

A Web-based Clinical Library Service Specializing in Complimentary Alternative Medicine
would Increase Communication among Physicians, Patients, and Therapists

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Abstract

The use of Complimentary Alternative Medicines (CAM) is increasing due to the abundant availability of information about CAM therapies on the internet. As the use of CAM therapies proliferates, physicians must be more knowledgeable about the use of these interventions. CAM therapies may enhance or interfere with some allopathic treatments, but many physicians are skeptical and unfamiliar with CAM therapies; therefore, are unlikely to suggest the use of them to their patients. Consequently, many patients do not tell their physicians about the CAM therapies they are using. One way to change this paradigm is to provide physicians with access to unbiased and trusted resources regarding CAM therapies through a web-based clinical library service. If physicians can quickly access valid, reliable information through trusted online resources, then acceptance, understanding, and the application of CAM therapies is possible in allopathic practices. The acceptance of effective CAM therapies would enhance dialogue between physician and patient as well as between physician and practicing CAM therapist. The potential of CAM interventions to enhance allopathic medicine, especially if they are used synergistically, is extremely promising and could increase the efficacy of both allopathic treatments and the CAM intervention.

Keywords: literature review, CAM therapies, Western medicine, use of CAM therapies, physician attitudes, physician education, Flexner, integrations of CAM therapies, acceptance, trends, clinical librarian, clinical medical librarian

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There is a gap in medicine and it is between allopathic medicine and complimentary alternative medicine (CAM). It began with the American Medical Association¹ (AMA) over one hundred years ago. The AMA is a long standing and respected office and is revered by the medical community. Established in 1847 by Nathan Davis Smith "to elevate the standard of medical education in the United States" and is considered the largest medical association in the United States. The AMA set standards for medicine and pharmaceutical/drug manufacturing as early as 1849. The founding meeting of the AMA consisted of 250 delegates from 28 states and was held at the Academy of Natural Sciences in Philadelphia, Pennsylvania.

In 1904 the AMA created the Council on Medical Education to develop and establish standards and policy on medical education. Not only did the council review and recommend medical education standards, they ensured the public had access to qualified physicians. In their endeavors to institute educational standards for medical schools, the AMA established the following grading system: A-acceptable; B-doubtful; and C-unacceptable. The criteria for these standards were part of the *Medical Education in the United States and Canada: a Report to the Carnegie Foundation for the Advancement of Teaching* - also known as the *Flexner Report*.

Published in 1910, the Flexner Report was the culmination of an investigation of 160 medical schools in the United States and Canada (Flexner, 1910). Abraham Flexner was an educator with an established reputation for scholastic expertise. Flexner was enlisted and financed by the Rockefeller and Carnegie foundations and endorsed by the AMA to evaluate the

medical schools in the United States and Canada. According to Duffy (2011), who analyzed the effects of the Flexner Report on medicine today, it “transformed the nature and process of medical education in America...” (p.269).

Flexner (1910) stated in his report that “the proposition raises at once the question as to whether in this era of scientific medicine, sectarian medicine is logically defensible... Sectarrians, in the logical sense above discussed, are (1) the homeopathists, (2) the eclecticists, (3) the physiomedicalists, (4) the osteopaths” (p.158). Flexner believed that these practices and the schools that taught them did not meet the criteria sanctioned by the AMA. He also believed that the entrance requirements and educational standards of these sectarian schools were not high enough.

The Flexner Report resulted in the elimination of non-science based practices in American and Canadian medical schools. Many practices in these schools were unorthodox, harmful, and unethical; however, among them were traditional practices that had been validated historically and had been used successfully in other cultures for centuries (i.e., the herbalism of Native American, Chinese and Ayurvedic traditions). Flexner changed the face of today’s medical practice by promoting research and evidence based medicine (EBM) above other sources of care. Not only did the Flexner report remove traditional agendas, but ensured that medical education was cutting-edge science. In the search for science and validation, medical schools and practices lost sight of patient care in the pursuit of medical research. The consequence of Flexner’s report is one hundred years of evolution that has become our Western medical profession today (Duffy, 2011).

This evolution of scientific study has advanced medicine in many ways, but it also removed some valid and time-tested traditional medical practices, because they could not be proven in a laboratory. As the promotion of science and research became a priority, medical

practices became more about experimental research rather than clinical care. Many practices and schools chose alternative interventions and lost AMA endorsement due to the rigid constraints in the Flexner Report.

Chiropractors were among those who voiced the most vigorous objections (Jenik, 2014), because they believed the new admission standards would eliminate practitioners that could not afford the costly higher educational standards endorsed by the AMA. They chose not to affiliate with the AMA because they did not agree with AMA standards or their practices. In their study of the Flexner Report, Stahnisch and Verhoef (2012) made the following comment of the change in the current paradigm that Flexner's report had established:

“We increasingly recognize today that treatment is not an isolated event in patients' lives, but it takes part in the patient's own bio-psycho-social context, which includes social networks, patients' subjective experiences, and their mental health status, along with the patient provider relationship (a system). These elements are crucial to testing an intervention, as a patient is not an average patient, with average beliefs, devoid from any contextual influences” (p. 8).

Through his study, Duffy (2011), revealed the rift that has been growing between allopathic practitioners and CAM practitioners since Flexner presented his findings. The Flexner Report also elevated physicians to a place of absolute authority in patient care, because science became the supreme power in all things medical (Goold, Lipkin, 1999). This ideology also removed the patient's responsibility over their own health –who is going to argue with a doctor whose education and expertise are years beyond the average person? Today patients are learning to examine their physician's recommendations and assume responsibility for their own health by communicating their opinions about suggested treatments to their doctors (Hixon, 2015).

Effective communication is an issue for doctors, patients, and CAM therapists. Most patients do what the doctor says and active communication is not practiced by either physician or

their patient. “[At the turn of the 20th century], advances in medical science now began to change the healing landscape. No longer just rhetoric, regular medicine had new tools and knowledge at its disposal that offered a tangible hope of healing. Americans did not lose their attachment to self-reliance, but many problems now seemed bigger than any one individual could possibly grasp through common sense alone. In this culture, expertise became a trait of increasing popular value” (Janik, 2014, p.45). This is not solely the physician’s fault, but the evolution of our medical culture (Choudhry, Fletcher, Soumerai, 2005).

Today, medical information is easily accessible through the internet and the numerous self-help health books on the market, more patients are finding their own answers and coming up with their own treatment options. Unfortunately, many patients do not communicate to their physicians about the alternative interventions they are incorporating into their medical treatment (Cowan, 2014). It now behooves the physician to learn about the therapies and treatments their patients may be using on their own. Additionally, there is very little communication between CAM therapists and physician. The language of medicine is evolving to promote communication between physician and CAM therapist and to accommodate patient needs and demands. For example, the term CAM is changing to the term integrative medicine. The term integrative medicine has fewer negative connotations to allopathic physicians than the word alternative. Alternative implies it is not a complimentary treatment, but something to be used in place of the standard allopathic treatment. This may be one reason for some of the hostility and distrust between physicians and CAM therapists.

The change in language better illustrates the true nature of CAM, which is to heal both mind and body (Chopra, 2011). Effective communication is a crucial start to the healing process by establishing an environment of cooperation and trust. In order to facilitate this evolution into a

new paradigm, there has to be an open and reliable exchange of information between physician and CAM therapist. A web-based clinical library service can be the instrument that facilitates that exchange.

This study will ascertain that there is a need for physicians to access reliable data about CAM therapies complimented with the need to effectively communicate that knowledge to their patients. This study will also illustrate that the more physicians know about CAM therapies, the more accepting they can be of their patient's use of those therapies (Page, 2013). The ultimate goal of this study is to propose a web-based clinical library service. A web-based clinical library service will provide a platform for accessing reliable studies on CAM therapies and would encourage dialogue between patients and physicians.

Methods

The literature for this study was retrieved from LIRN, Wiley, NCBI and Springer through keyword searches in Google Search and Google Scholar. The studies chosen had to meet several measures. They had to be free, accessible to the public, and from a scholarly source. Dates of the studies were within the last ten years unless the study had continued significance in today's medical climate. Each study was selected for its relevance and support of the statements in this document. The studies chosen will show trends in CAM therapies that establish a growing use and accessibility of these therapies. These studies will also illustrate the tenuous relationship between allopathic physicians and CAM therapists and explore what physicians think about incorporating CAM interventions into their treatment plans.

Key word searches were done on both Google Search and Google Scholar. Depending on the key words used, Google Search results often referred to the same results found on Google Scholar. Google Search also listed many of the same databases that Google Scholar had listed. The studies found through these search engines were listed in the various medical databases

stated above. Many times the only difference between using Google Search and Google Scholar was Google Scholar does not provide web-based businesses, products, or advertisements. It should be noted that when a document required a fee on Google Scholar, it was often accessible without cost on Google Search when the title was copied directly into the search box.

Results

Studies Used for Scholarly Presentation

More than 106 articles were reviewed through the various key word searches. Out of the 106 reviewed 43 were chosen based on the following criteria: lack of bias, relevance, date, and accessibility. There was also an aspect of intuitive searching, where the search phrases, words, and parameters were modified slightly to find a more refined result. The study topics and the number of studies found for each topic are as follows:

<u>Topic</u>	<u>Number of Studies Used</u>
1. Physician's interest in CAM	10
2. How physicians search for answers	4
3. Patient - physician relationship	3
4. Flexner Report	4
5. Acceptance and learning	6
6. Time Management	5
7. Trends in medicine	5
8. Clinical librarianship	6
Total	43

While most of the studies listed, originated from the combined sources of LIRN, Wiley, NCBI and Springer, there were other singular sources such as the American Medical Association website, the Association of American Colleges, Medical Librarian Association, various university resources and 4 hard copied books (2 historical, 2 technical). In addition to the standard scholarly allopathic medical sources, scholarly CAM sources were used as well, such as: Evidence-Based Complementary and Alternative Medicine, BMC Complementary and Alternative Medicine, and the Journal of Alternative and Complementary Medicine.

Search Criteria for Other Web-based Clinical Library Services

To discern whether or not there were other services similar to a web-based clinical library service specializing in CAM therapies, two searches were performed. The first search used the phrase *medical literature review service* typed into the search line on Google. That phrase was chosen because it was the best description of the proposed service. The second search phrase was *alternative medicine literature review service*. The phrase *alternative medicine literature review service* provided literature reviews already completed for specific CAM therapies.

The initial search of the phrase *medical literature review service* entered into Google Search produced 41.9 million results. The results are discussed below. Google Advanced Search using “exact phrase” was queried and produced 113 results for the same phrase. The results consisted of paper writing agencies for students, there were no literature review or library services. When Google Scholar was used, the resulting search revealed completed literature reviews and instructions on how to do a literature review, but no literature review or library services.

The terms *web-based clinical librarian* and *clinical librarian (CL)* were also used to find other web-based clinical library services. When these terms were used, the ensuing outcomes only resulted in schools of library science and studies based on clinical librarianship. While it was not possible to search every page of results retrieved, up to 10 pages of results were viewed with no web-based clinical library services specializing in CAM therapies were found.

When using the internet to gather data, any term typed into the search box will generate a vast assortment of data. Several parameters were adjusted to focus the results –“verbatim”, “date updated”, and “exact words”. The results listed were those that came up consistently with each parameter. The top 7 results for the term *medical literature review service* typed into Google Search are listed below:

1. **University of Colorado Health Sciences Library** offers a Professional Literature Search Service for anyone with: an initial meeting in-person or by phone; a list of citations with abstracts in various formats including Endnote, Endnote Web, RIS, or Word; search strategies for each database; a brief description of the literature search methodology for the publication; and a flow chart with retrieval data as recommended in the PRISMA Statement. This was the most comprehensive service. <http://hslibrary.ucdenver.edu/prof-lit-search/#services>
2. **InvoHealth** is a literature search service began in 1999 as a group of college students in 1999 that offered a variety of search services for anyone. Their literature search provides: a list of publications on the topic of your choice and they review the full-text of publications and find the exact phrase specific to the request. According to their webpage, they have experience with 150 databases and medical literature search engines. <http://www.invohealth.com/>
3. **University of MN** will do literature searches for students and faculty only. <http://hsl.lib.umn.edu/biomed/services/reference/literature>
4. **School of Clinical Medicine, University of Cambridge** has a database of medical literature, but does not search it for you. <http://library.medschl.cam.ac.uk/resources-training-support/databases/>
5. **The Royal Society of Medicine** will do literature search for members only. <https://www.rsm.ac.uk/library/services/literature-search.aspx>
6. **SciCentral: Search the Scientific Literature** will provide a list of open access search engines and databases that you can search through on your own, but does not perform any type of review or search for specific articles. html <http://www.scicentral.com/Y-litera>

7. **Theranaturals** is an online company for herbal supplement and essential oils. The company also provides “Expert Medical Literature Research and Consultation Service”. Their service is the closest to the proposed project. The only drawback is that they also sell products and which may create a bias towards the use of their products.

<https://www.theranaturals.com/research-/11-literature-search.html>

When the words *alternative medicine* were added to the term *literature review service*, the results showed only literature reviews. This search did not find other sites that offered literature searches specific to CAM therapies, only items 1, 2, and 4 from the previous search were repeated. That is not to say that the above services would not search CAM therapies, but they must be knowledgeable of the terms used in CAM interventions. For instance, when the kidney is referenced in Traditional Chinese Medicine it is referring to the primordial yin (water) and primordial yang (fire) of the body and regulation of the internal *chi*. When the yin or yang is out of balance, it requires a treatment representing the opposite of what is manifested to restore balance to the internal *chi* (Joiner, 2001). This demonstrates that an understanding and knowledge of a broad range of CAM interventions is necessary.

Search Criteria for Clinical Librarian

To show how an understanding of library practices applies to the proposed web-based clinical library service, the search performed on Google Scholar using the term *clinical librarian* also demonstrated the role a CL plays in medical research. The role of the *clinical librarian* was used because that is the primary service that the proposed website will provide. The CL specializes in medical information, database, and internet research. They are usually found in hospital or academic settings.

This paper intends to demonstrate that a web-based clinical library service specializing in CAM therapies can provide both the research skills and the language needed to accurately search

and evaluate the data requested. In addition, the web-based clinical library service is accessible to anyone who needs answers, not just universities and hospitals. The web-based clinical library service can be a tool for a greater acceptance of the CAM interventions that patients are seeking and using. Patients are already using CAM therapies, creating a need for their physicians to learn more about those therapies. The web-based clinical library service would provide an avenue to access pertinent data on those CAM therapies.

Discussion

Evaluation of the Literature Search Services

The services listed have several advantages: they are already established to produce medical literature reviews; their library collection has had time to accumulate reviews; they have more than one experienced bibliographer or researcher that can provide a timely turn around; and they have access to a great many resources, especially university services. Their disadvantage is their lack of specificity. The advantage of the proposed web-based clinical library service is that it is specific to CAM therapies. Based on internet searches for other web-based clinical library services there does not appear to be any web-based clinical library services that specialize in CAM therapies.

The comparison of other literature review services has evidenced the need for a web-based clinical library or literature review service specific to CAM therapies. When Google Search engine is used to search for lavender essential oil, the resulting data not only contained 1.54 million results consisting of producers of CAM products and therapies, but also *advertisements* for CAM products and therapies; very little scholarly data was found. When the same term is used in Google Scholar with the added filter of *articles from 2011*, there is still an abundance of data; 9,860 articles most of which may not be available to the searcher. This can

discourage the most intrepid investigator. Only an experienced researcher will know which search results to use and will have access to most of the data included in the results.

Required Skills

There is skill and expertise for knowing where and how to search for specific information (Coumou and Meijman, 2006). Only using key-words can generate overwhelming results. The lay person does not always have a full understanding of the topic or the technical language required of a scholarly search, and a physician does not need to see advertisements for the CAM products they are researching. However, both scholarly and non-scholarly searches can be beneficial for accessing current pertinent information on CAM therapies. Experience in database and search engine queries, requires more than entering a simple word or phrase into a search line. It also requires the ability to quickly assess the needed data generated from a query that produced millions of results (Perrier et al, 2014).

Accessing that data in a timely manner requires an understanding of the search objectives, and the query must be tailored to very specific parameters. However, no matter how carefully the query is tailored, there will be an overabundance of data. The CL must have the ability to decide which articles are worth assessing. It is important to keep record of trusted sites, to know when to pay for an article, and determine whether the abstract will provide the data required; sometimes the method and discussion sections are not relevant and only the outcome is needed.

As stated above a knowledgeable CL will need to use a certain amount of intuition when performing a search. Initially, they will know by the results of the first search if the parameters are correct. There are, however, some basic tips and tricks to internet searching. The Tech-Republic website gives 10 tips for searching the internet (see Table 1). While these tips might

narrow the parameters, an understanding of how those parameters would affect the results of a search is a practiced skill that requires familiarity with the subject and search engines.

The CL that specializes in CAM therapies would have both the skills to search the internet and the knowledge of CAM interventions. Understanding CAM therapies would allow the CL to discern the difference between a homeopath and naturopath. The subtleties of the language of these therapies can make the difference between finding valid data and obscure references. For instance, if the therapist is looking for an antiviral and it says germicidal, viruses may or may not be included in that term. Vague or ambiguous terms like antimicrobial, germicidal, microorganism or pathogenic should not be used. They may or may not be inclusive to what is being removed, prevented or killed.

According to Morton's article for TechRepublic (2011) "The Internet is the great equalizer for those who know how to use it efficiently... [However] never underestimate the power of a skilled search expert" (p. 2). The CL is a search expert by trade and training. However, Morton's premise that "anyone can now easily find facts using a search engine" does not seem very plausible given the fact the average user needs to know how to search the internet effectively.

Based on the 10 tips Morton (2011) listed, searching the internet can become quite complex and can more often be a source of frustration rather than a source of information. That can be seen by the number of sites that offer instruction on how to search the internet. Merely typing in the phrase "Internet searching techniques" in the Google search line produces more than 118 million results. The information is there, but the stifling number of results for each query can be intimidating and overwhelming, especially when one is seeking a simple answer.

The CL is a specialist that can find the simple answers and can customize the answer to the audience that is receiving it. The lay person may not be interested in the technical aspects of

a study and may only want the simple answer from a qualified source. The physician and CAM therapists usually want more technical details about how the study was comprised.

Clinical Medical Librarian/Clinical Librarian

In an editorial by Lipscomb (2000) the historical role of a clinical medical librarian (or CL) was discussed. The efforts to establish a CL was the concept of Gertrude Lamb. The University of Missouri-Kansas City was where Lamb established the first CL program in 1971 (Lipscomb, 2000). Lamb also presented her program at the Medical Library Association's (MLA) annual meeting in 1975. During its evolution, some hospitals allowed the CL to follow physicians and other medical staff on their rounds. This enabled the librarians to anticipate the questions medical staff might have.

As hospital budgets have been reduced, the number of CLs was also reduced. Despite - the hospital's' reduction of CL programs, the CL still plays a significant role in medical research "and are capable of managing information needs in a manner that cannot be duplicated or replaced by any other source" (Lipscomb, 200, p. 394). While the role of the CL in a hospital setting has been downgraded, there is an established core curriculum, in some schools of library science, for those that want to pursue a career as CL. Unfortunately, there are few schools that teach clinical medical librarianship. It is a specialized field and is not taught in all schools of library science. The curriculum is based on standard medical practices, but does not include CAM therapies. According the *US News and World Report* 2013 Education Ranking, only seven out of 50 top schools of library science offer a health librarian option.

Based on their study, Perrier et al. (2014) "Librarian-provided services directed to participants in training programs (e.g., students, residents) to improve skills in searching the literature to facilitate the integration of research evidence into clinical decision-making. Services provided to clinicians were shown to be effective in saving time for health professionals and

providing relevant information for decision-making” (p. 1118). These services are being underutilized as evidenced by the lack of courses available in clinical librarianship. In their search for studies that provided CL services, Perrier et al. (2009) found there were no studies that showed CLs providing research data directly to clinicians and patients, they only found studies that provided research instruction to users.

While the internet has made information and data readily available, data retrieved regarding CAM therapies is often little more than a bibliography of articles and books that may or may not answer a researcher’s question. It takes time and effort to find data on a specific topic. A CL will sort through relevant topics, review the data and provide a summary of what was found. The CL is an expert with the correct experience and training to find the correct documentation for the query submitted.

In a bibliography of CLs, the Library of Congress (2013) “suggest that clinical librarians’ detachment from direct patient care enables them to provide objective analysis to clinical-care teams” (p. 19). This bibliography chronicles the history of the CL and discusses the considerable debate over CL’s role and utilization. There is argument over whether the CL needs to be part of the treatment team or employed only as information specialists that provide easy access to needed information.

A good CL will have the vocabulary and a thorough understanding of the subject they are defining. For instance, knowing the difference between holistic, complementary, alternative, and integrative medicines can make a difference in the information retrieved from a search (Mandel, 2009). This is why the proposed web-based clinical library service would focus on CAM therapies. A service that has a qualified librarian can review the literature and relay pertinent information that answers the question asked instead of only providing a list of citations.

The studies accessed and reviewed demonstrates that a need to access reliable, unbiased data, through credible resources, is critical for physicians today. Many physicians do not speak the language of CAM therapies nor do they possess the skills needed to find reliable data through internet searches. A web-based clinical library service that specializes in CAM therapies can assist physicians in finding answers to their questions about CAM treatments. It can also nurture a greater degree of communication not only between physician and patient, but between physician and CAM therapist by providing easy access to relevant data.

As part of this study, a demonstration of the data a web-based clinical library service can retrieve will be in the form of three literature reviews on three different topics presented in appendices² A, B, and C. The literature reviews will show the end product a web-based clinical library service can produce to answer questions quickly and easily. It will also demonstrate the importance of having a strong knowledge base when searching for the correct data and an understanding of the data retrieved. Searching the internet for specific answers requires extensive researching skills, and the final products presented in this study will demonstrate that expertise.

The need for a Web-Based Clinical Librarian

Increased Use of CAM therapies. The Center for Disease Control (CDC) and the National Health Statistics Reports (NHSR) show that 34 percent of adults in the United States use some form of CAM treatment in 2012 (Clark, 2015). The CDC and NHRS survey included various forms of alternative medicine from herbal supplements and probiotics to yoga and chi gong. They surveyed people from ages 18 to 65 and older and discovered that younger age groups tend to use more alternative therapies than older adults. This is an indicator of a continued increase in the use of CAM therapies.

The World Health Organization³ (WHO) reports that approximately 80 percent of the world's populations rely on traditional medicines, mainly from herbal sources, in their primary healthcare. The WHO defines traditional medicine as “the sum total of the knowledge, skills, and practices based on the theories, beliefs, and experiences indigenous to different cultures, whether explicable or not, used in the maintenance of health as well as in the prevention, diagnosis, improvement or treatment of physical and mental illness.”

In another study, Frass, et al. (2012) performed a meta-analysis of 16 studies on the use of CAM therapies. Their study demonstrated varied uses based on culture, age, gender, and education to be from 5 percent to nearly 75 percent of each cohort studied. They found that German speaking persons showed a preference for homeopathy and acupuncture. Their study showed most users were middle aged, educated women. Medical students were the most critical of CAM therapies. Common ailments for CAM therapies were back pain, insomnia, migraine, headache, and digestive issues. Chiropractic manipulation, herbal medicine, massage, and homeopathy were the most common CAM treatments used.

There are many reasons patients choose CAM therapies. According to Perlman (2014) CAM therapies have achieved a great public awareness; the therapies are noninvasive, less expensive than prescription medication, and do not require a prescription. Many CAM therapies offer temporary and sometimes permanent relief for chronic conditions without prescription medication or invasive treatments. The CAM therapist may spend up to two hours with their patients asking them about diet, lifestyle, and family medical history (as far back as they can go). Some may even want to know if the patient is right or left handed (Gray & Orrock, 2014).

The detailed exam creates an environment of care and concern. Many CAM therapies use hands-on treatment methods such as chiropractic care, massage, acupuncture, and Reiki. These interventions promote an intimate relationship between practitioner and patient. CAM

therapies view all of the body's systems as working together to maintain balance. CAM treatments do not isolate one area of the body, but incorporate all the body systems into the treatment (Mandel, 2009).

Another reason CAM therapies are gaining in popularity is that CAM supplements, vitamins, and herbs are considered dietary supplements by the Food and Drug Administration and not regulated like pharmaceuticals are. While this may be convenient, there is a misconception that if it is natural it cannot harm you. This can be a dangerous assumption when drug-herb interactions are possible and little communication exists among physicians, patients or CAM therapists (Perlman 2014). This issue creates another endorsement for a web-based clinical library service that specializes in CAM therapies. It can assist physicians in learning about possible drug-herb interactions which they can then communicate that to their patients.

Research Requires Time. Physicians may have serious time management issues because of “the increased costs of operating a practice, time-consuming regulatory burdens, and hassles with getting paid by insurance companies” (Terry, Ritchie, Marbury, Smith, and Pofeldt, 2014). These are a few of the challenges physicians face today that Terry et al. (2014) list in their 2014 article for Medical Economics. Alper, et al. (2004) examined how much effort is needed to keep up with relevant literature. This can be a complex and time consuming process for a busy physician as shown in their list of “341 currently active journals with 8,265 articles [it] would take an estimated 627.5 hours per month to evaluate these articles” (Alper et al, 2004). Even though this study examined only epidemiologist literature, it is a significant example of the plethora of information a physician would have to review just to stay current.

According to Almberg (2014), over 16 percent of a physician’s day is spent on administrative duties. The data he reviewed showed over 20 percent is spent on administrative duties if those physicians use only digital data. While digital data can be useful, doctors still

appear to be “drowning in paperwork”. This article also showed physicians in groups of 100 or more actually spent more time on administrative work than those in smaller practices (Almberg, 2014).

In Almberg’s article for the *Physicians for a National Health Program*” (2014) “the more time doctors spend on such bureaucratic tasks, the unhappier they are about having chosen medicine as their career” (p.1). In addition to being unhappy, a study by Ruitenbunrg, Frings-Dresen, and Sluiter. (2013) concluded “exposure to several physical job demands that are perceived as uncomfortable and exhausting and the presence of physical health complaints reduce surgeons’ work functioning”.

Illness and disability can be one more demand on a physician’s time even though it is not mentioned as a time constraint, a health issue it can represent a significant loss of time. Discontent and stress can also be great consumers of time, health, and productivity Ruitenbunrg et al. (2013). A person who is unhappy in their job is not going to be as productive as one who is happy. While health and being happy in their career can be important time factors for physicians, these issues are too complex to go into detail about in this study, but they are worth mentioning.

The importance of time management cannot be ignored especially when running a business. Terry et al (2014) conducted research to provide a business prospective as an article for *Modern Medicine*. They used other resources and studies to show 15 reasons why a physician’s time is being used as it is and how it can be managed. Some of these issues dealt with staying current on medical information either for patient care, or maintaining current certifications.

Alper et al (2004) emphasized a clinician’s need for timely “access to relevant evidence when clinical questions arise”. The goal of their study was to show a need for more sophisticated searches than just evidence-based medicine (EBM) searches. An EBM search can

generate thousands of records. A time strapped physician does not have enough resources to read through thousands of titles yet alone the articles. They concluded that “more comprehensive and systematic literature surveillance efforts are needed” (Alper, 2004, p. 436)

A physician’s time is a valuable commodity and as Almberg (2014) suggested time used for duties other than patient care and treatment will result in job dissatisfaction. There is considerable data available to help them become better informed; however, finding the time to access that data is often an overwhelming obstacle and accessing the data can be just as daunting. Alper et al (2004) proposes there is a need for a “systematic literature surveillance process” that can filter out thousands of records that result from a typical EBM search. There is so much information available, but there is no easy way to sift through the amount of valid data.

The complexities of a medical practice, whether it is a private practice or a health maintenance organization (HMO), can consume considerable time and effort to keep up with the daily obligations. When all the requirements for maintaining the practice have been achieved, there is little time for additional research or understanding of new treatments or therapies. Time management and a reduction in administrative duties is critical as is a way to find and access timely information for physicians to remain informed and inspired to treat and heal.

Attitudes and acceptance. Nadelson and Sinatra (2009) suggest that learning is an “evolved ability” and can be a foundation for cognitive biases that hinder acceptance of ideas that are different from “intuitive biases” that our culture and genetics have established. While these may have been useful in a survival sense, it may interfere with learning new ideas that may be in contradiction to these biases. It is possible that physicians may have an unconscious resistance to new ideas such as CAM therapies because they may seem unsafe on an intuitive or primitive level.

Nadelson & Sinatra (2009) propose that learning has an evolutionary or instinctive side that may have more influence on some more than others. Resolving the issue of resistance is understanding the difference between acceptance and knowledge. They demonstrated the blurred line between knowledge and acceptance in their study of the acceptance of the theory of evolution by educated professionals. They found that many did not recognize the difference between acceptance of the theory of evolution and knowledge of the theory of evolution, but how it was taught or promoted was very different between those that knew about evolution and those that accepted it.

Knowing something not the same as accepting it. Exposure to new ideas may bring awareness, but acceptance has to come from a deeper level of the human psyche. To reach that level, there must be a way to get beyond the intuitive bias. Fear of the unknown, fear of reprisals, fear of ridicule and fear of being ostracized are also barriers to accepting new ideas. As new ideas become mainstream, some of those fears resolve themselves as the unknown becomes known (Nadelson & Sinatra (2009). While some may never accept the concepts of CAM therapies, they are becoming more common and less of a novel idea.

Science is not a static entity, there are continual ideas and theories that change current paradigms. Medicine is no different and even though many CAM therapies are not new, they are new to today's current medical standards. In their study of age and acceptance of new ideas, Packalen, & Bhattacharya (2015) state, "Transformative science thus requires considerable tolerance toward the testing of new ideas. This tolerance must extend beyond the scientist who came up with the new idea to other scientists in the field who are willing to lend their time and expertise to trying out the idea" (p. 1).

If physicians were more familiar with CAM therapies, they would be more comfortable discussing them (Gray and Orrock, 2014). Getting reliable data in order to become more knowledgeable about a CAM treatment can make talking about it easier. If patient asks their physician about aromatherapy and their physician doesn't know anything about it, the physician is not likely to be comfortable discussing it with their patient. If a physician can learn about aromatherapy from a reliable unbiased source, they will have the knowledge base to discuss it comfortably with their patient (Howell, 2012).

In the *AMA Journal of Ethics*, Deepak Chopra (2011) describes the relationship between CAM therapists and allopathic medicine as a 'mood of expanded tolerance' with "science serving as the mediator". The expanded tolerance comes from exposure and a physician's need to know what other therapies their patients are using. The scientific mediator is the evidence that CAM therapies are working. It is seen in the acceptance of such therapies as massage, nutrition, acupuncture, and yoga/mediation in mainstream hospitals and HMOs (Page, 2013).

One advantage CAM therapies have over allopathic medicine is the individualized care a patient receives from their CAM therapist. The relationship a patient has with their CAM therapist is more intimate than the one they share with their physician (Chopra, 2011). Choudhry, Fletcher, and Soumerai (2005) discuss the changes in medicine over the past several decades, such as how evidence-based medicine, quality assurance techniques, disease management, and performance evaluation are all being used more often by younger less experienced physicians than older experienced physicians. This suggests younger physicians may be more receptive to new ideas.

Wahner-Roedler, et al (2006) studied physician's attitude and knowledge of CAM therapies at the Mayo clinic in Clinic in Rochester, MN. They conducted a web-based survey of 660 internists at the clinic in 2004 asking them a series of questions such as:

- What level of evidence it would take for a physician to incorporate CAM therapies into their practice?
- Would they refer a patient to CAM therapist?
- Did they think incorporating a CAM therapy would have positive outcome to their treatment?

What the survey questions revealed was that most would like to incorporate CAM interventions into their treatment, but no therapists were available; however, they were not comfortable discussing it with their patients. Communication between physicians and patients about CAM became an obstacle.

In 2012 Wahner-Roedler et al. repeated their 2004 survey of 660 internists in the Mayo Clinic in Rochester MN. There were 188 responses in 2004 and 233 responses in 2012. Overall, the responses to the survey questions about knowledge and acceptance of CAM therapies was more positive in the 8 years since the first survey. Based on the responses to their survey Wahner-Roedler, et al (2013) advocate that "evidence based information [needs to be] easily accessible to physicians so they can guide and advise their patients about the complex topic of CAM".

It is interesting that, India, a country that has one of the oldest forms of traditional medicine has issues of accepting CAM therapies today. In India, common CAM therapies are not part of the conventional medical curriculum in standard Indian medical schools even though Ayurvedic treatments have been the hallmark of the traditional medicine of India for thousands of years (Roy, Gupta, and Ghosh, 2014). However, Roy et al. (2014) also suggest the need for

educating standard practitioners in CAM modalities. This demonstrates that the growing use of CAM therapies without a physician's endorsement is not just a local issue, but a global one.

Physicians and Electronic Data. As common as the internet is, it is often underutilized and can be intimidating to use due to the incredible amount of information in which users are inundated (Morton, 2011). This can be a time constraint for busy physicians. In the U.S. there is a proposal called *Healthy People 2020* it “emphasizes equitable access to health information and improved health communication as key strategies for bridging health disparities and consequently, for improving health outcomes” (Lustria, Smith, and Hinnant, 2011, p. 3). This program has set aside \$38 billion through 2020 for healthcare information technology.

According to Lustria et al. (2011) physicians are going to have to access the internet for information, because their patients are being encouraged to use the internet to bring their own information to their office visits. In an article for PM360 (a pharmaceutical marketing magazine), Mcdonough (2015), observed 16 physicians over 4 different specialties and found that “doctors love effective information compartmentalization. For example, providing separate links to disease, diagnosis, treatment and side effects ensures that MDs get only what they need at the time of their search. Time is money” (p. 1). While this was not a substantial cohort study, it does reinforce the evidence of Lustria et al.'s (2011) study that physicians do need easy access to information on the internet.

Physicians are using the internet more and more as a source of information in addition to peer consultations and printed material (Coumou et al., 2006). The internet is becoming a necessary tool for physicians as patients increase their use of data available over the internet. There will be an increased need for data sorting and compartmentalization to give physicians timely access to the information they need. A web-based clinical library service will be an avenue to facilitate the transition to electronic data gathering, storage, and retrieval.

Doctor-Patient Relationship. The relationship between doctors and their patients has been a topic of discourse since Hippocrates. It is the foundation of a healthcare system and the basis of healing (Goold, & Lipkin, 1999). This relationship requires communication and trust. Part of that trust is being open and receptive to the discussion of integrative or CAM therapies. It involves an understanding of other therapies and being nonjudgmental about their use. When there is no judgement, the treatment is open to discussion (Cowan, 2014).

Patients who use alternative therapies are not likely to discuss it with their physician. These patients believe their “[western] doctors are unaware, inappropriately skeptical, or simply arrogantly biased when it comes to implementation of non-Western approaches” (Cowan, 2015, p. 1799). There are some physicians who will recommend or incorporate a CAM intervention into their treatment. Cowan (2015) suggests around 20 percent of head and facial pain practitioners were willing to explore CAM therapies with their patients. Approximately 90 percent of the facial pain practitioners surveyed in the study inquired about CAM therapies their patients may be using. Unfortunately, up to 50 percent of those patients that use CAM treatments did not tell their physicians. Cowan (2015) cites a failure to communicate as physicians have neither the time nor inclination to become accomplished in other therapies.

According to an Australian study, Singer and Adams (2014) suggest healthcare managers may be in the position to “ensure effective integrative healthcare services”. Healthcare managers who were trained in CAM treatments describe complimentary alternative medicine as not “being just about relaxation, it is about affect regulation ... it can offer relaxation, but it can also activate and engage the body in a different form of healing. CAM fills gaps in the standard treatment of chronic illness by treating the whole body” (Singer & Adams, 2014). The endorsement of Cam therapies has to come from all levels of healthcare in order to effectively incorporate them into a treatment plan.

Communication. In her editorial, Srivastava (2015), an oncologist, asks the question, “What do doctors say to 'alternative therapists' when a patient dies?” This was not a positive endorsement for CAM therapies, but her experience with CAM therapists had tragic ends due to false claims and distortions of what the therapy can do. Nevertheless, Srivastava goes on to suggest “perhaps this would make it easier to follow their advice, if doctors familiarized themselves with the various forms of complementary and alternative medicines.” This would help the physician understand what their patient is doing and may be able to help the patient make a more informed decision. They do not have to prescribe it or practice it; they need only to be aware of and learn enough about CAM interventions to understand how they work. This can be critical to patient care.

The lack of communication between CAM Therapists and physicians also needs to be addressed. There are many reasons for this lack of communication: lack of awareness, uncertainty, lack of understanding and knowledge, lack of evidence, unwillingness to change, arrogance, fear, lack of trust, and intimidation on both sides. These reasons come from the current paradigms that influence today’s healthcare system. There is a need to introduce physicians and CAM therapists to each other and cultivate trust in each other to see to the common good of their patient.

In 2001, Owen, Lewith, and Stephens questioned whether or not physicians could answer questions about CAM therapies their patients might ask. They propose that “practitioner's values and personal theories translate through practice into the external theory of a profession” (p. 156). This can manifest in apathy or lack of interest in alternative interventions. However, when a patient decides to use CAM therapies, the physician almost has no choice, but to learn about that treatment if they are to effectively care for their patients.

Access to reliable data on CAM therapies can help generate communication through knowledge. Providing a service that allows questions to be answered without judgment and with anonymity can create a safe environment to increase familiarity of something unknown. This can solve many communication issues by eliminating the fear of not understanding or not knowing. The web-based clinical library service can create that environment.

Conclusion

American medicine is a work in progress. It grew from the roots of many cultures as settlers, pioneers and indigenous peoples brought their home remedies and versions of healing arts to this country. Early settlers relied on family and local resources for their medical needs. Early physicians only performed aggressive lifesaving measures and they were few and far between (Colter, 1982). As America expanded, so did medical practices and medical schools and many were unregulated with no consistent curriculum. By the 19th century, most medical education was taught in trade schools (Janik, 2014). A hundred years later the AMA had standardized medical education throughout the country by endorsing the Flexner Report.

Duffy's analysis of the effects of the Flexner Report suggests the standardization was beneficial in many ways as it protected the public and potential students of medicine from the frauds and charlatans that professed to teach medicine, but were merely profiteers taking advantage of public trust (2011). The standardization of medicine also removed viable traditional and local practices that were taught by those who valued tradition and sanctioned healing through a holistic approach. These traditions continued, but were not recognized by the AMA. Many such practices went "underground" for fear of ridicule and prosecution (Janik, 2014).

As we move further into the 21st century, we reach another era in healthcare evolution. This time it encompasses not just America and Canada, but many other countries and cultures. It is about affecting expanding access to information and giving patients an opportunity to make

educated choices. The new paradigm is providing practitioners of other therapies an avenue to share their healing arts with compassion and support. The current ideologies are shifting from intolerance and ignorance to tolerance and acceptance of these therapies. These statements summarize some of the findings of Gray's and Orrock's 2014 study of factors influencing referrals in integrative medicine. This new paradigm can be fostered through easy access to valid data and information sharing.

With the media, books, and the internet, there is an abundance of information on healthy lifestyles and medicine today. There is so much information that it is hard to know what to use or what a valid treatment is. To add to the confusion, CAM has many other names such as: holistic, natural, integrative, and alternative (Mandel, 2009). This makes it complicated for the lay person or the physician to formulate appropriate searches. The language of medicine and alternative therapies must be understood in order to find the correct information and discerning what is a viable source and what is not (Chopra, 2014). When the correct words are used in the correct way, the most accurate information is clear.

The CL can effectively use internet resources because they not only have the skills to search, but they also have the vocabulary to find the right information. Liscomb (2000) showed how hospitals and medical schools use CLs to help sort through that information as well as instruct clinicians and students how to search. However, only about 10 percent of the schools of library science teach medical research and none specified any curriculum involving CAM therapies. Data retrieval is part of the curriculum, but that is only half of what is needed to effectively find data on CAM therapies.

The internet is an extremely useful tool, but searching for relevant information on it can be daunting when a simple query can literally produce millions of results (Morton, 2011). A web-based clinical library service specializing in CAM therapies can help physicians sort

through the barrage of data a simple internet search can produce. There are clinical research services, but as stated previously, they do not specialize in CAM modalities. Goold and Lipkin (1999) considered communication is a key component to any healthcare treatment and having easy access to needed information can create better communication between healthcare professionals and patients.

Time is also an issue for physicians as they can spend up to 17 percent of each day performing administrative duties as stated by Almberg (2014). Not only does this take away from patient care, but it makes it difficult to find the time to access data just to stay current for their own certifications yet alone add CAM research to their already stressed timelines (Alper, 2004). The proposed web-based clinical library service can help shorten the time it takes for a physician to get the answers they need. The CL can sort through the data for which physicians do not always have the time or the necessary skills to search. Providing easy access to new information from reliable unbiased sources can help bridge the gap between allopathic medicine and CAM therapies.

Recommendations

As CAM therapies become more conventional, a web-based clinical library service specializing in CAM therapies can be a valuable resource in sorting out new data and providing access to current information. Cultivating dialogue among patients, physicians, and CAM therapists is the primary purpose of this library service. It is the intent that the service to provide the most current available data through the internet and to be accessible to everyone.

A web-based clinical library service is strictly a source to educate so physicians, patients, and CAM therapists can make informed decisions and discuss options and cautions with each other. The clients would have the option of a literature review or copies of the three studies for which they can pay (to accommodate copyright laws) if they are not open access. The focus of

the service would be on the efficacy of CAM interventions; in order to maintain objectivity, studies selected would not be solely based on positive outcomes.. The selection criteria is current, valid, and from reliable sources no matter the outcome.

A web-based clinical library service specific to CAM therapies would focus on CAM therapies and the resulting product would be in the form of an informal literature review of studies that pertain to the queries submitted (Appendices A, B, and C). The review would evaluate the studies for their content and methods, summarize the results, and provide access to the studies presented. Once the query was answered, the review can be stored in a developing library accessible to those that want to search on their own.

It is expected that the web-based clinical library service specializing in CAM therapies would be able to provide a fair and unbiased answer and evaluation of the query presented based on the integrity of the data examined. The service would be a resource that would also provide access to the sourced documents for the user to make their own educated decisions. It is hoped that this service would be a platform to encourage communication and foster acceptance by providing easy access to unbiased data. In addition to providing data, the clinical librarian can also explain CAM terms in a way that everyone can understand.

The literature review would be designed to educate and encourage further inquiry and stimulate exchange of ideas among physicians, patients, and CAM therapist. It will also give physicians a tool for answering the questions their patients are asking. It would be a simple summary of 3 to 5 studies (it may be difficult to find more than that on some topics) relevant to the question with additional supporting references, a key word search to show how the information was obtained, databases used, and indications and contraindications (if applicable).

Since the CL is not a diagnostician nor medically trained to treat, the user must draw their own conclusions or ask their own physician or therapist about the answers to their query. The

web-based clinical library service is strictly a source to educate so that patients, physicians and CAM therapists can make informed decisions and discuss options about treatment plans. Clients of this proposed library service would have the option of a literature review or copies of the studies used to write the review, for which they can purchase if they are not open access. The web-based clinical library service is a resource that would provide data without coloring the user's decision either way.

Table 1. 10 Tips for Searching the Internet

No.	Search Tip
1	<p>Use unique, specific terms To reduce the number of pages returned, use unique terms that are specific to the subject you are researching.</p>
2	<p>Use the minus operator (-) to narrow the search The rarely used but powerful minus operator, equivalent to a Boolean NOT, can remove many unwanted results.</p>
3	<p>Use quotation marks for exact phrases Using quotation marks around a phrase will return only those exact words in that order. It's one of the best ways to limit the pages returned.</p>
4	<p>Don't use common words and punctuation Common terms like a and the are called stop words and are usually ignored. Punctuation is typically ignored.</p>
5	<p>Capitalization Most search engines do not distinguish between uppercase and lowercase, even within quotation marks.</p>
6	<p>Drop the suffixes It's usually best to enter the base word so that you don't exclude relevant pages.</p>
7	<p>Maximize AutoComplete Use the dropbox</p>
8	<p>Customize your searches There are several other less well known ways to limit the number of results returned and reduce your search time:</p> <ul style="list-style-type: none"> • The plus operator (+): The plus operator tells the search engine to include those words in the result set. • The tilde operator (~): Include a tilde in front of a word to return results that include synonyms. • The wildcard operator (*): Google calls it the fill in the blank operator. For example, amusement * will return pages with amusement and any other term(s) the Google search engine deems relevant. • The OR operator (OR) or (): Use this operator to return results with either of two terms. For example happy joy will return pages with both happy and joy, while happy joy will return pages with either happy or joy. • Numeric ranges: You can refine searches that use numeric terms by returning a specific range, but you must supply the unit of measurement. Examples: Windows XP 2003..2005, PC \$700 \$800. • Site search: Many Web sites have their own site search feature. When doing research, it's best to go directly to the source, and site search is a great way to do that. • Related sites: For example, related:www.youtube.com can be used to find sites similar to YouTube. • Change your preferences: Search preferences can be set globally by clicking on the gear icon in the upper-right corner and selecting Search Settings. • Forums-only search: Under the Google logo on the left side of the search result page, click More Discussions or go to Google Groups. Forums are great places to look for solutions to technical problems. • Advanced searches: Click the Advanced Search button by the search box on the Google start or results page to refine your search by date, country, amount, language, or other criteria.
9	<p>Use browser history- If you can remember the general date and time of the search you can look through the browser history to find the Web page.</p>
10	<p>Set a time limit — then change tactics Step away, try a new search engine, ask for help</p>

10 Internet search tips. Courtesy of TechRepublic Retrieved from <http://www.techrepublic.com/blog/10-things/10-tips-for-smarter-more-efficient-internet-searching/>

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Footnotes

¹ History of AMA courtesy of the American Medical Association “Our History” and “Historical Timeline” retrieved from <http://www.ama-assn.org/ama/home.page?>

²Appendices are not presented in APA format in order to show a distinction from the actual paper. The web-based clinical library service would not be rigid with formatting in order to keep the information sharing informal and to allow for easy presentation of the data obtained.

³World Health Organization (WHO) provided the data on traditional medicine. Retrieved from <http://www.who.int/medicines/areas/traditional/definitions/en/>

Appendix A

Aromatherapy uses and pathways

Aromatherapy is not just about inhaling scented air. Aromatherapy is named after the aromatic compounds that are distilled from plant extracts. They are also known as volatile oils or essential oils. According to Buckle (2003) aromatherapy is defined as “the use of essential oils for therapeutic or medical purposes” (p.10). Historically, aromatherapy has its roots in the perfume industry. As the distillation of plant essential oils became more advanced, the purity of the oils was found to have an effect on mood and health (Buckle, 2003). Aromatherapy can be administered via inhalation, topically, orally, or rectally.

In Aromatherapy it is critical to know what being treated before choosing the method of application. Physical issues might be treated topically and the essential oil is absorbed through the skin. Because the stratum corneum (outer layer of the skin) is both hydrophilic (water affinity) and lipophilic (fat affinity); essential oils are able to cross this skin barrier. Essential oils can also be absorbed through hair follicles, sweat ducts, and sebaceous glands (Rhind, 2012). The topical application route comprises of an essential oil in a carrier oil used in massage, or compresses. When used in baths (whole body or just foot or hand baths), salts or carrier oils are used. A carrier oil can be coconut oil, avocado oil or olive oil, etc.

The inhalation method can be direct in steamed water-where the oil is mainly for the person treated or indirect as used in a room oil burner or humidifier where many people in the room get the benefit. The direct inhalation method effects tissues via the respiratory tract-into the alveoli in the lungs and then into the bloodstream (Rhind, 2012). The inhalation method is used for respiratory complaints or when you are trying to address the nervous system such as a client with depression or anxiety.

Essential oils can be used internally either through oral or rectal applications. However, caution must be used as essential oil can have toxic effects if used improperly. Internal application of aromatherapy must be done by a professional aromatherapist who is trained in internal application of essential oils. They can be mixed and placed in capsules, mixed with honey or added into herbal teas. The oral pathway is utilized through the digestive system and is good for treating nervous stomach and can reduce vomiting and nausea.

Suppositories can deliver the drug rapidly to the lower and middle hemorrhoidal veins for absorption. The rectum is not buffered and has a neutral pH. It also has very little enzymatic activity. Suppository formulations more efficient in delivering medications because they do not occupy much volume. In this route the essential oil bypasses the liver and goes directly into the blood stream (Lis-Balchin, 2006). Suppositories are usually made by adding the essential oil to coconut oil, this mixture is cooled in a suppository mold. The molded coconut oil mixture hardens into a suppository capsule.

The study of pain pathways can demonstrate a possible reason for the effectiveness of aromatherapy through inhalation. The perception of pain is located in the limbic system and so is the sense of smell (Buckle, 2003). In a study by Zufall et al. (2012) showed a connection between anosmia, pain and the sodium channels in the olfactory sensory neuron function: loss of smell = loss of pain sensation. Zufall et al. (2012) suggest “Nav1.7 was previously known for its

essential role in the perception of pain; therefore, this channel is being explored as a promising target in the search for novel analgesics. This advance offers a functional understanding of a monogenic human disorder that is characterized by a loss of 2 major senses:—nociception and smell—thus providing an unexpected mechanistic link between these 2 sensory modalities”.

There is still skepticism about the efficacy of aromatherapy, but there is increasing evidence that it is a viable intervention. The term aromatherapy is representative of the essential or volatile oils found in the distillation of plant extracts, not because inhalation is a treatment pathway. Since these essential oils can be toxic if used improperly, it is cautioned to seek out a trained aromatherapist if using this intervention, especially if the route of administration is internal (both oral and rectal routes). Many times the route of the application of the essential oil will be dependent on the illness or disorder being treated. The chart below shows the various functional groups found in essential oils and what they can be used to treat.

PROPERTIES	FUNCTIONAL GROUP								
	ALCOHOL	PHENOL	ALDEHYDE	KETONE	ACID	ESTER	OXIDE	LACTONE	CUMARIN
AINTI INFLAMMITORY			X		X			X	
ANTIBACTERIAL	X	X							
ANTIFUGAL			X			X			
ANTIPYRETIC								X	
ANTIVIRAL	X								
ANTISEPTIC	X	X							
DISINFECTANT		X	X						
EXPECTORANT				X			X		
RELAXANT	X			X					
SEDATIVE			X			X			X
STIMULANT		X							

Table A1. Functional groups (horizontal) found in essential oils and the symptoms (vertical) they can reduce.

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Appendix B

Chamomile: three medicinal species

Chamomile has three common species that are used medicinally: Roman chamomile, or *Chamaemelum nobile*; German chamomile, or *Matricaria chamomilla*; Moroccan chamomile or *Ormenis multicaulis*. The steamed distilled oil is from all three plants and comes from the flower. The oil color ranges from blue to brown due to azulene compound in the flowers. However, the color will fade over time, but it does not affect the potency. German chamomile has a higher azulene content, therefore more blue than either Roman or Moroccan chamomiles (Singh, 2011).

Roman chamomile had been used for centuries and is considered sacred by some. This essential oil is highly volatile and has a sweet herbaceous, tea-leaf-like odor and a bitter, chemical taste. It's a lighter blue than German chamomile due to less azulene. Roman chamomile is preferred for internal applications. Another aspect of Roman chamomile is a high ester count. At greater than 80%, it is one of the highest percentages in the essential oil world. Esters have antifungal and sedative properties. Historically, Roman chamomile is used as an antidepressant, emollient, and fungicide and bactericide. It is not as effective on skin disorders as German chamomile, but it is favored for eczema and psoriasis (Dezfooli et al., 2012)

German chamomile is also called blue chamomile due to its high azulene content. The oil itself has a high viscosity and has somewhat bitter, herbaceous flavor. It has been shown to reduce inflammation, speed wound healing and reduce muscle spasms in animal studies. Like Roman chamomile, it is also used to relax and calm the nerves. German chamomile is best for skin disorders and is a better at reducing inflammation than Roman chamomile (Ehrlich, 2013).

There are few references to any medicinal properties of Moroccan chamomile or *Ormenis multicaulis* other than fragrance and perfumes. It can be used for ameliorating allergic reactions and sunburns. It is not a true chamomile; though related to German chamomile botanically, it differs both by its smell and chemical constituents. It is mainly composed of terpene alcohols, limonene, some sesquiterpenes and azulenes. Moroccan chamomile is native to Northwest Africa. This oil is steam distilled from the flowering tops. Its oil is pale blue to brownish yellow in color with a sweet odor. It blends well with a range of other perfume oils (lavender, sage, and Frankincense). Moroccan chamomile should not be used as a replacement for either German or Roman chamomile. It is used almost exclusively in the fragrance trade as a top-note in colognes: even a minute quantity is pleasantly noticeable (Zrira et al., 2007).



Figure 1B. Chamomile species from left to right: Roman, German, and Moroccan. Courtesy of Google Search images of Roman Chamomile, German Chamomile and Moroccan chamomile.

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Appendix C

The Development of Homeopathy and its Efficacy for Treatment of Disease

Homeopathy is one of the most controversial CAM therapies. Homeopathy is said to have been established by Samuel Hahnemann in 1796. Hahnemann was a German physician who gave homeopathy a name and structure. He developed his concept through a series of “provings” where he and volunteers, that he recruited, took small doses of various drugs, and compounds and meticulously recorded their symptoms. Through his “provings”, he developed a theory that if a drug or compound manifested symptoms of a specific illness in a healthy person then it would cure a sick person who was manifesting those same symptoms. He established this as his law of similar, like cures like.

Hahnemann also believed that all sickness was a product of a deep rooted or “miasm” or an “infectious principal.” Another of Hahnemann’s postulates or “laws” was infinitesimal dilutions or the greater the dilution the more powerful the medicine. It is these infinitesimal dilutions that are the crux of the controversy. How can a drug be effective if there is no trace of it in the remedy? These dilutors were combined with a series of ”succussions” or vigorous shaking, or pounding of the container on a firm, but soft surface (such as a book) in between dilutions. This was called potentiation; Hahnemann believed it “woke up” the healing power of the drug.

There have been many studies that have tried to prove that it works, but they mostly fail in the face of hard science. Even trained homeopaths cannot explain why it works. However, the positive results are hard to evaluate scientifically and the outcomes are largely anecdotal. Homeopathy has been researched for decades and still there is no specific scientific data that can validate it as a viable treatment. It has been stated that homeopathy is just a placebo effect, but when some studies have compared it against a placebo, the results show that it is more than that (Linde et al., 1997). However, years later Linde, et al.’s review was reevaluated and the conclusions showed that Homeopathy was no better than a placebo (Ernst, 2002).

Homeopathy is ambiguous at best and it is not easy to develop a randomized control trial (RCT) on a treatment that is tailored to the individual. Three systematic reviews of hundreds of studies on homeopathy were completed in 1997, 2002, and 2005. In 1997 Linde, Clausius, Ramirez, Melchart, Eitel, Hedges, and Jonas reviewed 186 trials published in Medline and Embase since 1990. Their results demonstrated that homeopathy was only slightly better than a placebo. He also found there was not enough evidence of its efficacy for any specific treatment.

Ernst completed a systematic review in 2002 on “all such papers published since 1997”. Ernst searched Medline, Embase, Amed and CISCOP and reviewed 120 systematic reviews, 6 of which were a reanalysis of Linde, et al.’s (1997) original work – the authors of the reanalysis all agreed that Linde et al.’s (1997) conclusion was not supported. Ernst’s conclusions were similar; there is no solid evidence that homeopathy is superior to placebos or can be an effective clinical treatment. It should be noted that Ernst is also a Homeopath.

Ernst also published an article in 1997 that demanded a conclusion to the controversy over the efficacy of Homeopathy. He noted there was even criticism within the Homeopathic community about Hahnemann's high dilutions. Even the president of the British Board of Homeopathy disagreed with Hahnemann's theory of similars for all disease. These internal criticisms further the controversy over Hahnemann's laws.

Another systematic review was completed by Shang et al. in 2005. They completed a review of 105 studies from 19 different databases including 5 homeopathic data bases. They spent much of their discussion on biases and how smaller studies with "low methodological quality" (Shang, et al., 2005) tended to have more positive results in favor of Homeopathy. Again, they found no evidence proving that Homeopathy worked or was better than a placebo effect. However, Shang et al., (2005) qualified their results with a discussion of how bias and the relationship between caregiver and patient can have an effect on experimental outcomes. They suggest because of the close relationship between Homeopath and patient, Homeopathy can "be another tool that complements conventional medicine" (Shang et al. 2005, p. 728).

The controversy will continue until there is definitive, scientific evidence that proves one way or the other. However, there is something to be said about the relationship between doctor and patient and having a sense of the spiritual. The cure often requires a whole system approach that includes the mind, body and spirit. Homeopathy does take in the whole person. A Homeopath may take up to two hours for the initial consultation and will interview the patient in depth. The doctor-patient relationship is hard to duplicate in a lab and it is not possible to perform a double-blind study on treatments that vary from person to person.

Currently, there is no hard scientific proof of the efficacy of Homeopathy. Just because the mechanism for the cure isn't seen now, doesn't mean it won't be seen later. Homeopathy is gaining in use and popularity despite the lack of hard scientific evidence. There may be something more than can be demonstrated in the lab. There was a time when acupuncture, massage and chiropractic treatments were all considered quackery, but now they are endorsed and advocated by major healthcare facilities. One way to answer this question is for physicians and homeopaths to work together, the goals are the same - patient health and wellbeing. Maybe both can learn from each other to the greater benefit of those in their care (Bellavite, 2014).

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