

Understanding Perceptions and Practices of Herbal Medicine in New England



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Abstract

The use of herbal medicine in the United States has risen. We explored and cataloged knowledge of herbal medicine in New England. Our methods included conducting interviews and a survey to understand baseline practices, perceptions, and awareness of herbal medicine. To provide additional weight, we reviewed studies to learn efficacy from a scientific perspective. We found interest in improved cooperation between herbal medicine and allopathic care, insurance companies, and quality control, as well as in a comprehensive source for information with verified studies.

Executive Summary

Various forms of plant-based remedies as well as complementary and alternative medicine (CAM) are used across the United States, and they are growing in use. Knowledge and usage of these remedies has been passed down through families and is also distributed by practitioners of various traditional disciplines. Patients also find information to self-treat through information available online. Although studies have been completed to verify the medicinal properties of these plants, many remedies still remain unsupported by the Food and Drug Association (FDA). Better awareness of herbal medicine and its efficacy has the potential to offer support to patients with a more holistic and complementary approach. This project thus aimed to record some of the practices that have long been in place. Our goal was to explore and catalog knowledge of herbal medicine used in New England. It must be noted that we faced many challenges in data collection due to the Coronavirus Pandemic of 2020 and subsequent enforced social distancing rules, however we adapted our methods and goals. We hope this project will contribute to a catalog of commonly used herbal medicines, and that this project can encourage further studies and the sharing of knowledge.

Literature Review

Communities around the world have used plants to treat and alleviate diseases for centuries. To better understand the use of herbal medicine in the US, we explored the practice of traditional systems in the US, and the perceptions surrounding herbal medicine. This project relied on three key terms: “allopathy”, “complementary and alternative medicine” (CAM), and “herbal medicine”. Allopathy refers to mainstream health care in the United States including pharmaceutically derived medication, surgery, and radiation (Iftikhar, 2019). CAM refers to any medical practices that are non-mainstream. These practices were adopted from ancient traditional medicine systems from around the world. CAM is either used in conjunction with or instead of allopathic practices (National Cancer Institute,

2019). Herbal medicine falls as a subcategory within CAM. Merriam-Webster defines it as “the art or practice of using herbs to maintain health and to prevent, alleviate, or cure disease” (Merriam-Webster, n.d.).

Herbal medicine is used in several fields such as Ayurveda, Chinese traditional medicine, naturopathy, and homeopathy. The main belief of all traditional medicine systems is that health is maintained through whole-body balance. Disease is caused by an imbalance of the body, mind, and soul (Ratini, 2020). Treatments consist of a combination of herbs, diet, lifestyle, massage, and exercise.

When these allopathic and complementary approaches are used together, however, it is considered integrative health care. While the integrative approach has grown in usage in the United States (NCCIH, 2018a), a more widespread, holistic approach can enhance the level of healthcare for those who use CAM. Despite this demonstrated interest, herbal medicine remains a matter of speculation in allopathic practice. The lack of official licensing discourages the use and trust of practitioners. Many researchers request more understanding and regulations on herbal medicine before defending their value in treatment plants (Bent, 2008). Furthermore, a major limitation to herbal medicine in the US is the lack of insurance coverage (Tachjian et al., 2010). CAM and herbal medicine are viewed as secondary options that may be unsafe and inconsistent. The question remains about why we see increased interest in these alternative medicines and remedies, and how Americans are adding this tradition into their own treatment strategies.

Approach

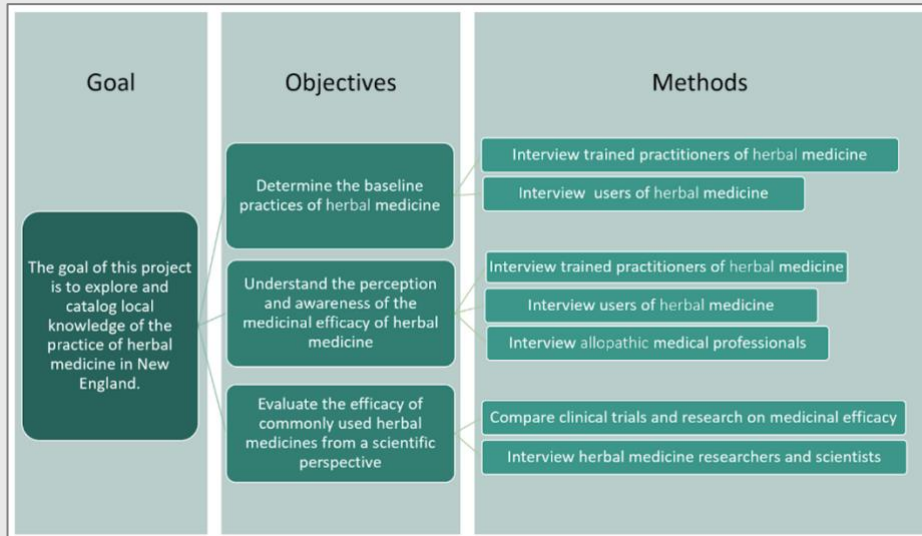


Figure A: Process Flowchart

Results

New England residents without formal herbal training most commonly reported using herbal teas, elderberry, turmeric, echinacea, ginger, essential oils, eucalyptus, garlic, lavender, and licorice. The applications of these medicines varied, but the results are shown in Figure B.

Many of these informal users reported that they choose herbal remedies because some remedies actually work better than pharmaceutical options. Though most interview participants used herbal medicine in conjunction with allopathy, the majority of survey respondents reported that herbal medicines work well enough to forego pharmaceutical options (Figure C).

Informal herbal medicine users disagreed about the level of knowledge held by allopathic practitioners. Two felt comfortable with how much doctors knew and suggested herbal medicine, while seven others expressed that allopathic practitioners know little or nothing about herbal medicine. To learn about herbal medicine, most

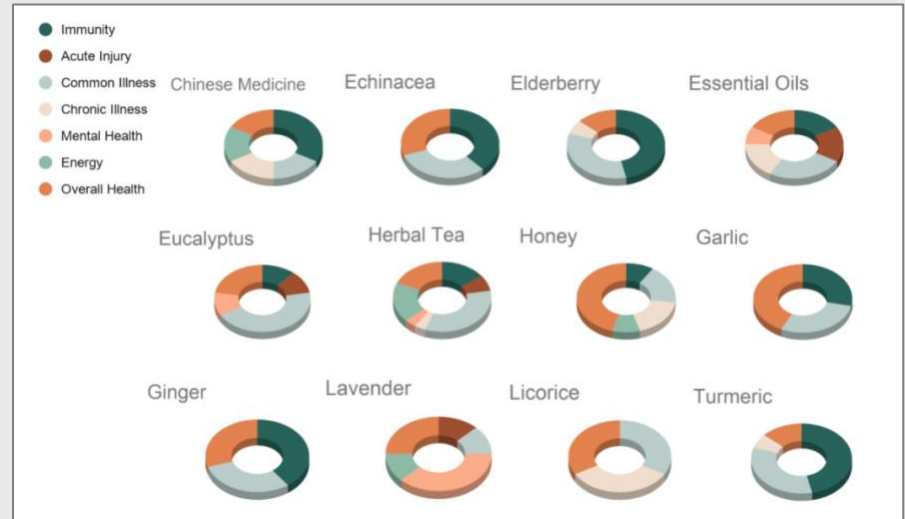


Figure B: Reported Applications of Common Medicines by New England Residents

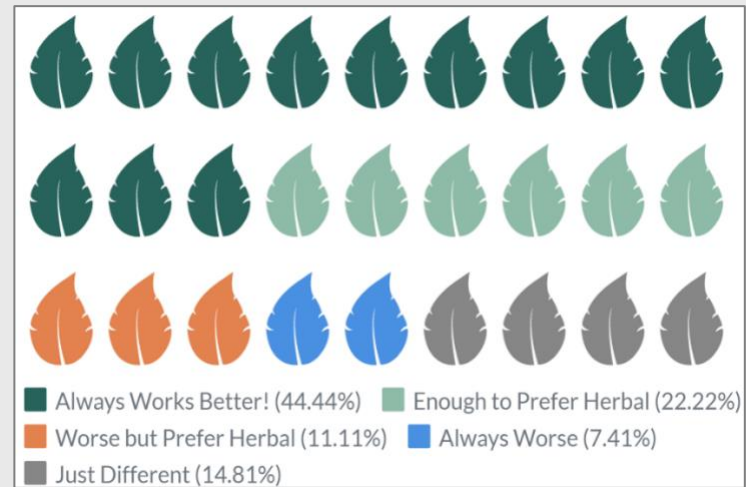


Figure C: Do These Herbal Medicines Work Better or Worse Than Pharmaceutical Options?

participants instead turn to the internet, despite their reported difficulty in finding reliable sources.

An unexpected finding was the complex relationship between CAM and insurance or regulation. Some participants sought more regulation of products to promote safety and more insurance

coverage to increase the availability of herbal medicine. Others were wary. They agreed with these benefits but expressed concerns that increased product regulation and insurance coverage can hinder a practitioner from actually caring for their patients. Because this topic was often identified without our prompting, we highlighted this as a significant finding to address in our recommendations.

To compare the anecdotal reviews for herbal remedies with efficacy studies, we assessed, we selected the ten most commonly cited herbal medicines and created a table to link efficacy studies. The top three are shown below in *Table A*.

Recommendations

Our team developed several recommendations to continue to explore the disconnect between CAM and allopathy. Currently, herbal medicine is regulated exclusively by third party vendors that have lower standards for quality and purity. Our team recommends that distributors of herbal medicine partner with third party vendors and manufacturers to develop a product certification process to ensure herbal medicine comes in its most potent

and safest form. A common thread among our research and interviews was the need for further studies and research to confirm or deny the medicinal properties of common herbs. Clinical trials of greater extent can enhance the general public's trust of herbal medicine. Due to respondent interest in health insurance coverage, we recommend that CAM practitioners and health insurance companies develop a coverage or financial reimbursement plan for CAM, while also allowing the long evaluations and varied treatments that are necessary for CAM. Additionally, residents reported that, although extensive information on herbal medicine exists, they don't know how to identify trustworthy sources, and they are also scattered over many different sources. We recommend that a future project be conducted to create a database linking commonly used herbal medicine to evidence of their efficacy and safety. This evidence could consist of patient success stories, validation from herbal medicine practitioners, and other scientific research that is peer-reviewed for accuracy, safety and reliability.

Table A: Clinical Trials and Research on Efficacy

Medicine	Use	Study	Citation	Participants	Result
Echinacea	Review of Studies	link	(Manayi, Vazirian, & Saeidnia, 2015)	N/A	further studies needed to prove efficacy
	Review of Studies	link	(Shah, Sander, White, Rinaldi, & Coleman, 2007)	N/A	Published evidence supports echinacea's benefit in decreasing the incidence and duration of the common cold.
Elderberry Extract	Treat Influenza A and B	link	(Zakay-Rones, Thom, Wollan, & Wadstein, 2004)	60	Illness duration shortened by 3-4 days
	Treat Influenza B	link	(Zakay-Rones, Zichria et al., 1995)	64	
	Treat Cold Symptoms	link	(Tiralongo, Wee, & Lea, 2016)	312	Placebo group participants had a significantly longer duration of cold episode days
	Review of Studies	link	(Porter & Bode, 2017)	N/A	further studies needed to prove efficacy
Garlic and Honey	Ex-vivo, against bacteria	link	(Andualem, 2013)	N/A	the mean inhibition zone of garlic extract and honey was greater than that of commercially used antibiotics against tested pathogens

Authorship

Katherine Blumanthal

Hi there, my name is Katherine Blumanthal! I am a junior Chemical Engineering major and am originally from Newberg, Oregon. Medicine is a fascinating field. Seeing it from a fresh perspective has been really interesting. I have loved hearing people's stories and bringing more light to a subject that people we interviewed wished was talked about more frequently. This project has given me a deeper appreciation for the subtle culture differences that exist but are not as commonly identified. I'm eager to see how the conversation about alternative medicine continues in the US.



Katharine Edel

Hello! My name is Katharine Edel, and I am a WPI junior originally from Highland Mills, New York. I'm majoring in Mechanical Engineering with a Theatre Minor. I've enjoyed learning more about herbal medicine and its usage and efficacy, especially due to the lack of official support of their efficacy despite their long history. I will continue to follow this field and see what the next years bring!

Isabelle Sillo

Hi! My name is Isabelle Sillo and I am a junior majoring in Biomedical Engineering with a Chemistry minor at WPI. I am originally from Rutland, Massachusetts. I have really enjoyed completing this IQP, even with the remote experience. It has been amazing to see all the different ways my peers and professors adapted to this situation. I am very interested to see how the US healthcare system unfolds after this pandemic and how herbal medicine is integrated into that.



The members of this team contributed equally to the report and the project. Chapters were divided up into multiple sections and then distributed equally to all the members of the team. When a member finished writing their section, she then read over and edited the sections written by other members of the group. This writing and editing process was followed throughout the duration of this report.

Acknowledgements

This team would like to acknowledge our advisors and sponsors, Professor Uma Kumar and Professor Ingrid Shockey, for all their advice and guidance through this unique and challenging process of the remote IQP. We'd like to thank our interview participants, including some of our friends and family, for their time and support. Also, we'd like to thank our fellow classmates for their helpful critiques and participating in our data collection.

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1. Introduction

Various forms of plant-based remedies as well as complementary and alternative medicine (CAM) are used across the United States, and they are growing in use. In 2012, nearly a third of adults in the United States used CAM (Clarke, Black, Stussman, Barnes, & Nahin, 2015), and the practice “has nearly doubled in popularity and acceptance in the United States in the last decade” (Quezada, Briscoe, & Cross, 2016, pp.1523-1530). Knowledge and usage of these remedies has been passed down through families and is also distributed by practitioners of various traditional disciplines. Patients also find information to self-treat through information available online.

Although studies have been completed to verify the medicinal properties of these plants, many remedies still remain unsupported by the Food and Drug Association (FDA). Their common disclaimer which reads, “*These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure, or prevent any disease*”, remains on products that have been used in traditional medicine practices for centuries (Food and Drugs, 2019). Support for clinical trials could advance knowledge and acceptance by physicians and federal agencies such as the FDA. Better awareness of herbal medicine and its efficacy has the potential to offer support to patients with a more holistic and complementary approach.

This project thus aimed to record some of the practices that have long been in place. Our goal was to explore and catalog knowledge of herbal medicine used in New England. To meet our goal, we identified three objectives. The first was to determine the baseline practices of herbal medicine. The second was to understand the perception and awareness of the medicinal efficacy of herbal medicine. The third was to evaluate the efficacy of commonly used herbal medicines from a scientific perspective. It must be noted that we faced many challenges in data collection due to the Coronavirus Pandemic of 2020 and enforced remote learning, however we adapted

our methods and goals to reflect this. We hope this project will contribute to a preliminary catalog of commonly used herbal medicines, and that this project can encourage further studies and the sharing of knowledge.



Figure 1: Assortment of Fresh Herbs (Sillo, April 2020)

2. Literature Review

Communities around the world have used plants to treat and alleviate diseases for centuries. Despite this rich history, there exists a division between traditional and mainstream medicine in the United States. To better understand the use of herbal medicine in the US, we explored this division, the practice of traditional systems in the US, and the perceptions surrounding herbal medicine.

2.1 Defining Terms

Because so many cultures are integrated within the United States, complementary and alternative medicine involves many diverse practices and, thus, many terms. This project relied on three key terms: “allopathy”, “complementary and alternative medicine” (CAM), and “herbal medicine”. Allopathy refers to mainstream health care in the United States including pharmaceutically derived medication, surgery, and radiation (Iftikhar, 2019). CAM refers to any medical practices that are non-mainstream. These are used either in conjunction with or instead of mainstream practices (National Cancer Institute, 2019). Herbal medicine falls as a subcategory within CAM. Merriam-Webster defines it as “the art or practice of using herbs to maintain health and to prevent, alleviate, or cure disease” (Merriam-Webster, n.d.). Herbal medicine is used in several fields such as Ayurveda, Chinese traditional medicine, naturopathy, and homeopathy. This project does not focus on one of these fields but addresses the broad use of herbal medicine regardless of its original influence. *Figure 2* illustrates the relationships between these systems.

Herbs are commonly interpreted as aromatic plants used in cooking. However, several dictionaries broadly define an herb as “a plant or plant part valued for its medicinal, [culinary], or aromatic qualities” (Merriam-Webster, n.d.). Understood this way, the term “herbal medicine” is the practice of healing with any plant-related medicine, and thus “medicinal herbs” with “plant-based medicines”

are interchangeable. *Figure 3* demonstrates these relationships and provides a few examples.

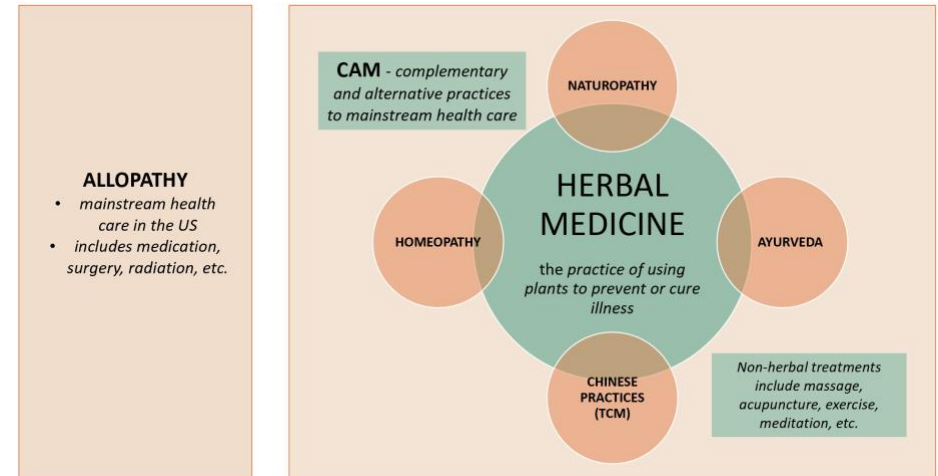


Figure 2: Healthcare Systems and Herbal Medicine

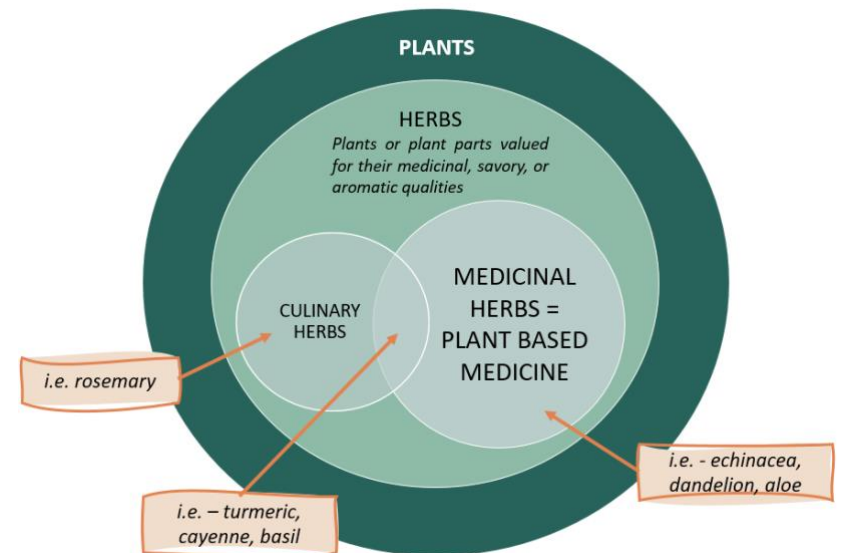


Figure 3: Defining Herbal Medicine

As seen above, herbal medicine can be classified into many different categories based on their unique aspects and composition.

The following two sections, 2.2 and 2.3, will explore the frameworks and origins of traditional medicine and CAM.

2.2 Traditional Medicine Systems

Traditional medicine is described by the World Health Organization (WHO) as a “sum total of the knowledge, skills, and practices based on theories, beliefs, and experiences indigenous to different cultures used in the maintenance of health and in the prevention, diagnosis, improvement or treatment of physical and mental illness” (Bodeker, Ong, Grundy, Burford, & Shein, 2005, pp. xi). Having such a broad definition, traditional medicine is referred to by its place of origin. The major Eastern traditional medical systems came from China, Japan, and India. Additional, although perhaps less widely studied systems, include diverse Native American, African, Middle Eastern, Tibetan, and Central and South American traditional medicine. Homeopathy and naturopathy belong to western traditional medical systems, both originating in Europe (Ratini, 2020; Wachtel-Galor & Benzie, 2011). Despite differences in approach and philosophy, all of these practices emphasize maintaining tradition and whole-body healing (Wachtel-Galor & Benzie, 2011).

Traditional Chinese Medicine

Written records of traditional Chinese medicine (TCM) date back to 200 B.C.. The guiding principle of TCM is that the body is a fragile balance of two intertwined and opposing forces called yin and yang. Yin is the cold and slow or passive principal, while yang is the warm, excited, or active principal (Ratini, 2020). The main belief of this system is that as herbal and allopathic medications could interfere or have conflicting side effects. Disease is caused by an imbalance of yin and yang, leading to a blockage in the flow of qi along certain pathways in the body. Qi is defined as vital energy essential for the life force of every living thing (Ratini, 2020). Practices of TCM include herbal medicine, acupuncture, and massage. They are all used to undo

Disease is an imbalance of yin and yang

the qi blockage and return harmony and health to the body. From these beliefs, Korean, Japan, and Vietnamese medicine have emerged as their own systems (Ratini, 2020).

Traditional Japanese Medicine

The traditional medicine system in Japan is known as Kampo and comes from TCM. Kampo has undergone many adaptations and changes since adapted from Chinese medicine and is now well integrated into Japanese healthcare. It is considered a preferred form of treatment by patients and used by many physicians in their daily practice. Also, it is frequently used as a cancer treatment alongside chemotherapy and radiation (Yuan, Ma, Ye, & Piao, 2016). Kampo also holds the belief that treatment should focus on the body as a whole, rather than the specific illness. Apart from TCM, Kampo also sees the body and mind as mutual, interconnected components of a person. Diseases are thought to originate from the psyche (mind or soul) and soma (body) (Yuan et al., 2016). Herbal medicine is used as treatment and has equal effects on the psyche and soma. The efficacy and formulas of Kampo herbal treatments are highly regulated by the Japanese government, and therefore, considered very safe and accepted (Yuan et al., 2016).

Treatment should focus on the body as a whole



Figure 4: Massage, a Treatment in Many of These Traditional Systems

Traditional Indian Medicine

The focus of traditional Indian medicine is defined by its long-established guiding principles. This system contains three distinct categories: Ayurveda, Unani, and Siddha. Ayurvedic medicine is a healthcare practice that has been established in India for centuries (Ravishankar & Shukla, 2007). Ayurveda focuses on holistic well-being. In this system, every individual exists in an interwoven system with all other people, nature, and the entire universe. This makes health a balance of physical, mental, and spiritual well-being (NCCIH, 2008). Disruptions to health, also called *doshas*, are viewed as disruptions in the individual's internal and external balance within their environment (Bagla, 2011). Treatments consist of a combination of herbs, diet, lifestyle, massage, and exercises. Meditation and yoga also originated from ancient Ayurvedic texts. Ayurveda is highly regarded in India as a main form of treatment, as 70% of Indians rely on it for their primary healthcare (Yuan et al., 2016).



Figure 5: Sushruta Samhita, an Ayurvedic Text on Medicine and Surgery, 12th-13th century (Los Angeles County Museum of Art)

Unani is an ancient holistic system that first developed in Greece 2500 years ago and then integrated into the Indian medical system a couple hundred years later (Yuan et al., 2016). The belief behind Unani, similar to many other traditions, is to treat the body, mind, and soul as a single entity. Health is maintained by harmony between the four basic elements that make up the body (earth, air, water and fire). These each have respective “temperaments” unique to each person, which are cold, hot, wet and dry (Yuan et al., 2016). An alteration in temperament puts the body at risk for illness. The active ingredients in medicinal plants/herbs, such as vitamins and minerals, are extracted to serve as medicine in their true form (Yuan et al., 2016).

Finally, Siddha is similar to Ayurveda in terms of philosophy. The Siddha system of medicine consists of *Siva* and *Sakthi*, meaning matter and energy. These are believed to be the two main entities that shape the nature of the Universe and they are inseparable and complementary (Ravishankar & Shukla, 2007). Similar to Unani, Siddha utilizes the pure active ingredient in medicinal plants and herbs. This medical system uses *ashtashana pareeksha*, the examination of specific body parts, as a diagnostic tool (Ravishankar & Shukla, 2007).

Naturopathy and Homeopathy

The tradition of naturopathy started in Europe as a system of healing that emphasizes a return to a healthy state along with treating the disease. Illness is thought to be caused by changes in the process in which the body naturally heals itself (Ratini, 2020). The term translates to “nature disease”. The six principles that represent this practice are: the healing power of nature, identifying and treating the cause of the disease, the “first do no harm” concept, the doctor serves as a teacher, treatment involves the whole body, and the utilization of prevention (Ratini, 2020). Treatments include changes in diet, vitamin and mineral supplements, herbal medicine, acupuncture, acupressure, TCM, water therapy, massage, and lifestyle counseling. There are currently no research studies devoted to the efficacy of naturopathy, as they are hard experiments to design (Ratini, 2020).

Among the European traditions, Homeopathy is a medical system founded in Germany by a physician named Samuel Christian Hahnemann. He believed that the symptoms of the treatments should be mild versions of the symptoms of the ailment (Ratini, 2020). Hahnemann observed the patients' emotional and mental health and then administered very small and potentially ineffective doses of medicine that had been found to produce the same effects as the disease. For example, onions - which cause lacrimation and irritation of the eyes and nose - would be administered to treat hay fever (Vickers & Zollman, 1999). There is limited research on this practice and almost no proof of efficacy. Therefore, many allopathic professionals and CAM practitioners are skeptical of this practice (Ratini, 2020).



Figure 6: Garlic, a Common Treatment in Naturopathy



*Figure 7: Homeopathic Medicine Chest, Europe 1800-1900; (Science Museum, London)
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2.3 Complementary and Alternative Medicine

The WHO defines complementary and alternative medicine (CAM) as, “a broad set of health care practices that are not part of the country's own tradition and are not integrated into the dominant healthcare” (Bodeker et al., 2005, pp. xiii). The National Center for Complementary and Integrative Health (NCCIH) further defines CAM; both terms complementary and alternative refer to non-mainstream practices, but are referred to as complementary when used in conjunction with conventional medicine, and alternative when in place of conventional medicine (NCCIH, 2018a). In the United States, the “melting pot” nature of our culture means that most forms of traditional medicine are considered CAM.

CAM usage in the United States

The practice of CAM has increased in popularity and acceptance in the United States, and nearly a third of adults used CAM in 2012 (Clarke et al., 2015; Quezada et al., 2016). As seen in *Figure 8*, natural products were the most common form of complementary medicine used by adults in the United States in 2012. In this case, the term “natural products” applies to “dietary supplements other than vitamins and minerals” (NCCIH, 2018a).

Although many people use CAM, there may be implications for how this is communicated to primary physicians. According to a 2005 global atlas by the WHO, “most people who use CAM do so in conjunction with allopathic approaches, but often without the knowledge or involvement of their allopathic healthcare providers” (Bodeker et al., p.63). This has potential negative consequences, as herbal and allopathic medications could interfere or have conflicting side effects.

“health care practices that are not part of the country's own tradition and are not integrated into the dominant healthcare”

herbal and allopathic medications could interfere or have conflicting side effects

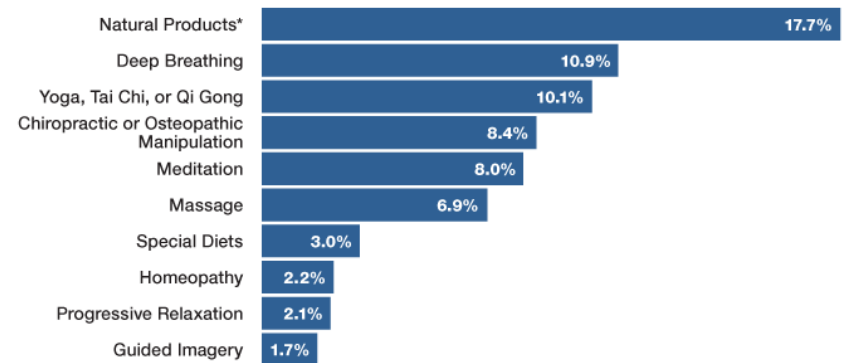


Figure 8: The 10 Most Common Complementary Health Approaches Among Adults – 2012 (NCCIH, 2018a)

When these allopathic and complementary approaches are used together, however, it is considered integrative health care. According to the NCCIH, integrative health care “emphasizes a holistic, patient-focused approach to health care and wellness... [and] aims for well-coordinated care between different providers and institutions” (2018a, p.1). While the integrative approach has grown in usage in the United States (NCCIH, 2018a), a more widespread, holistic approach can enhance the level of healthcare for those who use CAM.

Education and Practice of CAM in the United States

Professional licensing in the United States is handled at the state level, and licensing for CAM practitioners in New England only exists in the practices of acupuncture, chiropractic, naturopathy, and massage therapy. Herbalists, plant-based practitioners, or Ayurvedic practitioners have no official licenses available to them, and according to the WHO, they could “be prosecuted for the unlicensed practice of medicine if they present themselves as physicians” (Bodeker et al., 2005, p.65). Despite this, there are many allopathic professionals in the New England area who prescribe herbal remedies as part of recommendations for clients. The 2005 Global Atlas by the WHO states in their report on traditional medicine:

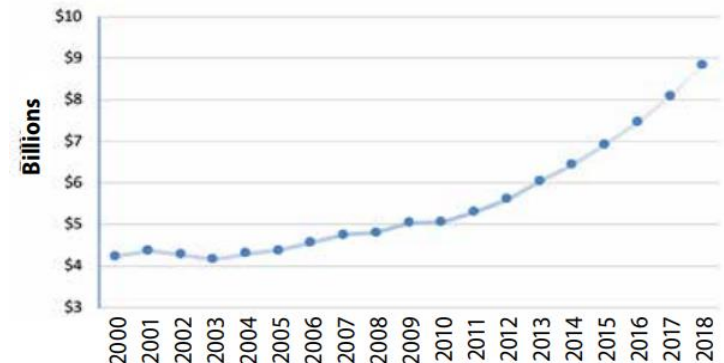
“...98 of the 126 medical schools in the United States included some CAM instruction in their required curriculum, the purpose of which was to acquaint students with CAM therapies. Additional elective CAM-related courses were offered at 81 schools. ...Surveys have also demonstrated that physicians and medical students want more information about CAM in order to meet the needs of their patients” (Bodeker et al., 2005, p.66).

Physicians want to learn more about CAM to meet the needs of their patients.

The atlas also notes that herbs and botanicals were the CAM topic taught second most frequently in medical schools, just after acupuncture. More than three-fourths of medical schools instruct their students in CAM, but physicians are looking to learn more about CAM to meet the needs of their patients, who have become increasingly more interested in recent years (Bodeker et al., 2005, p.66).

2.4 Perceptions of Herbal Medicine

A 2008 report states that herbal medicine products have gained popularity in the last decade with 20% of the American adult population using herbal medicine (Bent, 2008). In 2018, the sales of herbal medicine had record growth since 1998 and found that “consumers spent a total of \$8.842 billion on herbal supplements across all market channels in 2018 — an increase of roughly \$757 million in sales from the previous year” (Smith, Gillespie, Eckl, Knepper, & Morton Reynolds, 2019). *Figure 9* illustrates this growth from 2000-2018.



Source: Nutrition Business Journal

Figure 9: Total US Retail Sales of Herbal Supplements Between 2000-2018 (Smith et al., 2019)

The main reported reason American adults reached for herbal medicine in this study is the “belief that it will promote healthier living” and general wellbeing (Ekor, 2014; Smith et al., 2019). A 2002 study surveyed 151 nurse practitioners from Missouri and Oregon. These surveys were self-administered and focused on the participants’ knowledge and implementation of CAM in their own practices. The study found that nurse practitioners are most likely to recommend CAM because of its “fit with the patient’s belief system” (Sohn & Loveland Cook, 2002). It also stated that nine out of ten nurse practitioners recommend CAM to patients, but that their knowledge of CAM does not come from their training programs. The average reported knowledge of herbal medicine was reported as a 2.6 out of 5, and that 60% of participants showed interest in further herbal medicine education. Out of all CAM treatments, participants were most interested in learning more about herbal medicine (Sohn & Loveland Cook, 2002). Although this data was collected in 2002, it can be used to foreshadow the current increasing popularity and acceptance of herbal medicine in the United States.

belief that it will promote healthier living

Despite this demonstrated interest, herbal medicine remains a matter of speculation in allopathic practice. Allopathic practitioners and researchers hold great authority in the United States, and their reservations influence the greater population despite the plentiful studies that demonstrate efficacy of herbal medicine (Ernst, 2000). This speculation toward herbal medicine likely comes from the lack of understanding how herbal medicine interacts with allopathic treatment and from the lack of regulation of prepared herbal medicines (Ernst, 2000; Saper et al., 2004). Many researchers request more understanding and regulations on herbal medicine before defending their value in treatment plants (Bent, 2008; Ferner & Beard, 2005; Raynor, Dickinson, Knapp, Long, & Nicolson, 2011; Saper et al., 2004).

To add to the speculation, some Ayurvedic and Chinese medicines have been reported as containing high levels of arsenic, lead, or other toxic substances (Ching, Lam, Chan, & Mak, 2012; Saper et al., 2004). Although many herbal medicines are safe and effective, this safety concern naturally demands more regulations on the industry (Saper et al., 2004). Furthermore, some herbal medicine has confirmed negative interactions with allopathic medications such as cardiovascular drugs (Tachjian, Maria, & Jahangir, 2010). Herbal medicine does present some safety concerns that “may temper the decision to use these products”. (Bent, 2008, p.854).

The US government does not provide licenses for Ayurvedic medicine, Chinese medicine, or similar practitioners (NCCIH, 2018b). The lack of an official license likely discourages the use and trust of practitioners. It also calls into question how to assess the quality of services from various practitioners. Furthermore, a major limitation to herbal medicine in the US is the lack of insurance coverage. Consultations, treatment sessions, and herbal products are not covered by most insurance and thus result in large out of pocket costs. In 2011 the Americans were obliged to pay 30 billion dollars out of pocket for CAM consultations and appointments (Tachjian et al., 2010).

The perceptions of herbal medicine in the US are understandably complex, but interest in the art of herbal medicine has been on the rise. The countless internet blog posts, anecdotal stories of efficacy, and the availability of herbal supplements vendors illustrate the support for herbal medicine in the US. Conversely, limited awareness, restricted regulations, lack of federal support, and lack of insurance make herbal medicine an unlikely source of healthcare for most Americans.

Herbal medicine remains a matter of speculation in allopathic practice



Figure 10: Ginger Root (Brett_Hondow, n.d.)

2.5 Summary

Herbal medicine has been established as traditional health care in countries around the world for centuries. Despite this rich history, these traditional practices have not been well-integrated into mainstream US healthcare (Bodeker et al., 2005, p.65). Allopathy is highly regarded in the US and it has full institutional support, as it is most people's primary form of healthcare. CAM and herbal medicine are viewed as secondary options that may be unsafe and inconsistent. The question remains about why we see increased interest in these alternative medicines and remedies, and how Americans are adding this tradition into their own treatment strategies. Through interviews and further research, we hope to confirm the use and efficacy of herbal medicine, spread awareness of it, and add to the body of research working to reduce the stigma of herbal medicine in the US.

3. Methods

In this chapter, we detail the methods used to explore and catalog knowledge of herbal medicines used in New England. To accomplish this goal, we set three objectives:

1. Determine the baseline practices of herbal medicine
2. Understand the perception and awareness of the medicinal efficacy of herbal medicine
3. Evaluate the efficacy of commonly used herbal medicines from a scientific perspective

The flowchart in *Figure 11* displays a summary of our methods and objectives, and sections below describe our methods in further detail.

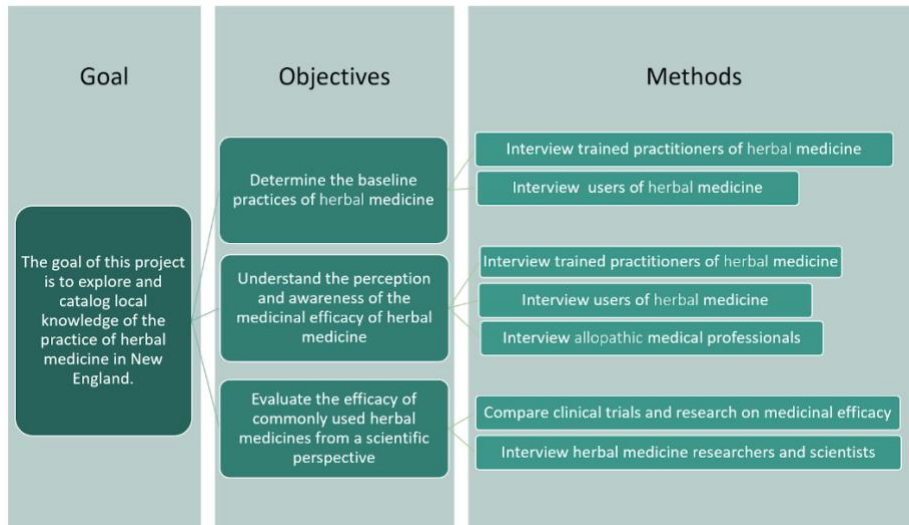


Figure 11: Process Flowchart

3.1 Baseline Practices of Herbal Medicine

Our first objective was to identify the baseline practices and knowledge of herbal medicines within the New England area. We executed this objective by surveying 59 New England residents and by conducting interviews with three CAM practitioners, one allopathic professional, and nine residents of various states in New England. We planned to interview more allopathic professionals and informal users

of herbal medicine but were unable because of the COVID-19 pandemic and quarantine constraints. Although the data was limited in scope, we present it as a representative sample of New England informal users coupled with a few expert interviews. All participants were found using snowball sampling and thus resulted in many advocates for herbal medicine. All interviews were semi-structured (Berg & Lune, 2017), because this format enabled us to prioritize a few central questions, while leaving space for unexpected discussion helpful to our research. The interviews investigated what herbal medications are commonly used, how they are obtained, and their application method. We asked questions such as:

- Do you use any herbal medicines?
- What injuries and/or illnesses do you treat with herbal medicine?
- From where do you obtain these herbal medicines?
- Are there any herbal medicines or family remedies passed down through your family?

See *Appendix A* for a full list of the questions asked.

To supplement the interviews by gaging popularity and use of herbal remedies on a wider scale, we also created a survey. This asked participants whether they used herbal medicine and, if so, what they use, how they use it, and from where they obtain the medicines. See *Appendix B* for screenshots of these survey questions. The survey was sent online, and participants were found by sample of convenience.

All interview scripts and survey data were coded for trends and tabulated to form a master reference of herbal medicine and family remedies.

3.2 Awareness of Herbal Medicine and Perceptions of Efficacy

Our second objective was to understand the perception and awareness of these medicinal herbs with regard to their efficacy. This objective focused on the perceptions of those who use herbal medicines in the New England area, along with practitioners who prescribe them and other allopathic professionals who may not be familiar with them. We documented anecdotal accounts of the efficacy of the medicinal herbs, in order to show trends about the validity of herbal medicine.

The interviews used to execute this objective were included in our existing interviews described in Section 3.1. Questions such as the following were asked:

- Has your herbal medication use changed throughout your lifetime?
- How do you feel about the availability of information on herbal medicines?
- Does the herbal medicine you use ever have any positive/negative side effects?
- Are there any complications of the herbal medicine that you are aware of?

See *Appendix C* for additional questions asked. We asked allopathic practitioners about efficacy in technical terms and about comparative results from treatments they provide in their practices.

Our survey supplemented this data with two questions. The first was “Do these herbal medicines work better or worse than pharmaceutical options?” and the second was “Have you experienced positive/negative side effects with these herbal medicines?”.

All interview scripts and survey data were coded to identify patterns in responses. Unexpected and uncommon responses were also identified.

3.3 Efficacy from a Scientific Perspective

The final objective to meet our goal of creating a comprehensive database of the common herbal medicines used in New England was to evaluate the efficacy of the medicinal herbs from a scientific perspective. To complete this objective, we compared clinical trials and research on medicinal efficacy and interviewed Ayurvedic medicine researchers and scientists. This was done to supplement the anecdotal evidence supplied in interviews, since we were unable to complete our own experiments to analyze the chemical properties of the medicinal herbs. This allowed us to present the most effective medicinal herbs in our documentation, while also being able to back up their purported value with both qualitative and quantitative evidence.

When researching clinical trials and articles, we found one study for each of the ten most common herbs that arose in interviews and survey responses. The trials were found using databases available online and through the WPI Library. We compared the findings of these studies to the results of the interviews in Section 3.2, and presented both in our final product to give an overall analysis of the efficacy of the medicines. These findings were not used to confirm or reject the medicinal effects of the herbs, but instead were used in correlation with anecdotal evidence to understand where gaps in knowledge may lie.

Interviews were conducted with medicine researchers and scientists and were found by a sample of convenience. Our interview method was semi-structured, to match the interviews described in Section 3.1. Questions such as the following were asked:

- What kind of research are you conducting involving herbal medicine?
- What scientific claims are you trying to prove or disprove?
- What is the structure of your clinical trial?
- Have you recorded any positive/negative side effects of the medicines?

See *Appendix D* for additional survey questions asked.

3.4 Proposed Timeline and Conclusion

Due to unforeseen changes in our project during the pandemic quarantine of 2020, our timeline and research approach was somewhat constrained. We relied on archival research and began interviews in the second week to allow for an extended interview process. The majority of our time was focused on online interviewing and compiling data into a reference that can be helpful to promote and to help spread knowledge of herbal medicine. This extended interviewing process also enabled our interviews to evolve and deepen as we gather more information. After seven weeks of research and writing, we presented the data we collected that describes the baseline practices and perceptions of herbal medicine complemented with an analysis of their effects.



Figure 12: Echinacea Flower (Jasmin777, n.d.)



Figure 13: Turmeric (Verch, 2020)



Figure 14: Arnica Flower (Shaw, 2014)

4. Results and Discussion

We collected both anecdotal and scientific data on the practices, perceptions, and efficacy of herbal medicine from users and practitioners in the New England (NE) area. This data was collected through surveying 59 people by a sample of convenience and interviewing nine NE informal users, three herbal practitioners, and one allopathic professional to meet objectives one and two. Of these participants, we found that the majority, or 58%, reported using herbal medicine. Due to limits in our outreach capacity, our survey reached a younger audience, and we found that most respondents were between the ages of 18-23. Furthermore, most informal herbal medicine users (82%) were female, with a 18% response from male users. Because of a greater availability of Massachusetts contacts, 44% of users were from Massachusetts and 56% were from various other New England states. The survey demographics can be seen in *Appendix E*. Archival research was used to gather data for the third objective. The results of these findings are reported and discussed in detail below.

4.1 Results

Objective 1: Baseline Practices of Herbal Medicine

To understand the range in baseline practices, we surveyed and interviewed a combination of ordinary people as well as medical experts who had some experience in herbal medicine to assess awareness and interest.

New England Residents

The most common herbs reported among ordinary non-expert respondents who used herbal medicine were found to be herbal teas, elderberry, turmeric, echinacea, ginger, essential oils, eucalyptus, garlic, lavender, and licorice. Honey was also identified as a popular natural remedy, despite not being plant-based. In terms of identifying single herbs, elderberry and turmeric (*Figure 13 and 15*) were common responses reported

by NE residents (18% amongst users), while echinacea and ginger (*Figure 12 and 15*) were each reported to be used by 16%.

In some cases, categories of compounded herbs were identified. For example, Chinese medicine was listed as a popular category of herbal medicine. Under the category of Chinese medicine, the most commonly cited herbs were noni leaf, ginkgo leaf, arnica, and echinacea. Similarly, herbal teas were found to be the most popular herbal medicine, with 34% of NE residents reporting they used it. Herbal teas varied amongst users. The most popular teas were mint, eucalyptus, licorice root, slippery elm, ginger, and chamomile (*Figure 16*).



Figure 16: Herbal Tea Collection (Sillo, May 2, 2020)



Figure 15: Elderberry Syrup (Left), Turmeric Powder (Middle), and Ginger (Right) (Sillo, May 2, 2020)

We found that among these remedies, there are many applications for each herbal medicine. We noted the range of reported applications for the herbs, as is shown in *Figure 17* below.

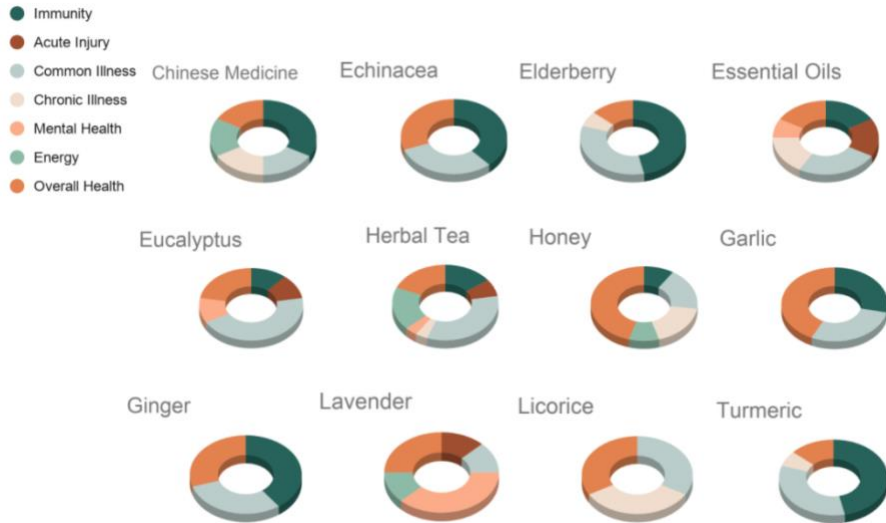


Figure 17: Reported Applications of Common Medicines by New England Residents

Respondents indicated that herbal remedies are taken for multiple reasons and also as multipurpose treatments. Many reported the value as boosting the immune system, mitigating common illnesses, and improving overall health as motivations for the use of the most common herbal medicines listed.

We learned that users get their herbal medicine information from multiple sources. Among the informal users, 74% reported getting their information mainly from family and friends and 45% conducted individual research using books, articles, and online sources. Participants were also asked where they obtained their herbal medicines; the answers are illustrated in *Figure 18* by frequency of their response. It was found that the majority of informal users obtain their herbal medicine from online, specialty stores, grocery stores, and family or friends.

Where Do You Obtain Your Herbal Medicine?

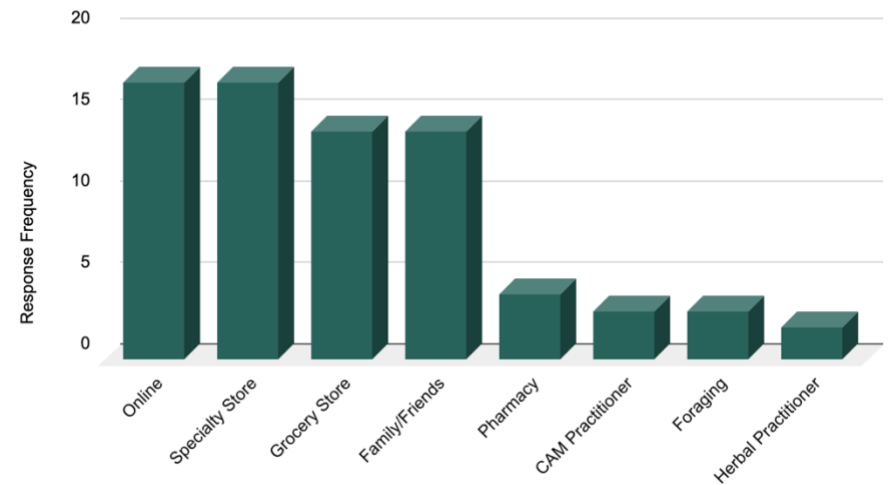


Figure 18: Sources for Herbal Medicine among Informal Users

Interestingly, these sources were largely outside of the Western medical community or pharmacies. Nearly all interview and survey participants learned about their herbal medicine from the internet. Many described this information as extensive but “scattered” and not always reliable.

We asked these users of herbal medicine about side effects. A majority of users reported having no side effects, or even having positive side effects from their herbal medicine. The positive side effects include increased elimination, cleansing, higher energy, and “feeling lighter” (Sillo, April 2020). It was found that 20% of users reported experiencing negative side effects from these medicines, including heartburn and upset stomach. One survey participant reported that “overuse can sometimes lead to overtiredness” (Response #23, April 2020). Example responses can be found in *Appendix E*. The usage and knowledge of herbal medicine varied

“overuse can sometimes lead to overtiredness”

amongst the different groups we interviewed. The following section reports the findings from herbal medicine and allopathic professionals.

CAM and Allopathic Professionals

The perceptions and philosophies of CAM and allopathic practitioners on herbal medicine varied between each other and even within practices. We interviewed two Ayurvedic practitioners, one chiropractic doctor, and one allopathic nurse. It was initially intended to interview more medical professionals, however due to complications with the Coronavirus Pandemic, many very busy and unavailable. Of these accounts, the greatest difference in practice was found between CAM and allopathy. The comparisons can be seen below in *Figure 19*.

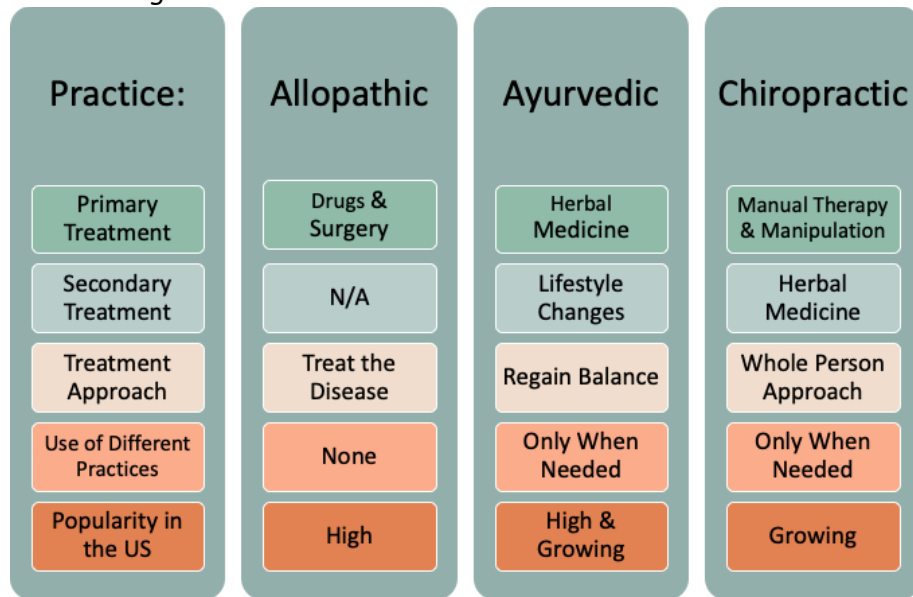


Figure 19: Perceptions and Approaches of Health Care Practices

In assessing allopathic methods, herbal medicine was not found to be used in patient care. The nurse reported that she was not allowed to prescribe herbal medicine in her treatment plans. In contrast, although CAM practitioners rely their treatments heavily on herbal medicine, they were found to prioritize allopathic medicine in

certain critical situations. Within the various CAM practices, the interviewed Ayurvedic practitioners supplement herbal medicine with lifestyle changes, including diet, exercise, yoga, and meditation (Interview #7, April 22, 2020); Interview #8, April 16, 2020). However, the chiropractor reported using herbal medicine to restore balance to areas of the body that manual therapy and spinal manipulation were unable to treat (Interview #9, April 20, 2020).

All allopathic and CAM professionals claimed that allopathic medicine aims to treat the symptoms and specific disease, while herbal medicine focuses on treating the whole body. Ayurveda views the root of disease as an imbalance in the body, mind, and soul, and the chiropractic practitioner explained his “whole person approach” as evaluating the structural (injury), chemical (viral, bacterial, etc.), and emotional (state of mind) wellbeing of the patient.

All of the professionals were hesitant to combine practices outside of their own into their treatment plans. The allopathic nurse reported some concerns with using herbal medicine in her practice, as it may be harmful during surgery and that her patients would not be receptive to the information after receiving care (Interview #1, April 7, 2020). CAM practitioners identified using allopathy only in critical situations, such as life-saving surgery and medications. They revealed their personal and their patients’ dissatisfaction with the rigidity and long-term damage of allopathic medicine when treating chronic ailments. However, 2 out of 3 professionals, including one practitioner from the Boston Ayurveda School, appeared hopeful that the two practices would soon be integrated to provide the most comprehensive patient care. This claim is supported by the reported increasing popularity and effectiveness of herbal medicine and CAM in New England. The use and acceptance of herbal medicine in Massachusetts exceeds most states in the surrounding NE region, as stated by one CAM practitioner, while Rhode Island, New York, and New Jersey are slow to follow (Interview #9, April 20, 2020).

Objective 2: Awareness of Herbal Medicine and Perceptions of Efficacy

Our second objective investigated the perceptions held about herbal medicine. In answering this question, we saw trends but also some disagreements. Our respondents often considered the relationship between herbal and allopathic medicine and what could be improved in the field.

Noticeable Difference in Health

Our first major finding was how all of our interview participants reported that they see a noticeable difference in their health while using herbal medicine. This was described as being apparent both physically in their body, as well as mentally with regard to mind clarity, mood, and energy level. One participant described the benefit of herbal medicine as an “intangible sense of wellness” (Interview 13, April 27, 2020). Another participant said,

“I can definitely tell when I have gone off the rails for . . . two or three days. . . I think it makes a big difference. . . As soon as you start cooking and eating that way again [with herbs], you start to find clarity again. Your body heals and your soul heals. Everything just feels better” (Interview 3, April 15, 2020).

**“Your body
heals, and
your soul
heals.
Everything
just feels
better.”**

Motivation Behind Use

Our second finding regarded the motivation behind herbal medicine usage. Many interview participants reported that they choose herbal remedies because some remedies actually work better than pharmaceutical options. One interview participant described how when she was diagnosed in the mid-1990’s, no allopathic medicine could help her IBS. She tried oregano and peppermint capsules and they took away the pain and made her condition basically disappear. “It works like a charm!” she said, explaining how she’s used herbal medicine to treat her condition ever since (Interview 4, April 20, 2020).

Eight out of nine interview participants used herbal medicine in conjunction with allopathic medicine. Surprisingly, the majority of survey respondents reported that herbal medicines work well enough to forego pharmaceutical options (*Figure 20*).

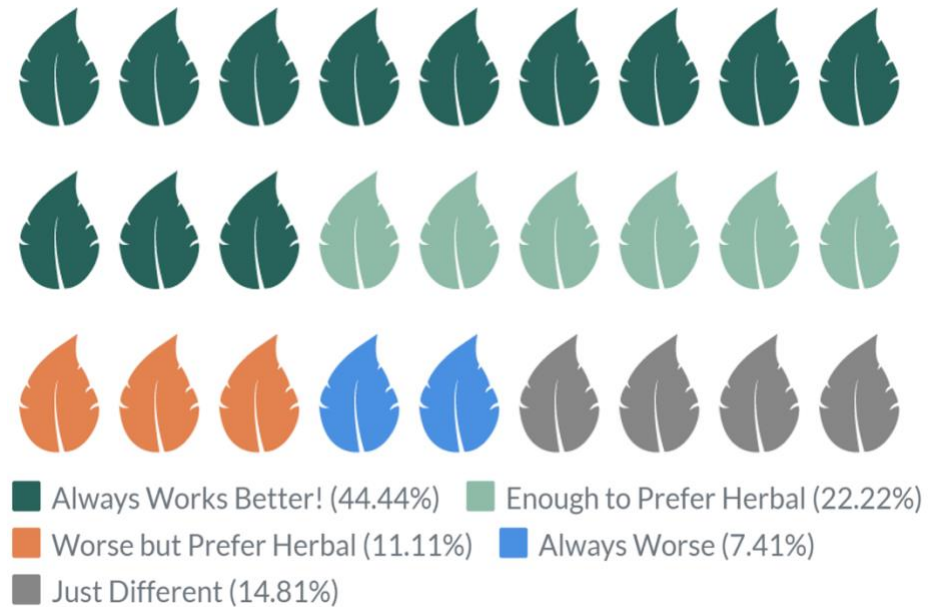


Figure 20: Do these herbal medicines work better or worse than pharmaceutical options?

A majority of the participants reported that using herbal medicine allowed them to avoid allopathic medicines for some ailments. The reasons given for avoiding western medicine ranged widely. Most wanted to avoid the side effects and discussed how allopathic medicine was too strong: “the potency is overkill.” Doctors would give an antibiotic for an ear infection, whereas garlic can fix it completely without the repeated treatments [required with allopathic medicine] (Interview 12, April 22, 2020). Others complained that allopathic options required a long list of accompanying medicines. For example, to lower cholesterol, a

**“the potency
is overkill”**

patient needs to take coq10 and a statin. In comparison, herbal medicine only requires the patient to add more garlic to their diet.

While several participants reported that they worry about the adverse effects of taking herbal medicine with Western medicines, one participant reported that because herbal medicines have existed for so long, they most likely do not interact with Western medicines. The motivations behind using herbal medicine were complex but their efficacy and safety in comparison to pharmaceutical options motivated our participants the most.

Whole Body Healing

Our survey and interviews also revealed a contrast between herbal medicine and Western allopathic approaches. This was our third major finding. When asked what they appreciate about herbal medicine, participants noted that alternative care providers use herbal medicine to treat the body as a whole in looking for the root cause (Figure 21). Conversely, the respondents perceived Western medicine as identifying one symptom, covering up the pain, and ignoring the rest of the body or underlying issues (Figure 22).

Respondents said that this whole-body care was both more effective and made them feel more whole and appreciated. One participant described the care given to her by her doula, “It was above and beyond what I could have received at a doctor. Pam was in tune with me as a person, my family, mental health concerns, and [my husband’s] health, because she knew those were intertwined with my care. She would stay and make tea for me and provided even postpartum care” (Interview 12, April 22, 2020).

The thorough practice with herbal medicine took more time and patience, but users described a strong preference to this medical philosophy.

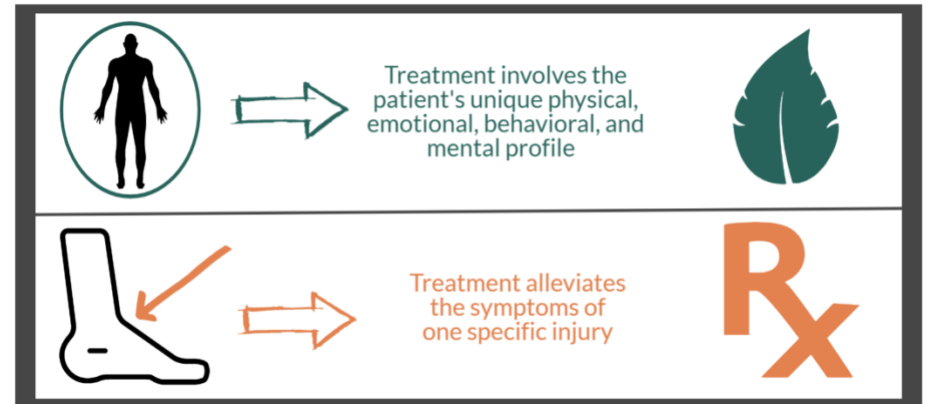


Figure 21: Whole Body Treatment Makes Patients Feel More Cared For

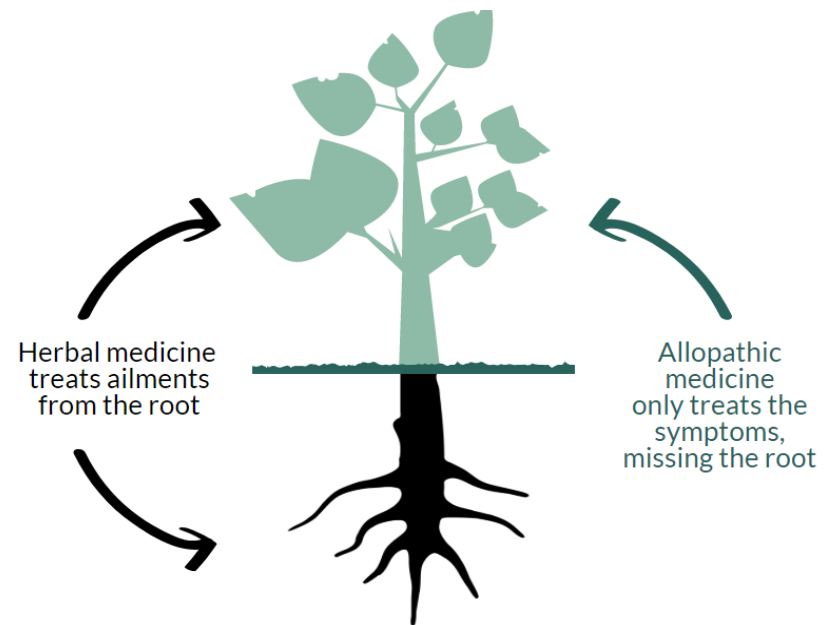


Figure 22: Whole Body Treatment Is More Effective; Root Photo Credit: (Wahab marhaban, n.d.)

Linear Versus Complex Application

Our fourth major finding regarded the different approaches informal users have in comparison to CAM practitioners. The informal users we interviewed considered herbal medicines as antidotes to specific ailments. They also saw herbs as universal treatments: “Bodies are different, but generally what works for me will likely work for anyone else” (Interview 5, April 23, 2020). The CAM practitioners we interviewed, however, contradicted this view entirely. They noted that a patient’s unique disposition, body type, and personality should dictate their unique blend of herbal medicine. They also said these treatment blends change for each season. One practitioner described how her herb blends and recipes come from the ancient Ayurveda text and that they are complex and can be dangerous to change or

“One of the bases of the Ayurvedic system is that everyone is different...Ayurveda has a beautiful way of working with the patients over the long term...People look for one herb to fix one problem...They are stuck on A equals B. It’s not linear and it’s not the same for everyone” (Interview 8, April 21, 2020).

“They are stuck on A equals B. It’s not linear and it’s not the same for everyone.”

This difference in approach is illustrated in *Figure 23*. Our interview questions did not prompt this finding directly. The three CAM practitioners we interviewed described this difference and our interviews with informal users illustrated it precisely.

Confidence to Self-Treat

Our fifth major finding regarded a confidence in informal users to self-treat ailments. Several informal users reported that they felt empowered by herbal medicine to treat themselves because they had tried enough herbal medicines to try their own approach before running to an allopathic doctor. Interestingly, this confidence was not as much in the herbs themselves. Rather, they described this confidence as coming from their experience learning about home medicine and finding success after experimentation. In support of trying alternative medicines first, several participants also said that Western medicine is too often relied on and seen as “the quick and easy fix”. Another felt that western medicine is “necessary but overused and abused” (Interview 4, April 20, 2020). A similar position came from an individual who described how many people do not try different forms of treatment before using potentially harmful treatment prescribed by allopathic practitioners (Interview 6, April 15, 2020).

Awareness and Education of Herbal Medicine

A sixth major finding lies in the awareness and education of herbal medicine in New England. Two informal users said that allopathic doctors have knowledge of herbal medicine: “When I go in

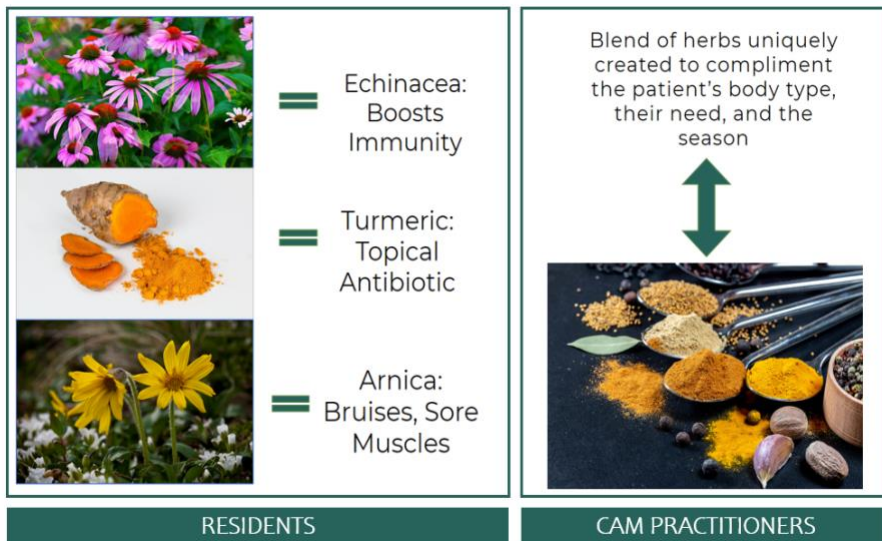


Figure 23: Formulaic vs Complex Use of Herbal Medicine (Ward, n.d.; Frank, 2012; Verch, 2018)

experiment with. The herb blends may be in the form of powder, oil, capsules, or tinctures. That same Ayurveda practitioner described the thorough process of learning about the patient’s unique disposition and taking time to develop these blends. She said,

for my checkup, my doctor tells me to use garlic” (Interview 11, April 24, 2020). Seven other informal users disagreed. They said that their impression is that allopathic practitioners know little or nothing about herbal medicine. For this reason, three participants rarely tell their doctor about herbal treatments they use, and one participant rarely visits any allopathic practitioner.

Seven out of nine informal users also reported that they’ve seen awareness of herbal medicine increase in New England and in the US as a whole.

“People think it’s witchcraft.”

Conversely, one participant said that in New England “people think [herbal medicine] is witchcraft”. She reflected on how much more accepted herbal medicine was in California - where she lived two years ago.

Insurance and Regulation

Our last major finding arose in the discussions about the availability of herbal medicine and CAM as a whole. Without prompting, informal users and CAM practitioners discussed the complexity of insurance coverage and product regulations. Four participants wanted more safety regulations and insurance coverage as this would increase product reliability and make herbal medicine accessible to more people. Three others were wary. They agreed with the benefits but expressed concerns that increased product regulation and insurance coverage can hinder a practitioner from actually caring for their patients. “Things have to be regulated, but it’s a fine line between safely regulated and overly regulated” (Interview 12, April 22, 2020).

In conclusion, our survey and interviews identified the motivations of informal herbal medicine users, comparisons between allopathic and herbal medicine, and gaps that people identified in the complex field of herbal medicine and CAM.

Objective 3: Efficacy from a Scientific Perspective

To compare the anecdotal reviews for herbal remedies with efficacy studies, we assessed herbal remedies uncovered in our interviews and surveys against scientific analyses associated with these treatments. We selected the ten most commonly cited herbal medicines and created a table to link efficacy studies. We chose peer reviewed clinical trials that made claims about efficacy, or reviews of other trials that looked at the overarching state of studies in the field (see Table 1).

Although some individual studies show promising results, other research that looks at studies more broadly have concerns. For example, the clinical work evaluating elderberry has noted, “a deficit of studies comparing these *S. nigra* products and standard antiviral medications makes informed and detailed recommendations for use of

S. nigra extracts in medical applications currently impractical” (Porter & Bode, 2017). Similarly, we found a comment in a study for aloe vera, where “further, well-designed trials with sufficient details of the contents of aloe vera products should be carried out to determine the effectiveness of aloe vera” were suggested for follow-up recommendations (Maenthaisong, Chaiyakunapruk, Niruntraporn, & Kongkaew, 2007).

Due to time and access constraints of our research during the COVID19 outbreak of 2020, we were not able to reach out to research scientists and experts in the field as we had planned, and so our findings in this objective were limited to content analysis of efficacy studies.

Table 1: Clinical Trials and Research on Medicinal Efficacy

Medicine	Use	Study	Citation	Participants	Result
Aloe Vera	Review of Studies	link	(Maenthaisong, Chaiyakunapruk, Niruntraporn, & Kongkaew, 2007)	N/A	further studies needed to prove efficacy
	Treat Burns	link	(Shahzad & Ahmed, 2013)	50	aloe vera gel promoted wound healing in second degree burn patients better, relieves pain better, is cost effective
Echinacea	Review of Studies	link	(Shah, Sander, White, Rinaldi, & Coleman, 2007)	N/A	Published evidence supports echinacea's benefit in decreasing the incidence and duration of the common cold.
	Review of Studies	link	(Manayi, Vazirian, & Saeidnia, 2015)	N/A	further studies needed to prove efficacy
Elderberry Extract	Treat Influenza A and B	link	(Zakay-Rones, Thom, Wollan, & Wadstein, 2004)	60	Illness duration shortened by 3-4 days
	Treat Influenza B	link	(Zakay-Rones, Zichria et al., 1995)	64	
	Treat Cold Symptoms	link	(Tiralongo, Wee, & Lea, 2016)	312	Placebo group participants had a significantly longer duration of cold episode days
	Review of Studies	link	(Porter & Bode, 2017)	N/A	further studies needed to prove efficacy
Eucalyptus	Treat Bronchitis	link	(Fischer & Dethlefsen, 2013)	242	Cineole, a eucalyptus extract, actively and significantly reduces cough frequency after four days
Garlic and Honey	Ex-vivo, Against Bacteria	link	(Andualem, 2013)	N/A	the mean inhibition zone of garlic extract and honey was greater than that of commercially used antibiotics against tested pathogens

4.2 Discussion

Our data revealed some interesting trends about herbal medicines and how they are viewed. The most commonly cited herbs were those easy to access and common in regional cooking. This familiarity increased reported levels of trust to use them as medicine. Adding greatly to this trust were the plethora of anecdotal stories of the healing powers of herbal medicine. These stories seem to motivate the majority of users, because very few participants of our study actually visited an herbal practitioner regularly.

We found that informal users in NE use herbal medicine linearly and more simply. For example, to an informal user, oregano is used as an antibacterial and garlic is used to boost immunity. A trained CAM practitioner in our study described a far more complex relationship between oregano and garlic to one's well-being. The best use was dictated by a more sophisticated analysis of the patient's body type, personality, the time of year, and their medical history. The CAM practitioner also saw the herbs as initially used to cleanse the body then to restore a particular function. Following this method, the patient would be urged to stop taking the herbs- as she wanted to build a healthy body free of reliance on outside medicine of any type. This was different from our initial thought process and might have influenced our survey data, because we asked simply which each herb treats what ailment. It also makes the use of herbal medicine more complex to the untrained person. Despite this difficulty to increase education, we saw it as an even greater need for allopathic practitioners to be aware of herbal medicine, because of potential misuse and complications.

It seems that a larger than expected number of ordinary people use herbal medicine to some degree. This may be in part because as one interview participant said, "you don't think of herbs as being dangerous - you use them in cooking" (Interview 4, April 20, 2020). We found an emotional connection to herbal medicine. This can be seen with how much trust and anxiety plays a role in the discussion about side effects or even the business aspect of Western

medicine. Additionally, many people seemed drawn to herbal and other alternative medicines because this holistic approach gave them more human dignity and social connection.

The desire for autonomy of one's health is clear. The majority of informal users discovered and obtained their herbal medicine on their own, whether it be through the internet or their local community. They are taking their health into their own hands, instead of going through trained professionals. This independence is nearly impossible to do when dealing with the prescription drugs and insurance coverage of the allopathic world. As stated previously, many common herbal medicines were used in cooking and purchased in grocery stores. This finding was expected, as herbal medicine emphasizes using whole, natural foods for their medicinal properties.

Overall, we found a strong call for increased research and awareness of herbal medicine - both in its benefits and in verified instructions of use. The efficacy studies we reviewed recommended further studies on a larger scale to support their findings. As many people reported, the herbs are medicine just like allopathic drugs. The need to handle herbal medicine with education and respect seems to be of utmost importance.

Limitations

Due to the pandemic caused by COVID-19, our team confined our data collection to the New England area and used a sample of convenience to find participants. This restricted our data, as the majority of survey participants were between the ages of 18-23 and were also STEM students, who typically value science more than tradition. For our interviews, we were only able to obtain 9 participants, also found through a sample of convenience. Most of them were females between the ages of 40-65. All of these limitations created an unrepresentative sample of the NE population, which may have skewed the data collected on herbal medicine usage and perceptions in this region.

5. Recommendations and Conclusion

5.1. Recommendations

Overall, our study found increasing interest and use of herbal medicine, along with growing dissatisfaction with allopathy. More people seem to rely on herbal medicine as their primary or secondary treatment plan. Based on these trends, our team developed several recommendations to continue to explore this gap in healthcare approaches and enhance the value of the field of herbal medicine.

Quality Control Regulation

Currently, pharmaceutical medicine is controlled by the FDA, whereas herbal medicine is regulated exclusively by third party vendors that have lower standards for quality and purity. However, the lack of FDA involvement permits the production of new and helpful medicines that have yet to undergo the extensive research required by the FDA. Our team recommends that distributors of herbal medicine partner with third party vendors and manufacturers to develop a product certification process. This process would ensure that the herbal medicines meet certain qualifications, such as purity, toxicology, and quality. This verification would assure practitioners and customers that they receive herbal medicine in its most potent and safest form.

Insurance Coverage and Partnership

CAM practitioners indicated that they value their freedom from limitations and regulations imposed by insurance companies. However, many respondents expressed their interest in health insurance coverage for their CAM treatments, since they value them as much or even more than allopathic care. We recognize that insurance coverage inevitably comes with restrictions on visit durations, treatment costs, and other areas of healthcare. Therefore, we recommend that CAM practitioners and health insurance companies develop a coverage or financial reimbursement plan for

CAM, while also allowing the long evaluations and varied treatments that are necessary for CAM.

Integration of Herbal Medicine and Allopathy

As discussed earlier, the desire for CAM practices such as herbal medicine is becoming more popular amongst NE residents. It is clear that certain allopathic techniques, such as surgery and life saving drugs, are essential when the situation is critical. However, many informal users reported that they favored using herbal medicine in conjunction with or instead of allopathy. For this reason, healthcare practitioners see the future of medicine as a more integrated system of allopathy and CAM. We propose that practitioners in various healthcare fields work to help spark this integration. This can be achieved by creating CAM seminars and programs for allopathic physicians, nurses, and other professionals to expand their skill and knowledge set to include herbal medicine, chiropractic medicine, and acupuncture. For patients that need it, we also recommend that CAM and allopathic practitioners communicate to create a comprehensive treatment plan that covers more than either practitioner could do alone.

Increased Research and Studies

A common thread among our research and interviews was the need for further studies and research to confirm or deny the medicinal properties of common herbs. Nearly every study on efficacy that we reviewed recommended that further research be conducted to confirm their results. We see the need and recommend that further clinical trials be completed with the following criteria: have a large enough sample size to prove efficacy, tested both against placebos and currently accepted treatments, and follow methodologically sound practices. With clinical trials of this extent, the efficacy of medicinal herbs can be better proven, and thus enhance the general public's trust of herbal medicine. Further studies can also study the interactions of herbal medicine with pharmaceuticals and allow for more informed integration of allopathic and herbal treatments.

Continuation of Deliverables

Another unmet need that was identified amongst our participants was the unreliability and disorganization of information on herbal medicine. We recognize that the information on herbal medicine is extensive and available to people interested in locating it. However, informal users reported that they don't know how to identify trustworthy sources, and that the information is scattered over many different sources. For this reason, we created two deliverables to report our findings: a WIX website and an herbal catalog. This was distributed to our research participants for them to use and share at their leisure. Our team also connected with the Boston Ayurveda School, who was interested in sharing our project deliverables with their resident herbal physicians. Unfortunately, a domain was not purchased for this website and it can only be accessed through the provided link. The website contains basic information on our project and herbal medicine. It then goes on to categorize all of the 102 herbal medicines reported in our interviews and survey into 13 key categories. A PDF of the catalog is linked on the site and contains information about the applications, forms, places to obtain, preparation, and side effects of each medicine. These also follow the same categorization as on the website. Sample screenshots of the catalog are shown in *Appendix F*. The website address is <https://herbalmedicineiqp.wixsite.com/herb-catalog-igp> and sample screenshots of the website are shown in *Figures 24-30*. This link along with complete screenshots of the website can be found in *Appendix G*.



Figure 24: Home Page of Website

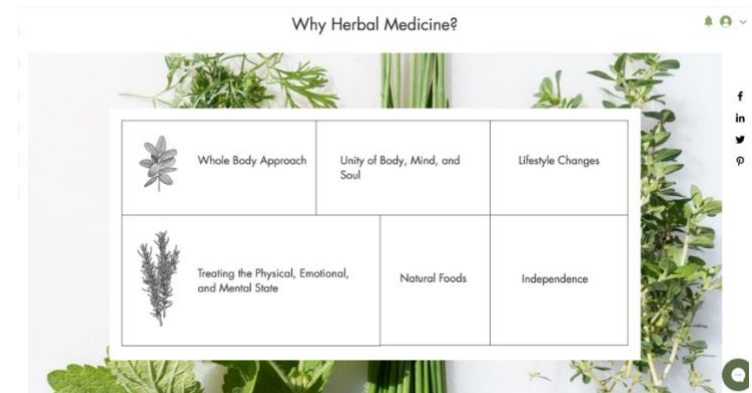


Figure 25: Website Page, Why Herbal Medicine

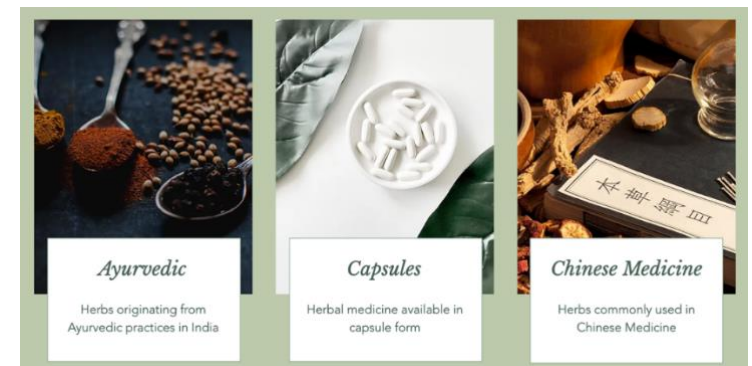


Figure 26: Website Page, Herb Categories

Trusted Distributors

These herbal medicine companies and distributors were recommended by the herbal medicine practitioners and informal users we interviewed

- 👍 Banyan Botanicals
- 👍 Medical Medium
- 👍 Green Med Info
- 👍 Mountain Rose Herbs
- 👍 Kottakkal
- 👍 Supreme Nutrition Products

Figure 27: Website Page, Trusted Distributors

Ayurvedic

Herbs originating from Ayurvedic practices in India

- | | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> Amalaki Anise Arnica Ashwagandha Basil Bitter Gourd Black Pepper Cardamom Carom Seeds Chyawanprash Cinnamon Cloves | <ul style="list-style-type: none"> Echinacea Eucalyptus Fennel Garlic Ghee Ginger Mustard Seed Stinging Nettle Leaf Tapioca Triphala Turmeric Whole Olive Leaf |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Figure 28: Website Page, Reported Ayurvedic Medicines

website and catalog using a more representative sample of participants and practitioners in NE. We also left a blank section for User Reviews, which could be incorporated into the future project by following up with informal users to evaluate their satisfaction with herbal medicine. Currently the website contains links to peer reviewed research articles. We would like this work to be expanded upon to include efficacy and safety evidence for each herbal medicine. This could consist of patient success stories, validation from herbal medicine practitioners, and other peer-reviewed scientific research.

There are also links to trusted herbal medicine distributors reported to us by our research participants. Future steps could be taken rates these companies and websites for convenience and reliability, to provide our readers with the most accurate information. Ideally, a diverse panel of CAM and herbal practitioners could be involved in this process. By implementing these updates to our website, we hope people will find herbal medicine more accessible and trustworthy.

Although extensive, our deliverables are solely based off of our interviews and survey data conducted through a sample of convenience. Also, we were only able to interview people in the fields of Ayurveda and chiropractic therapy. We acknowledge that our results contain bias because of this and may not reflect the complete usage and perceptions of herbal medicine in NE. Therefore, we are recommending that a future project be conducted to expand upon the

5.2. Conclusion

Despite having the world's leading economy and industry, the United States fails to champion the field of healthcare. The Global Burden of Diseases, Injuries, and Risk Factors Study of 2016 (GBD 2016) had the US coming in at a “respectable, but possibly surprising place” of 29th out of 195 countries for accessibility and quality of personal health care (Gingerich, 2018), p. 1). The report suggests that one of the main shortcomings of the US healthcare system is the disparity of care available at the state-level. With the current available health care failing to meet the needs of those in all socioeconomic classes, complementary and alternative treatments are becoming more sensible and attractive options.

The intent of this project was to catalog common herbal medicines used in New England and to identify awareness of the practice as a whole. Discussion with NE herbal medicine users and practitioners revealed that extensive information on herbal medicine exists online, but that it is neither organized nor completely reliable. A majority of our participants also criticized the lack of regulation and acceptance of herbal medicine by American allopathy. Our team decided to record our findings in a website where our catalog, efficacy research, and herbal medicine distributors can be accessed. In addition, the above recommendations were made to further our project. Areas of improvement for the website are shown in *Figures 29 and 30*. They are intended to enhance the field of herbal medicine and encourage its acceptance in the US. We believe this can be accomplished through changes within insurance companies, herbal medicine manufacturers, and CAM private practices. As herbal medicine becomes a more highly regarded and accepted form of healthcare in the US, we hope that the inequalities in health care quality and access can eventually be decreased or eradicated.

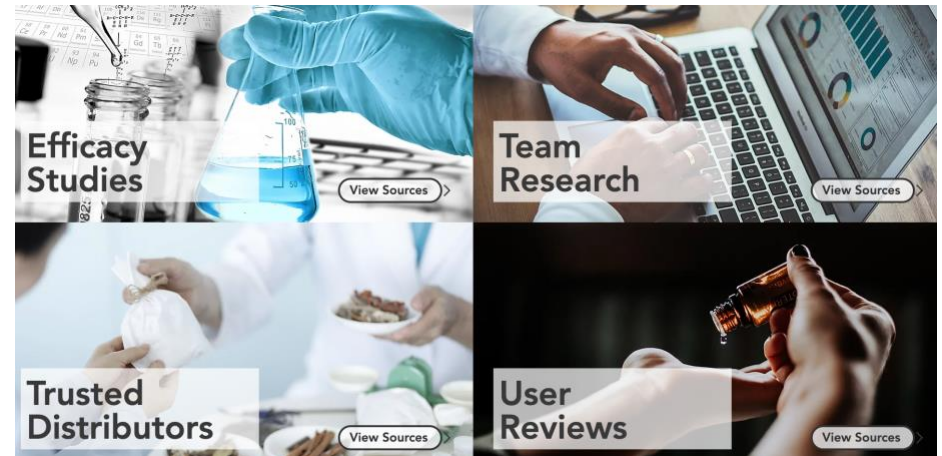


Figure 29: Website Page, Information Sources

User Reviews

Will be completed by
future projects

Figure 30: Website Page, Future Project

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Appendices

Appendix A: Interview Guide to Determine Baseline Practices

Profile

We are a group of students from Worcester Polytechnic Institute (WPI) researching common herbal medicine and family remedies used in New England. Your feedback would be very helpful in our data collection for our project. This information will be used to compile our herbal medicine catalog.

1. Does your profession/education/informal training involve the use of CAM or allopathic (contemporary/Western) practices?
 - a. If so, proceed with the following questions.
 - b. If inapplicable, skip to Medical Practices questions.
2. What is your profession?
3. What is your education level?
 - a. What educational degrees do you have?
 - b. What training have you undergone outside of your education for this profession?
4. Where did you receive your education/training?

Medical Practices

We would like to know more about your herbal medicine usage so we can assess their purpose and application (in your area of practice- for practitioners).

1. We define herbal medicine as a medicine that originates from any part of a plant and has chemical properties that possess medicinal value. This consists of herbs, roots, leaves, bark, flowers, and seeds. Do you use any herbal medicines?
2. Are they self-administered or prescribed?
3. What injuries or illnesses do you treat with these medications?
4. How effective are they in treating each injury or illness?
5. At what phase of the injury or illness do you begin using herbal medication? Initial, advanced, or terminal phase?

6. From where do you obtain the medicines?
7. Do your medications and treatments require any preparation?
8. Do you purchase/acquire them already prepared or do you gather them in their natural form?
9. How did you learn about them and their intended use?
10. Do they have any importance in your family and culture?
11. Do you know the original origin of the medicines?
12. Are these medicines popular amongst your friends and family? *(for residents)*
13. Do other people use them differently? *(for residents)*
14. Are these medicines popular amongst your patients or other practitioners? *(for practitioners)*
15. Do other practitioners or patients use them differently? *(for practitioners)*
16. Are there any herbal medicines or family remedies passed down through your family or community?
 - a. How are they passed down?
 - b. Are any of them not used anymore?
 - c. If so, why not?

Additional Questions for Practitioners:

1. Do you work with the same clients repeatedly?
2. How often do you receive new clients?
3. What is your diagnostic process?
4. How do you determine which treatment to administer your patients?

Appendix B: Online Survey to Find Potential Interviewees

This online survey was distributed to friends and family to collect preliminary data on the popularity of herbal medicine. From this data, we found people who are herbal medicine users and also showed interest in our project. This will allow us to compile a list of potential interviewees. Below are screenshots of the survey.

Herbal Medicine Feedback

We are a group of students from Worcester Polytechnic Institute (WPI) researching common herbal medicine used in New England. Your feedback would be very helpful in our data collection. This information will be used to compile our herbal medicine catalog and is completely confidential and anonymous.

We define herbal medicine as medicine that originates from any part of a plant and has chemical properties that possess medicinal value. This consists of fresh or dried plants, roots, leaves, bark, flowers, and seeds. They can be consumed/applied as powder, tablets, capsules, tea, oil, cream, etc.

This survey should take 5-10 minutes.

* Required

Do you use or have you used herbal medicine? *

Yes

No

[Next](#)

Herbal Medicine Feedback

As a reminder: We define herbal and plant-based medicine as medicine that originates from any part of a plant and has chemical properties that possess medicinal value. This consists of fresh or dried herbs/plants, roots, leaves, bark, flowers, and seeds.

They can be consumed/applied as powder, tablets, capsules, tea, oil, cream, etc.

What herbal medicines do you use? Please be as specific as possible.

Your answer

What is the purpose of the herb(s) you listed? If you have more than 5, just do your top 5 herbs. Please list in the same order as above.

Acute means a condition that has a severe and sudden onset. Chronic means a condition lasting more than 3 months.

	Medicine #1	Medicine #2	Medicine #3	Medicine #4	Medicine #5
To boost immunity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
An acute injury	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A chronic injury	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A common/acute illness (a common cold etc)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A chronic illness	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A mental health condition	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Energy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Overall health and wellbeing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

If you selected "Other" in the previous question, please elaborate.

Your answer _____

What information sources lead you to use herbal medicine? Select all that apply.

- A physician
- An alternative care provider
- An herbal practitioner
- A family member or friend
- Online articles and websites
- Other: _____

From where do you physically obtain these medicines? Select all that apply.

- Your physician
- An alternative care provider
- An herbal practitioner
- A family member or friend
- You buy them online
- You buy them in a specialty store
- Other: _____

Do these herbal medicines work better or worse than pharmaceutical options?

Your answer _____

Have you experienced positive/negative side effects with these herbal medicines?

Your answer _____

[Back](#)

[Next](#)

Demographics

This section is optional but would be appreciated to best categorize our data. All information will be confidential.

What US state is your primary residence?

Your answer _____

What is your age?

Your answer _____

What is your gender?

- Female
- Male
- Prefer not to say
- Other: _____

[Back](#)

[Next](#)

Almost Done!

Can we contact you if we have more questions? *

- Yes
- No
- Other: _____

Your email and/or phone number:

Your answer _____

Back

Next

Thank you for participating!

We appreciate your time and feedback. Have a good day!

If you have any questions about this project or would like to obtain the results of our research, please give us your contact information and we will get back to you.

You can email our group at gr-herbs@wpi.edu.

Back

Next

Comments/Feedback

If you have any comments or feedback about the survey, please list them in this section. Include anything that was confusing or could be improved. Any feedback will be helpful - short or long.

Thanks!

Comments?

Your answer _____

Back

Submit

Appendix C: Interview Guide to Determine Perceptions on and Awareness of Efficacy

1. Do you use herbal medicines?
2. Are they self-administered or prescribed?
3. Are there any positive and/or negative side effects of the medicines you use?
4. Are there any potential complications that you are aware of?
5. Has your herbal medication use changed throughout your lifetime?
6. Have you found new benefits for your medicines that weren't their intended use?
7. Have you stopped using any medicines because they didn't work?
8. Do you feel that knowledge or interest in herbal medicine is changing in your local community?
9. Has this change or lack of change impacted your healthcare options?
10. How do you feel about the availability of information on herbal medicines?
11. Do you feel that the following people are aware of herbal medicine?
 - a. Friends and family
 - b. The general US population
 - c. Allopathic professionals
12. Do you know of any common concerns about herbal medicines?
 - a. Do you believe any of these?
 - b. Can you support or debunk any of these claims?
13. Do you use allopathic medicine?
14. What are your views on allopathy?
15. To what extent do you combine herbal and allopathic medicine?
16. Where do you mainly receive medical care?
17. How satisfied are you with this care?
18. Where else do you receive medical care?
19. Do you go to different places based on the injury or illness you have, or treatment you are looking for?
20. How are you currently receiving your medical information?
21. What is the best way for you to receive medical information?
22. Would a comprehensive and organized catalog of herbal medicines available in your CAM clinic be helpful when deciding on a treatment?
 - a. Would a paper or digital copy of this catalog be more useful?

Questions For Allopathic Professionals:

1. How many years have you been working in this profession?
2. What kind of formal and informal training have you received?
3. What injuries and/or illnesses do your patients most commonly have?
4. Do you use herbal medicine in your practice?
 - a. How pleased are you with their results?
 - b. Do you find them to be successful in treating what they intended to treat?
 - c. Do they have any positive/negative side effects?
5. How would you compare the efficacy of herbal medicine with contemporary/Western practices?
6. What is the perception of herbal medicine among your: profession/patients?
7. Have you seen the use of herbal medicine change in your lifetime?
 - a. Do you develop new purposes for different herbs?
 - b. Do you ever try new herbs?
 - c. Have you stopped using any because they didn't work?
8. Do you wish herbal medications were more or less accessible?
9. Would you be interested in providing patients with a comprehensive catalog to advise them on herbal medicine?
10. Do you personally use any herbal medicines?
 - a. From where do you obtain these herbs?
 - b. How do you prepare and preserve them?
 - c. How did you learn how to use them?
 - d. Do they have any historical value for you and your family?

Appendix D: Interview Guide to Evaluate Herbal Medicine Efficacy

Profile

We are a group of students from Worcester Polytechnic Institute (WPI) researching common herbal medicine and family remedies used in New England. Your expertise would be very helpful in the data collection for our project. This information will be used to compile our Ayurvedic medicine catalog.

1. What is your profession?
2. What is your education level?
 - a. What educational degrees do you have?
 - b. What training have you undergone outside of your education for this profession?
3. Where did you receive your education/training?

Questions for Efficacy Researchers

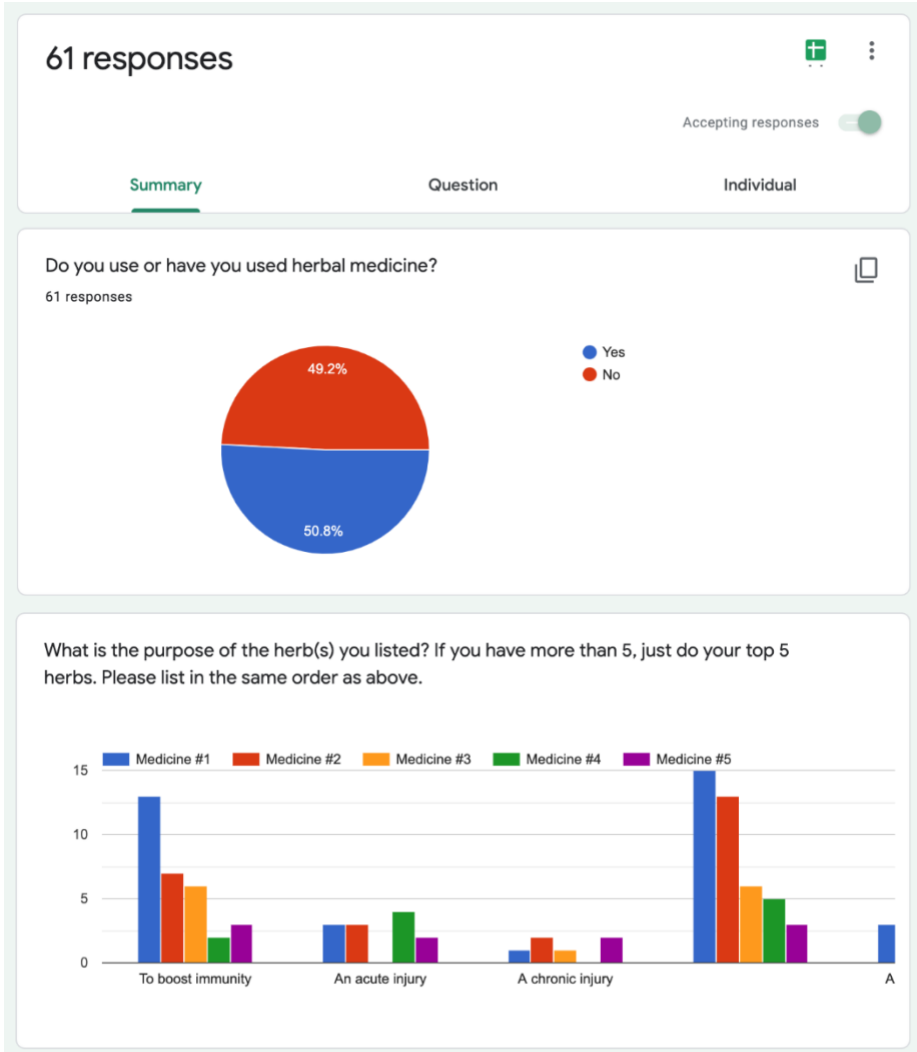
1. What kind of research are you conducting involving herbal medicine?
2. What scientific claims are you trying to prove or disprove?
3. What stage of your research are you currently at?
 - a. What have you already completed?
 - b. Have you made any definitive or potential discoveries?
 - c. Has your data supported or contradicted your hypothesis so far?
 - d. Have you had any unexpected results?
4. What data have you collected on the medicinal efficacy of the studied herbal medicines?
5. What kinds of scientific techniques are you/ have you used to conduct this research?
6. What are your research plans moving forward?
7. Have you conducted similar experiments in the past?

Questions for Clinical Trial Researchers

1. What is the structure of your clinical trial?
2. What research was conducted prior to this to prompt a clinical trial?
3. What scientific claims are you trying to prove or disprove?
4. What were the requirements to become a participant?
 - a. Are there any confounding variables that could affect the results of this study?
5. What stage are you at in your research?
 - a. What have you already completed?
 - b. Have you made any definitive or potential discoveries?
 - c. Has your data supported or contradicted your hypothesis so far?
 - d. Have you had any unexpected results?
6. What data have you collected on the medicinal efficacy of the studied herbal medicines?
7. Have you recorded any positive/negative side effects of the medicines?
8. What are your research plans moving forward?
9. Have you conducted similar experiments in the past?

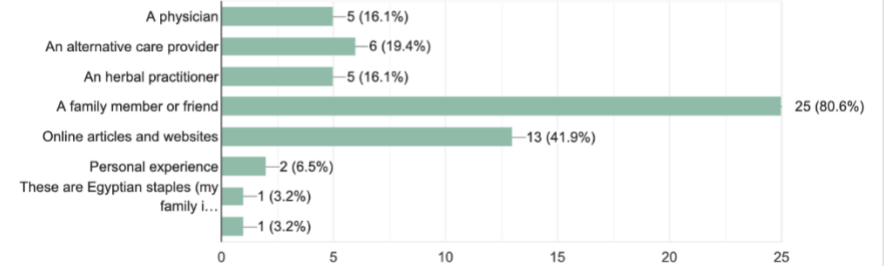
Thank you for allowing us to interview you! If you have any questions about this project, please give us your contact information and we will get back to you. You can also reach out to us at gr-herbs@wpi.edu.

Appendix E: Survey Summary and Responses



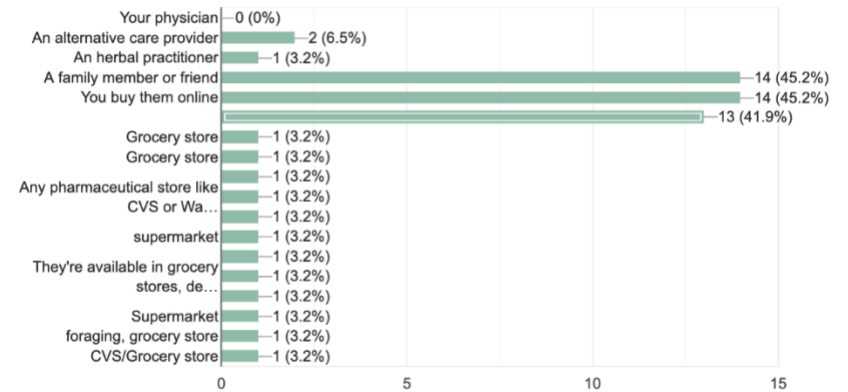
What information sources lead you to use herbal medicine? Select all that apply.

31 responses



From where do you physically obtain these medicines? Select all that apply.

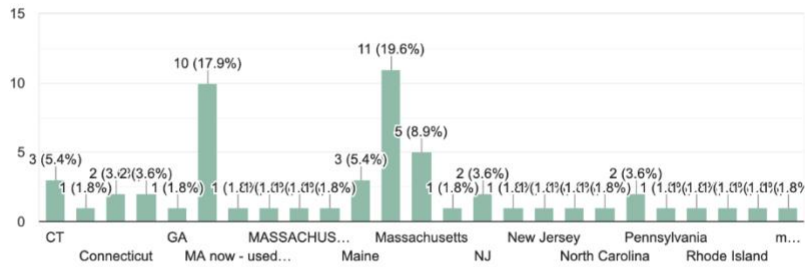
31 responses



Demographics

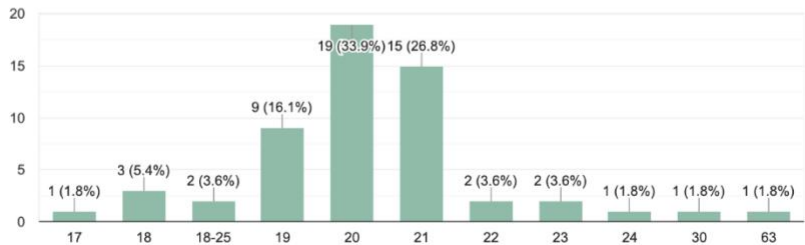
What US state is your primary residence?

56 responses



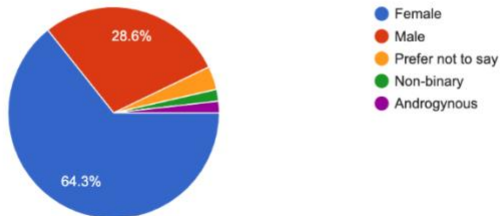
What is your age?

56 responses



What is your gender?

56 responses



Response #9

Do you use or have you used herbal medicine? *

- Yes
- No

Herbal Medicine Feedback

As a reminder: We define herbal and plant-based medicine as medicine that originates from any part of a plant and has chemical properties that possess medicinal value. This consists of fresh or dried herbs/plants, roots, leaves, bark, flowers, and seeds.

They can be consumed/applied as powder, tablets, capsules, tea, oil, cream, etc.

What herbal medicines do you use? Please be as specific as possible.

1. I have a Chinese medicine cookbook that combines traditional Chinese food medicine with modern meals and I use those when I'm feeling under the weather
2. herbal teas
3. in minor aromatherapy with candles I make myself
4. Handmade facemasks with different herbs and material ingredients

What is the purpose of the herb(s) you listed? If you have more than 5, just do your top 5 herbs. Please list in the same order as above.

Acute means a condition that has a severe and sudden onset. Chronic means a condition lasting more than 3 months.

	Medicine #1	Medicine #2	Medicine #3	Medicine #4	Medicine #5
To boost immunity	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
An acute injury	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
A chronic injury	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A common/acute illness (a common cold etc)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A chronic illness	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A mental health condition	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Energy	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Overall health and wellbeing	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

What information sources lead you to use herbal medicine? Select all that apply.

- A physician
- An alternative care provider
- An herbal practitioner
- A family member or friend
- Online articles and websites
- Other: _____

From where do you physically obtain these medicines? Select all that apply.

- Your physician
- An alternative care provider
- An herbal practitioner
- A family member or friend
- You buy them online
- You buy them in a specialty store
- Other: _____

Do these herbal medicines work better or worse than pharmaceutical options?

They work well for different things... Headache or upset stomach? Work better 100% .. the flu or COVID? I'm going for modern medicine any day

Have you experienced positive/negative side effects with these herbal medicines?

I find they have less side effects than modern medicine for minor issues

Response #23

Do you use or have you used herbal medicine? *

- Yes
- No

What herbal medicines do you use? Please be as specific as possible.

Medically prescribed marijuana in oil form

What is the purpose of the herb(s) you listed? If you have more than 5, just do your top 5 herbs. Please list in the same order as above.

Acute means a condition that has a severe and sudden onset. Chronic means a condition lasting more than 3 months.

	Medicine #1	Medicine #2	Medicine #3	Medicine #4	Medicine #5
To boost immunity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
An acute injury	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A chronic injury	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A common/acute illness (a common cold etc)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A chronic illness	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A mental health condition	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Energy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Overall health and wellbeing	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

What information sources lead you to use herbal medicine? Select all that apply.

- A physician
- An alternative care provider
- An herbal practitioner
- A family member or friend
- Online articles and websites
- Other: _____

From where do you physically obtain these medicines? Select all that apply.

- Your physician
- An alternative care provider
- An herbal practitioner
- A family member or friend
- You buy them online
- You buy them in a specialty store
- Other: _____

Do these herbal medicines work better or worse than pharmaceutical options?

Yes, for me, other psychiatric medications worsened my depression/anxiety, but medical marijuana is great for my issues.

Have you experienced positive/negative side effects with these herbal medicines?

Overuse can sometimes lead to overtiredness, and it's somewhat expensive. That's it though

Response #34

Do you use or have you used herbal medicine? *

Yes

No

What herbal medicines do you use? Please be as specific as possible.

Herbal teas

What is the purpose of the herb(s) you listed? If you have more than 5, just do your top 5 herbs. Please list in the same order as above.

Acute means a condition that has a severe and sudden onset. Chronic means a condition lasting more than 3 months.

	Medicine #1	Medicine #2	Medicine #3	Medicine #4	Medicine #5
To boost immunity	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
An acute injury	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A chronic injury	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A common/acute illness (a common cold etc)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A chronic illness	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A mental health condition	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Energy	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Overall health and wellbeing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

If you selected "Other" in the previous question, please elaborate.

sleep help

What information sources lead you to use herbal medicine? Select all that apply.

- A physician
- An alternative care provider
- An herbal practitioner
- A family member or friend
- Online articles and websites
- Other: _____

From where do you physically obtain these medicines? Select all that apply.

- Your physician
- An alternative care provider
- An herbal practitioner
- A family member or friend
- You buy them online
- You buy them in a specialty store
- Other: _____

Do these herbal medicines work better or worse than pharmaceutical options?

Worse but they help a little

Have you experienced positive/negative side effects with these herbal medicines?

No

Appendix F: Herbal Medicine Catalog



All Herbs:




	Herb	Form	Take For	Obtained From	Specific Preparation	Side Effects	Category
1	Alfalfa & Broccoli Sprouts	Seeds, Whole Food	•Gut Health	•Grocery Store	Wash seeds, place in a jar, and let sit in dark until sprouted	-	Whole Food
2	Aloe Vera	Extract, Topical Gel	•Acute Injury	•Grocery Store	-	-	Topical
3	Amalaki	Capsule	•Anticancer •Gut Health •Respiratory Disease •Vitamin C Deficiency	•CAM/Herbal Practitioner •Online	-	-	Ayurvedic, CAM, Capsule
4	Amol	Internal and External Tonic	•Acute Injury (Soothes Aches) •Clear Skin •Muscle Relaxer •Overall Health	•Family/Friend •Specialty Store	-	Positive	Topical
5	Anise	Seeds, Tea	•Common Illness •Sore Throat	•Family/Friends •Grocery Store	-	-	Ayurvedic, Common Illness, Culinary, Tea
6	Apple Cider Vinegar	Vinegar, Fermented Beverage	•Cleansing •Digestion •Gerd	•Grocery Store	-	-	Non Herb
7	Arnica	Capsule	•Acute Injury (Soothes Aches and Pains, Bruises) •Chronic Injury •Muscle Relaxer	•Family/Friends •Online •Specialty Store	-	-	Ayurvedic, Capsule, Chinese
8	Artichoke	Tea	•Overall Health	•Grocery Store •Specialty Store	-	-	Tea
9	Ashwagandha	Capsule	•Immune Booster •Overall Health	•CAM/Herbal Practitioner •Online	-	-	Ayurvedic, CAM, Capsule, Immune Booster
10	Baking Soda	Powder	•Alkalize Body •Cleansing	•Grocery Store	-	Very alkaline, excess can lead to impaired digestion	Non Herb
11	Barley Grass	Powder	•Cleansing Heavy Metals •Energy •Immune Booster	•Specialty Store	-	-	Energy, Immune Booster
12	Basil	Dried Leaves	•Anticancer •Antioxidant •Mental Health (Stress)	•Grocery Store	-	-	Ayurvedic, Culinary, Mental Health
13	Bee Pollen	Whole Food	•Chronic Illness (Allergies) •Immune Booster	•Specialty Store	-	-	Non Herb, Immune Booster, Whole Food
14	Bitter Gourd	Whole Food	•Controls Blood Sugar	•Specialty Store	Peel off the skin and eat the fruit raw or cooked	-	Ayurvedic, CAM, Whole Food
15	Black Pepper	Powder	•Digestion	•Grocery Store	-	-	Ayurvedic, CAM, Culinary
16	Black Tea	Tea	•Common Illness •Energy •Overall Health	•Grocery Store	-	-	Common Illness, Energy, Tea
17	Boneset	Tea	•Acute Injury	•Online •Specialty Store	-	-	Tea

Ayurvedic Herbs:

	Herb	Index
1	Amalaki	3
2	Anise	5
3	Arnica	7
4	Ashwagandha	9
5	Basil	12
6	Bitter Gourd	14
7	Black Pepper	15
8	Cardamom	18
9	Carom Seeds	19
10	Chyawanprash	26
11	Cinnamon	27
12	Cloves	30
13	Echinacea	34
14	Eucalyptus	36
15	Fennel	38
16	Garlic	42
17	Ghee	44
18	Ginger	45
19	Mustard Seed	68
20	Stinging Nettle Leaf	90
21	Tapioca	91
22	Triphala	97
23	Turmeric	98
24	Whole Olive Leaf	100

Herb Pictures:

	Herb	Pictures	Index
1	Alfalfa & Broccoli Sprouts		1
2	Aloe Vera		2
3	Apple Cider Vinegar		6

	Herb	Pictures	Index
4	Ashwagandha		9
5	Baking Soda		10
6	Barley Grass		11

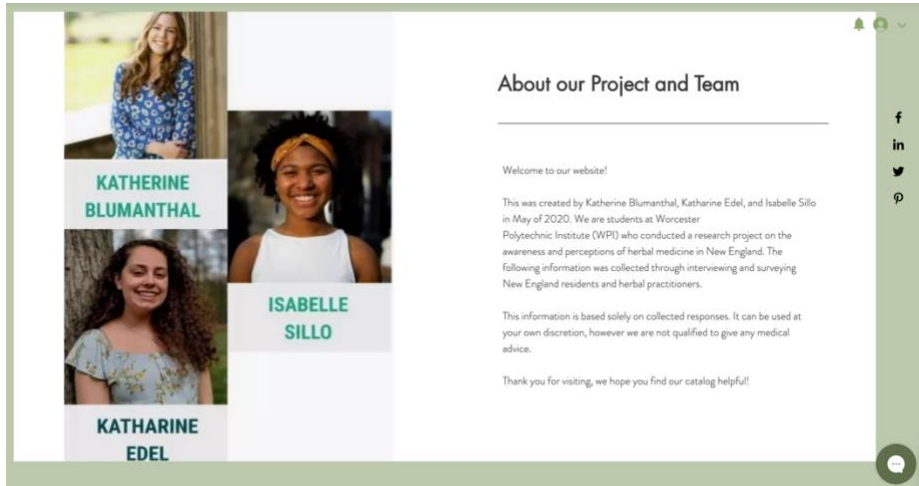
Appendix G: Herbal Medicine Website

Website Link: <https://herbalmedicineiqp.wixsite.com/herb-catalog-iqp>

Home Page:



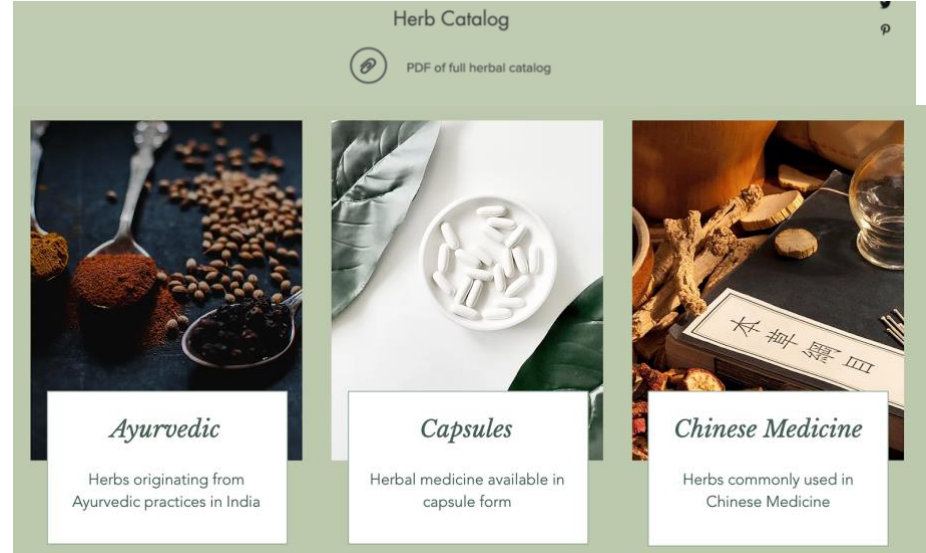
Our Project and Team:

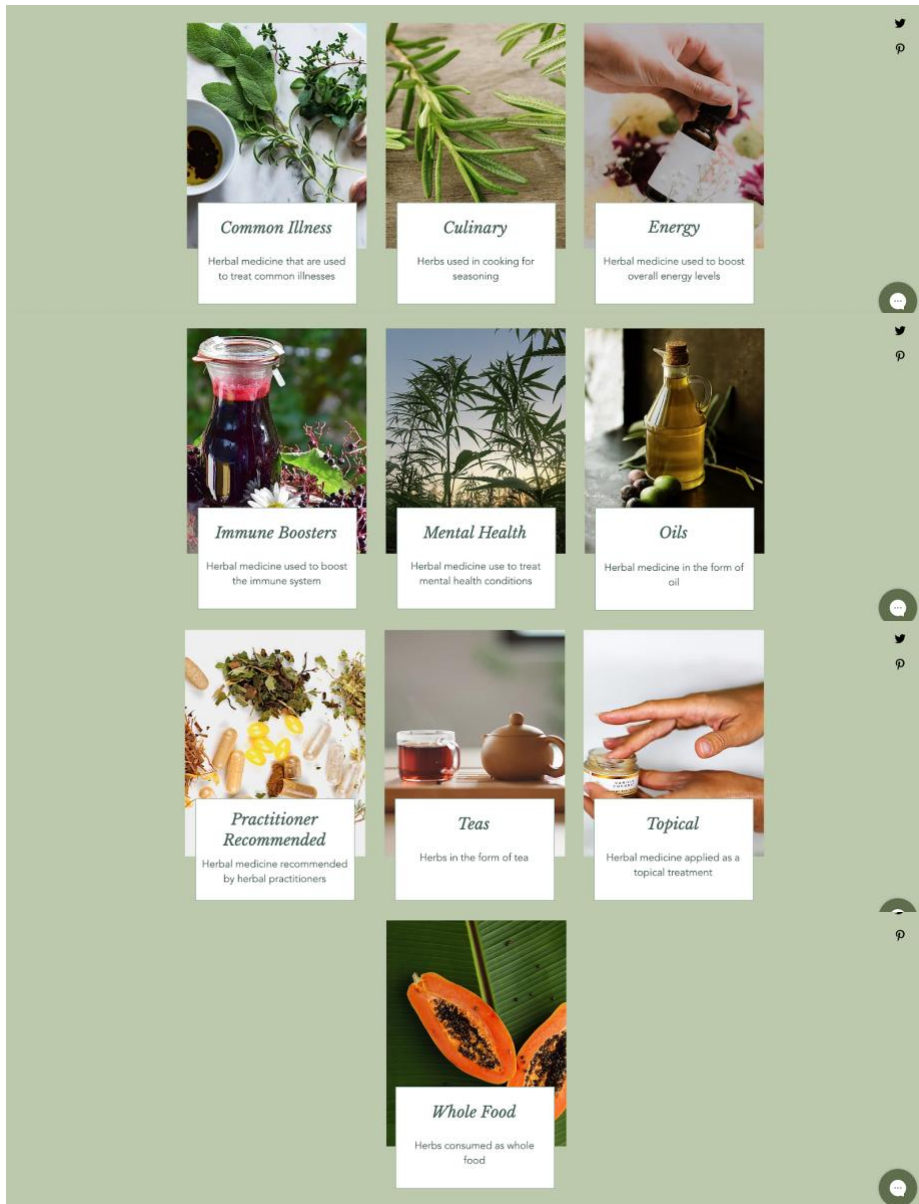


Benefits of Herbal Medicine:



Herb Categories:





Example Page of Herb Categorization:

Ayurvedic

Herbs originating from Ayurvedic practices in India

- Amalaki
- Anise
- Arnica
- Ashwagandha
- Basil
- Bitter Gourd
- Black Pepper
- Cardamom
- Carom Seeds
- Chyawanprash
- Cinnamon
- Cloves

- Echinacea
- Eucalyptus
- Fennel
- Garlic
- Ghee
- Ginger
- Mustard Seed
- Stinging Nettle Leaf
- Tapioca
- Triphala
- Turmeric
- Whole Olive Leaf

Information Sources:



Links to Efficacy Studies:

Efficacy Studies

Aloe Vera

Review of Studies:



Treats Burns:



Echinacea

Review of our Studies:



Review of Studies:



Elderberry Extract

Treat Influenza A and B:



Treat Influenza B:



Treat Cold Symptoms:



Review of Studies:



Eucalyptus

Treat Bronchitis:



Garlic and Honey

Ex-vivo, Against Bacteria:



Links to Our Deliverables:

Team Research



Herbal Catalog

Full list and categorization of reported herbs used in New England

Last Updated: May, 13, 2020



Research Paper

Complete report of our research project

Last Updated: May, 13, 2020

Links to Trusted Herbal Medicine Distributors:

Trusted Distributors

These herbal medicine companies and distributors were recommended by the herbal medicine practitioners and informal users we interviewed

[Banyan Botanicals](#)

[Green Med Info](#)

[Kottakkal](#)

[Medical Medium](#)

[Mountain Rose Herbs](#)

[Supreme Nutrition Products](#)

Blank Page for User Reviews:

User Reviews

Will be completed by future projects

Questions and Feedback Submission & Contact Information:

The screenshot shows a web form titled "Questions & Feedback". It includes input fields for "Name", "Email", "Subject", and "Message". A "Submit" button is located below the "Message" field. A "Thanks for submitting!" message is visible below the submit button. To the right of the form are social media icons for Facebook, LinkedIn, Twitter, and Pinterest. In the bottom right corner, there is a "Contact Us" section with the email address "gr-herbs@wpi.edu" and a chat bubble icon.