapies. With so many individuals making CAM a part of their healthcare, medical schools owe it to their students and the public to educate future doctors about these therapies, how to communicate with patients about CAM and how to coordinate care with CAM practitioners. Whether or not medical schools choose to fulfill

the expectations of incoming medical students relative to CAM, they need to be aware of students' expectations and choose how they will address those expectations. Lower student satisfaction ratings due to unmet expectations may result. More importantly, a lack of education of medical doctors about CAM may result in another generation of medical doctors ill equipped to advise patients effectively within a healthcare system in which CAM plays an important role.

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Appendix A

SURVEY INSTRUMENT

PERSPECTIVES OF ENTERING MEDICAL

STUDENTS TOWARD COMPLEMENTARY AND

ALTERNATIVE MEDICINE (CAM) PRACTICES

This survey includes six sections. The first section consists of a set of questions designed to assess your level of use and familiarity with Complementary and Alternative Medicine (CAM) therapies. The questions in the second section ask about your beliefs and opinions relative to CAM therapies. The third section assesses your expectations for CAM related content in your medical school training. The fourth section is to evaluate your beliefs and opinions about integrative medicine. The fifth section addresses your plans for future medical practice and whether you intend to incorporate CAM therapies into your practice. The questions in the sixth and final section are for demographic and classification purposes.

Section I: Use of Complementary and Alternative Therapies

1. For each of the following 14 CAM therapies, please select the appropriate response to indicate if you have ever personally used this therapy.

CAM Therapy	No, I have NOT used this therapy	Yes I have used this therapy
Acupuncture	0	1
Biofeedback	0	1
Chiropractic	0	1
Culturally Based Healing Practices (e.g., Curanderismo, Tibetan Healing Practices)	0	1
Energy Healing Practices (e.g., Therapeutic Touch, Reiki, Polarity)	0	1
Herbal/Botanical/Supplements	0	1
Homeopathy	0	1
Hypnosis	0	1
Imagery	0	1
Massage Therapy	0	1
Meditation	0	1
Naturopathy	0	1
Tai Chi/Qi Gong	0	1
Yoga	0	1
Other	0	1

2. Please indicate other specific CAM therapies you have used below:

_____
_____
_____
_____

3. Please indicate your general familiarity with CAM by checking the appropriate response.	Not at all familiar	Slightly familiar	Somewhat familiar	Moderately familiar	Extremely familiar
	1	2	3	4	5

Section II: Beliefs and Opinions about CAM

Please read and respond to the following statements according to your beliefs, by choosing the appropriate response from strongly disagree to strongly agree.

4. Complementary and alternative therapies include ideas and methods from which conventional medicine could benefit.	Strongly disagree	Disagree	Somewhat disagree	Neither agree or disagree	Somewhat agree	Agree	Strongly agree
	1	2	3	4	5	6	7

5. Complementary and alternative therapies are a threat to public health.	Strongly disagree	Disagree	Somewhat disagree	Neither agree or disagree	Somewhat agree	Agree	Strongly agree
	7	6	5	4	3	2	1

6. Treatments not tested in a scientifically recognized manner should be discouraged.	Strongly disagree	Disagree	Somewhat disagree	Neither agree or disagree	Somewhat agree	Agree	Strongly agree
	7	6	5	4	3	2	1

7. Most complementary and alternative therapies stimulate the body's natural therapeutic powers.	Strongly disagree	Disagree	Somewhat disagree	Neither agree or disagree	Somewhat agree	Agree	Strongly agree
	1	2	3	4	5	6	7

8. Effects of complementary and alternative therapies are usually the result of a placebo effect.	Strongly disagree	Disagree	Somewhat disagree	Neither agree or disagree	Somewhat agree	Agree	Strongly agree
	7	6	5	4	3	2	1

9. Complementary and alternative therapies have an important role in the healthcare system.	Strongly disagree	Disagree	Somewhat disagree	Neither agree or disagree	Somewhat agree	Agree	Strongly agree
	1	2	3	4	5	6	7

10. The use of CAM therapies should be discouraged because they are not based on scientific evidence.	Strongly disagree	Disagree	Somewhat disagree	Neither agree or disagree	Somewhat agree	Agree	Strongly agree
	7	6	5	4	3	2	1

Section III: Expectations for CAM in Medical School

For each of the following items, please indicate your expectations regarding CAM topics in your medical school education by choosing the appropriate response from strongly disagree to strongly agree.

11. I expect to be trained to assess patients' use of CAM therapies.	Strongly disagree	Disagree	Somewhat disagree	Neither agree or disagree	Somewhat agree	Agree	Strongly agree
	1	2	3	4	5	6	7

12. I expect to be trained to understand the risks and benefits of the most common CAM therapies.	Strongly disagree	Disagree	Somewhat disagree	Neither agree or disagree	Somewhat agree	Agree	Strongly agree
	1	2	3	4	5	6	7

13. I expect to be trained to communicate effectively about CAM therapies with patients.	Strongly disagree	Disagree	Somewhat disagree	Neither agree or disagree	Somewhat agree	Agree	Strongly agree
	1	2	3	4	5	6	7

14. I expect to be trained to coordinate patient care with practitioners of CAM therapies.	Strongly disagree	Disagree	Somewhat disagree	Neither agree or disagree	Somewhat agree	Agree	Strongly agree
	1	2	3	4	5	6	7

15. I expect to be trained to personally deliver some CAM therapies in my future practice.	Strongly disagree	Disagree	Somewhat disagree	Neither agree or disagree	Somewhat agree	Agree	Strongly agree
	1	2	3	4	5	6	7

Section IV: Beliefs and Opinions about Integrative Medicine

Please read and respond to each of the following statements according to your beliefs from strongly disagree to strongly agree.

16. Responsible patient care includes focusing on the relationship between the doctor and patient.	Strongly disagree	Disagree	Somewhat disagree	Neither agree or disagree	Somewhat agree	Agree	Strongly agree
	1	2	3	4	5	6	7

17. When treating patients, doctors should focus on the whole person, not just the specific disease.	Strongly disagree	Disagree	Somewhat disagree	Neither agree or disagree	Somewhat agree	Agree	Strongly agree
	1	2	3	4	5	6	7

18. Responsible patient care should include treatment that is informed by evidence.	Strongly disagree	Disagree	Somewhat disagree	Neither agree or disagree	Somewhat agree	Agree	Strongly agree
	1	2	3	4	5	6	7

19. Optimal health and healing is best achieved by making use of all appropriate treatment approaches, including CAM.	Strongly disagree	Disagree	Somewhat disagree	Neither agree or disagree	Somewhat agree	Agree	Strongly agree
	1	2	3	4	5	6	7

20. Responsible doctors maintain good relationships with health professionals whose approach to patient care differs from their own.	Strongly disagree	Disagree	Somewhat disagree	Neither agree or disagree	Somewhat agree	Agree	Strongly agree
	1	2	3	4	5	6	7

Section V: My Future Medical Practice

21. Indicate your career intentions for the period immediately after you complete your medical education. (Check one)

_____ (1) Full-time academic faculty (teaching, research)

_____ (2) Full-time clinical practice (non-academic)

_____ (3) Part-time academic faculty (teaching, research)

_____ (4) Part-time clinical practice (non-academic)

_____ (5) Other

_____ (6) Undecided

22. Indicate the setting in which you plan to work after the completion of your medical education. (Check one)

_____ (1) Large city (population 500,000 or more)

_____ (2) Suburb of a large city

_____ (3) City of moderate size (population 50,000 to 500,000)

_____ (4) Suburb of a moderate size city

_____ (5) Small city (population 10,000 to 50,000--other than suburb)

_____ (6) Town (population 2,500 to 10,000--other than suburb)

_____ (7) Small town (population less than 2,500)

_____ (8) Rural/unincorporated area

_____ (9) Undecided or no preference

23. Do you plan to locate your practice in a geographically underserved (e.g., rural or inner city) area?

_____ (1) Yes

_____ (2) No

_____ (3) Undecided

_____ (4) Do not plan to do clinical practice

24. When providing patient care, I plan to focus on my relationship with patients.	Strongly disagree	Disagree	Somewhat disagree	Neither agree or disagree	Somewhat agree	Agree	Strongly agree
	1	2	3	4	5	6	7

25. When providing patient care, I plan to focus on the whole person, not just the specific disease.	Strongly disagree	Disagree	Somewhat disagree	Neither agree or disagree	Somewhat agree	Agree	Strongly agree
	1	2	3	4	5	6	7

26. I plan to incorporate some CAM therapies into my future medical practice.	Strongly disagree	Disagree	Somewhat disagree	Neither agree or disagree	Somewhat agree	Agree	Strongly agree
	1	2	3	4	5	6	7

27. I plan to recommend the use of some CAM therapies to my future patients.	Strongly disagree	Disagree	Somewhat disagree	Neither agree or disagree	Somewhat agree	Agree	Strongly agree
	1	2	3	4	5	6	7

28. I plan to discourage my patients from using any therapy that has not been proven to be safe and effective by research.	Strongly disagree	Disagree	Somewhat disagree	Neither agree or disagree	Somewhat agree	Agree	Strongly agree
	7	6	5	4	3	2	1

29. Medical physicians knowledgeable of CAM (i.e., Chiropractic, Acupuncture, Homeopathy etc.), have more satisfied patients than physicians who are not familiar with CAM.	Strongly disagree	Disagree	Somewhat disagree	Neither agree or disagree	Somewhat agree	Agree	Strongly agree
	1	2	3	4	5	6	7

30. Patients whose medical physicians are knowledgeable of CAM (i.e., Chiropractic, Acupuncture, Homeopathy etc.) have better health outcomes than patients whose physicians are not familiar with CAM.	Strongly disagree	Disagree	Somewhat disagree	Neither agree or disagree	Somewhat agree	Agree	Strongly agree
	1	2	3	4	5	6	7

31. Knowledge about CAM therapies will be important to my future success as a physician.	Strongly disagree	Disagree	Somewhat disagree	Neither agree or disagree	Somewhat agree	Agree	Strongly agree
	1	2	3	4	5	6	7

32. The scope of medical practice should include CAM therapies.	Strongly disagree	Disagree	Somewhat disagree	Neither agree or disagree	Somewhat agree	Agree	Strongly agree
	1	2	3	4	5	6	7

Section VI: Student Background and Characteristics

33. Please indicate your gender:

_____ (1) Male

_____ (2) Female

_____ (3) Transgender

34. Race/Ethnicity (Choose the one that most closely describes you):

_____ (1) White/Caucasian

_____ (2) African American/Black

_____ (3) American Indian/Alaska native

_____ (4) Asian American/Asian

_____ (5) Native Hawaiian/Pacific Islander

_____ (6) Mexican American/Chicano

_____ (7) Puerto Rican

_____ (8) Other Latino

_____ (9) Other

35. Before coming to medical school, how much interaction did you have with people in each of the following groups?

		None	Little	Some	Substantial
a.	Asians	0	1	2	3
b.	Blacks/African-Americans	0	1	2	3
c.	Native Americans/American Indians	0	1	2	3
d.	Hispanics/Latinos	0	1	2	3
e.	Whites/Caucasians	0	1	2	3
f.	People with different religious beliefs	0	1	2	3
g.	Gay, Lesbian, or Bisexual individuals	0	1	2	3
h.	Individuals with disabilities	0	1	2	3
i.	Individuals from outside of the United States	0	1	2	3

36. The perspectives of individuals from racial and ethnic groups different than my own were often brought into my undergraduate coursework.	Strongly disagree	Disagree	Somewhat disagree	Neither agree or disagree	Somewhat agree	Agree	Strongly agree
	1	2	3	4	5	6	7

37. My knowledge or opinion of others was influenced or changed by becoming aware of different perspectives.	Strongly disagree	Disagree	Somewhat disagree	Neither agree or disagree	Somewhat agree	Agree	Strongly agree
	1	2	3	4	5	6	7

38. What is your current age? _____

39. Please indicate your current marital status.

_____ (1) Never married

_____ (2) Separated

_____ (3) Divorced

_____ (4) Widowed

_____ (5) Engaged

_____ (6) Married/Domestic Partner

40. Which of the following best describes where you grew up?

     _____ (1) Large city (population 500,000 or more)

     _____ (2) Suburb of a large city

     _____ (3) City of moderate size (population 50,000 to 500,000)

     _____ (4) Suburb of a moderate size city

     _____ (5) Small city (population 10,000 to 50,000--other than suburb)

     _____ (6) Town (population 2,500 to 10,000--other than suburb)

     _____ (7) Small town (population less than 2,500)

     _____ (8) Rural/unincorporated area

41. Please indicate the type of institution in which you completed your undergraduate education.

     _____ (1) Public institution

     _____ (2) Private institution

42. Please indicate your undergraduate major below.
     _____

43. What was your score on the MCAT?
     _____

44. What is the highest level of formal education obtained by your father or guardian?

     _____ (1) Junior high/Middle school or less

     _____ (2) Some high school

     _____ (3) High school graduate

     _____ (4) Postsecondary school other than college

     _____ (5) Some college

     _____ (6) College degree

     _____ (7) Some graduate school

     _____ (8) Graduate degree

45. What is the highest level of formal education obtained by your mother or guardian?

_____ (1) Junior high/Middle school or less

_____ (2) Some high school

_____ (3) High school graduate

_____ (4) Postsecondary school other than college

_____ (5) Some college

_____ (6) College degree

_____ (7) Some graduate school

_____ (8) Graduate degree

46. Regardless of your dependency status, please indicate your parents' or guardian's combined gross income for last year:

_____ (1)   Less than $10,000

_____ (2) $10,000 - $19,999

_____ (3) $20,000 - $29,999

_____ (4) $30,000 - $39,999

_____ (5) $40,000 - $49,999

_____ (6) $50,000 - $74,999

_____ (7) $75,000 - $99,999

_____ (8) $100,000 - $249,999

_____ (9) $250,000 - $499,999

_____ (10) $500,000 or more

Appendix B

Common CAM Therapies Defined by NCCAM

CAM Therapy	Definition
Ayurveda	An alternative medical system that has been practiced primarily in the Indian subcontinent for 5,000 years. It includes diet and herbal remedies and emphasizes the use of body, mind, and spirit in disease prevention and treatment.
Chiropractic	An alternative medical system focusing on the relationship between bodily structure (primarily that of the spine) and function, and how that relationship affects the preservation and restoration of health. Chiropractors use manipulative therapy as an integral treatment tool.
Dietary supplement	A product (other than tobacco) taken by mouth that contains a "dietary ingredient" intended to supplement the diet. Dietary ingredients may include vitamins, minerals, herbs or other botanicals, amino acids, and substances such as enzymes, organ tissues, and metabolites. Under DSHEA (Dietary Supplement Health and Education Act) of 1994, dietary supplements are considered foods, not drugs.
Homeopathic medicine	An alternative medical system based on the idea that "like cures like," meaning that small, highly diluted quantities of medicinal substances are given to cure symptoms, when the same substances given at higher or more concentrated doses would actually cause

those symptoms.

Massage	The therapists manipulate muscle and connective tissue to enhance function of those tissues and promote relaxation and well-being.
Naturopathic medicine, or naturopathy	An alternative medical system that proposes that there is a healing power in the body that establishes, maintains, and restores health. Practitioners work with the patient with the goal of supporting this power, through treatments such as nutrition and lifestyle counseling, dietary supplements, medicinal plants, exercise, homeopathy, and treatments from traditional Chinese medicine.
Osteopathic medicine	A form of conventional medicine that, in part, emphasizes diseases arising in the musculoskeletal system. There is an underlying belief that all of the body's systems work together, and disturbances in one system may affect function elsewhere in the body. Some osteopathic physicians practice osteopathic manipulation to alleviate pain, restore function, and promote health and well-being.
Qi Gong	A component of traditional Chinese medicine that combines movement, meditation, and regulation of breathing to enhance the flow of qi (an ancient term given to what is believed to be vital energy) in the body, improve blood circulation, and enhance immune function.
Reiki	A Japanese word representing "universal life energy," based on the belief that when spiritual energy is channeled through a Reiki practitioner, the patient's spirit is healed, which in turn heals the

physical body.

Therapeutic touch   Derived from an ancient technique, it is based on the premise that it is the healing force of the therapist that affects the patient's recovery; healing is promoted when the body's energies are in balance; and, by passing their hands over the patient, healers can identify energy imbalances.

Appendix C

Barriers and Strategies in Complementary and Alternative Medicine (CAM)

Curriculum Design and Implementation

Barriers	Strategies
Curriculum is too full	Integration into the existing curriculum and embedment within course elements; low-risk/high-success activities with reasonable goals; work on inclusion and presence rather than comprehensiveness; build trust through ongoing discussions with curriculum and course committee members and leaders; find "soft spots," such as EBM and cultural competency, that CAM addresses well.
Dissemination of information about program	Increased visibility, seminars, grand rounds, publications, media, brown-bag lunches; invite skeptical faculty to participate in curricular activities
Faculty lacks familiarity with CAM topics, and CAM faculty are unfamiliar with teaching in academic setting	Faculty development activities, such as mind–body training, CAM "camp," other experiential learning; use of CAM faculty; intramural/extramural research funding; training of CAM practitioners in academic methods and preceptoring; partnership with CAM academic institutions; strong emphasis on evidence-based discussion of CAM topics, particularly essential when dealing with faculty resistance to the topic area
Broad and complex programmatic elements	Leadership development, recruiting of multiple champions; understand and work with institutional dynamics and culture, i.e., personnel changes, attitudes, multiple stakeholders; medical anthropology consultation
Absence of organized information	Provide sustainable, credible, accessible reference resources; use CAM as focus to teach EBM; well developed online modules, Web-based cases, PowerPoint presentations; developed a series of widely distributed CAM educational monographs; Web site development
Sustainability of CAM educational program after funding expires	Leadership, cooperative climate, participation by organization members, politics, human resource development, and ongoing educational evaluation and revisions; institutionalization of curriculum

Appendix D

E-mail Cover Letter - Introduction to Medical Students

You are receiving this email as an invitation to participate in research study.

The purpose of this study is to examine the attitudes of incoming medical students toward complementary and alternative medicine (CAM). CAM includes treatments and healthcare practices not widely taught in medical schools, not generally used in hospitals and not usually reimbursed by medical insurance companies. The project results will help institutions understand and evaluate the CAM related knowledge, attitudes and expectations of beginning medical students and the factors that contribute to these attitudes and expectations. The data gathered from this study will help inform the design of curriculum focused on CAM topics.

This study will also result in a dissertation, a requirement for completion of my doctoral degree.

Your participation is entirely voluntary and you do not have to respond to every item or question. Your responses will remain anonymous and confidentiality will be maintained.

Please respond to this questionnaire with your own views. The survey takes less than 10 minutes to complete and remember there are no right or wrong answers.

Thank you in advance for taking the time to complete the survey.

Appendix E

Letter of IRB Approval – University of Minnesota

UNIVERSITY OF MINNESOTA

Twin Cities Campus	*Human Research Protection Program* *Office of the Vice President for Research*	*D528 Mayo Memorial Building* *420 Delaware Street S.E.* *MMC 820* *Minneapolis, MN 55455* *Office: 612-626-5654* *Fax: 612-626-6061* *E-mail: irb@umn.edu or ibc@umn.edu* *Website: http://research.umn.edu/subjects/*

08/08/2013

Dale K Healey
10017 2nd Avenue South
Bloomington, MN 55420-4913

RE: "Perspectives of Entering Medical Students Toward Complementary and Alternative
Medicine Practices"
IRB Code Number: 1307P38941

Dear Dr. Healey:

The Institutional Review Board (IRB) received your response to its stipulations. Since this
information satisfies the federal criteria for approval at 45CFR46.111 and the requirements set
by the IRB, final approval for the project is noted in our files. Upon receipt of this letter, you
may begin your research.

IRB approval of this study includes the consent form/recruitment e-mail received August 7,
2013.

The IRB would like to stress that subjects who go through the consent process are considered
enrolled participants and are counted toward the total number of subjects, even if they have no
further participation in the study. Please keep this in mind when calculating the number of
subjects you request. This study is currently approved for 230 subjects. If you desire an increase
in the number of approved subjects, you will need to make a formal request to the IRB.

For your records and for grant certification purposes, the approval date for the referenced project
is August 1, 2013 and the Assurance of Compliance number is FWA00000312 (Fairview Health
Systems Research FWA00000325, Gillette Children's Specialty Healthcare FWA00004003).
Research projects are subject to continuing review and renewal; approval will expire one year
from that date. You will receive a report form two months before the expiration date. If you
would like us to send certification of approval to a funding agency, please tell us the name and
address of your contact person at the agency.

As Principal Investigator of this project, you are required by federal regulations to inform the IRB of any proposed changes in your research that will affect human subjects. Changes should not be initiated until written IRB approval is received. Unanticipated problems or serious unexpected adverse events should be reported to the IRB as they occur.

The IRB wishes you success with this research. If you have questions, please call the IRB office at 612-626-5654.

Sincerely,

Christina Dobrovolny, CIP
Research Compliance Supervisor
CD/ks

CC: Darwin Hendel