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# Integration of Complementary and Alternative Medicine into the Healthcare System in the United States

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# Integration of Complementary and Alternative Medicine into the Healthcare System in the United States

Nikki Lu  
Healthcare Leadership  
May, 2018

Faculty Adviser: Dr. Weichao Yuwen

Essay completed in partial fulfillment of the requirements for graduation with Global Honors,  
University of Washington, Tacoma

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## Introduction

Chronic diseases including heart disease, cancers, chronic lower respiratory diseases, stroke, Alzheimer's disease and diabetes are consistently among the leading causes of mortality in the US (Centers for Disease Control and Prevention [CDC], 2017). Chronic diseases are also an issue around the globe (World Health Organization [WHO], 2018). Chronic diseases are hard to prevent because of various systemic factors including economic, social, political and policy issues (Shaffer, 2013). The US healthcare system is very complex and the factors that were mentioned above are a few examples of the current issues in the US healthcare system. These factors have created various health disparities and inequities among ethnic groups and other socially constructed groups, and financial expenditures in the US healthcare system (WHO, 2018; Fineberg, 2012). Healthy People 2020 (2018) defined the five major areas of determinants of health as “economic stability, education, social and community context, health and healthcare, and neighborhood and built environment.” Socioeconomic issues are important because these issues correlate to the affordability of healthcare (Swain, 2016).

The US healthcare system has been implementing some approaches to address socioeconomic issues such as social determinants of health, as well as complementary and alternative medicine (Edwards, 2012). Complementary and Alternative Medicine, also known as CAM, is defined as “a group of diverse medical and healthcare systems, practices, and products that are not presently considered to be part of conventional medicine” (National Center for Complementary and Integrative Health [NCCIH], 2016).

This paper will focus on socioeconomic issues in the US healthcare system, the current approaches in addressing these issues, and possible additional solutions by integrating

complementary and alternative medicines, such as treating food as medicine and Traditional Chinese Medicine in conjunction with the US healthcare system. The reason food as medicine and Traditional Chinese Medicine are chosen is because everyday people eat food and Traditional Chinese Medicine has existed since ancient times; therefore Traditional Chinese Medicine has had numerous opportunities to be refined and improved over the years (National Center for Complementary and Integrative Health [NCCIH], 2013). In order to examine the feasibility of integrating CAM in the US healthcare system, I went to a rural hospital in Taiwan, called Chang Bing Show Chwan Memorial Hospital. I interviewed the current vice-president of the hospital and learned about the hospital and Taiwan's integrative healthcare system which enables hospitals to integrate conventional medicine and CAM in their healthcare system as a global case study model.

### **Current Issues in the US Healthcare System**

Socioeconomic issues are among the numerous issues in the US healthcare system that impact the affordability of healthcare (Weinick, Byron & Bierman, 2005). Socioeconomic factors contribute to 40% of the social determinants of health (County Health Rankings, 2018). According to Centers for Medicare and Medicaid Services (2018), the National Health Expenditure Accounts estimated the total health expenditures in 2016 grew about 4.3% or \$3.3 trillion, which is \$10,348 per individual. Emanuel and Fuchs (2008) stated that "employers do not bear the cost of employment-based insurance; workers and households pay for their healthcare insurance through lower wages and higher prices. Moreover, government has no source of funds other than taxes or borrowing to pay for health care" (p.1057).

### **Healthcare Costs**

As healthcare costs increase and hospital budgets become limited, many American adults have problems in affording healthcare due to various income levels and health insurance coverage plans (Weinick, Byron & Bierman, 2005). For most people in the working age group of 18 years and older, their health insurance coverage is dependent on their working status. There are 12.4% of people between the ages 18-64 years old that are uninsured, 69.2% have private insurance, and 20.0% have public insurance. Based on these statistics, most people in the working age have insurance plans. However, the majority still cannot afford the rising costs of healthcare when they receive patient care in hospitals or clinics (CDC, 2017).

Shaffer (2013) indicated that in the past when the Affordable Care Act (ACA) did not exist yet, there were no requirements for employers to have employees receive health insurance coverage or “that insurance companies accept anyone for coverage” (p. 969). Before ACA was implemented, most people that were not part of a union or working for a company found that obtaining health insurance coverage was very difficult. People that had health conditions would be rejected for no reason. The reason was if these people with health conditions had succeeded in obtaining health insurance coverage, the financial costs would become burdensome on the insurance company.

### **Exclusivity in Insurance Packages**

Another issue that impacts the affordability of healthcare is the basic government insurance package that most people obtain through their employer which is Medicare. Medicare is intended for people aged 65 years and older. The original Medicare (Part A and Part B) coverage provided insurance for hospital care, skilled nursing care, nursing home care, hospice and home health care. The Medicare Advantage Plan covers clinical research, ambulance services, medical equipment, mental health services, a second opinion before surgery, and

limited outpatient prescription drugs. The Advantage Plan also covers preventive services such as the flu shot or detecting early stages of illnesses. However, some of these services only provide coverage for certain conditions (Medicare, n.d.).

The other common insurance coverage plan that some people are qualified for is Medicaid. Medicaid is intended for socioeconomically disadvantaged people: families, pregnant women, children, elderly and people with some disabilities. However, in order for this population group to receive this coverage, there is a rigid limit on the income level and the recipient's assets (Assistant Secretary for Planning and Evaluation, 2005). The Medicaid coverage is similar to Medicare but Medicaid has a broader coverage such as dental coverage, prosthetics, preventative services, rehabilitation services, case management, and other practitioner services to name a few examples (Medicaid, n.d.).

In an effort to learn more about the economic issues in healthcare insurance coverage, I interviewed an occupational therapist. She combines occupational therapy with Jin Shin Jyutsu, also known as Healing Touch therapy, in her private practice. Since her graduation in 1986, she experienced working in a hospital, nursing home, in-and-outpatient rehabilitation center, hospice home, mental health center, and private homes. From her vast experiences in healthcare, most people that seek complementary and alternative medicine are people that do not want to be dependent on prescription drugs for life to alleviate their pain or treat their chronic diseases. The reason is that they already attempted various medical treatments from conventional medicine. These people usually have to pay out-of-pocket because in the past, most insurance companies do not cover complementary and alternative medicine. In recent years, there has been slow progress in which a few insurance companies are beginning to cover complementary and alternative medicine such as Massage Therapy, Tai Chi and Yoga (P. Firth, personal

communication, April 18, 2018). The closest service that offers complementary and alternative medicine is in Medicaid because this package covers other practitioner services (Medicaid, n.d.). Not everyone fits into this category of qualifying for Medicaid. This is problematic for people that would like to use complementary and alternative medicine in conjunction with the conventional medical services.

### **Pharmaceutical Drugs**

Pharmaceutical drugs are expensive because “it takes at least ten years for a new medicine to complete the journey from initial discovery to the market place, with clinical trials alone taking six to seven years on average. The average cost to research and develop each successful drug is estimated to be about \$2.6 billion” (Pharmaceutical Research and Manufacturers of America [Phrma], 2015, p. 1). These costs includes the trial and error of the drugs which may cost thousands to millions during the research and development phase. Prior to drugs being subjected to clinical trials there is less than a 12% chance that the drug is approved for this process. In order for drugs to be considered successful the drugs require a great amount of resources such as scientists, latest technologies, updated manufacturing processes as well as project management (Phrma, 2015, p. 1). After the pharmaceutical drug is successful, pharmaceutical companies need to apply for patent approval. This patent term is exclusive for twenty years depending on the type of drug. However, the patent can be issued or expire at any time despite the drug’s approval status (Food and Drug Administration, 2018).

Research shows that 8% of people do not take their medication because they cannot afford the medication (LeWine, 2015). People would rather save their money instead of buying and taking pharmaceutical drugs. For adults younger than 65 years old, 6% of them do not buy or take drugs even though they are privately insured because they want to save money. With people



that are insured through Medicaid, 10% save their money instead of buying or taking drugs and 14% of people that are uninsured do not buy or take drugs in order to save money (LeWine, 2015).

Another problematic factor about prescription drugs is that they increase the risk of addiction in people that constantly rely on prescription drugs. There has been an opioid epidemic in the United States for the last twenty years. People have developed an opioid use disorder and have died from opioid overdoses (Jette, 2018).

### **Hospital Procedures**

In another case, people go for the option of taking prescription drugs even though people know drugs are expensive because of hospital procedures such as surgery. From 1997 to 2010, knee replacement and spinal fusion on average doubled in rates of hospitalization. A common procedure, cesarean section, has increased about 41% from 1997 to 2010 in rates of hospitalization. The rate of hospitalizations with indwelling catheters tripled from 1997 to 2010 (Pfundner, Wier & Stocks, 2013). These surgical procedures require pain medication which add to the total amount of hospital costs depending on the amount of days spent in the hospital. Most people cannot afford such high costs in clinical care despite insurance coverage.

Although the death rates from medical and surgical complications have declined over the years from 1999 to 2009 (CDC, 2012), not all hospital procedures have a high success rate in every person, which requires being admitted into the hospital more than once. Research by Maxwell (2014) noted an increase of death six days after cardiac surgery and a surprising amount of death at the 30 day mark (Maxwell, 2014). If the patient passes the 30 day mark, the patient is more likely to survive. This mortality rate leads to external pressures, resulting in

regulatory agencies and hospitals creating a success rating on surgeon performance success (Maxwell, 2014).

### **Current Approaches in Addressing the Issues in the US Healthcare System**

#### **Addressing Social Determinants of Health**

The purpose of Healthy People 2020 is to create a social and physical environment that promotes overall good health for people by addressing social determinants of health. Social determinants of health are defined by the five major areas of determinants of health, “economic stability, education, social and community context, health and healthcare, and neighborhood and built environment” (Healthy People 2020, 2018). According to Robinson, “Those who are less well-off often lack the information or resources to make informed choices on adapting to or otherwise avoiding future damages . . . so in times of crises the vulnerability of marginalised groups can increase dramatically” (Robinson, 2009, p. 50).

**Policy.** In order to improve the quality of social determinants of health, Dean, Williams and Fenton (2013) recommended that the most effective way to address social determinants of health issues is through policy makers implementing laws and strategies to improve the healthcare system at the local and national level. This section will focus on how the environment and policy correlates together.

A case in the documentary “Place Matters,” produced and directed by Ellie Lee (2008), showed how the environment in a neighborhood was changed through policy change and the implementation of the policy change. This case was located in Seattle, Washington where a neighborhood called High Point had low housing quality. Most houses had mold growing inside which invited dust mites. These factors induced a high rate of asthma and emergency room visits. Each emergency room visit for one child cost about \$3,000 to \$5,000. To solve the asthma

issue, a project called “breathe easy homes” was created. This new home project allowed a young child suffering from asthma and his family to move in to the new High Point where the homes had a better ventilation system that recycled the polluted air. By moving into a house with a better ventilation system, this saved the family a two-year cost of visiting the emergency room. The new High Point neighborhood also had a community garden where fresh produce was available. This type of funding was possible through the Federal Hope VI program. This case showed a positive effect on public health and people’s health in the long term.

**Environment.** “Neighborhood and built environment” (Healthy People 2020, 2018) in other words the physical environment includes the local and global environment. A person’s typical environment includes a home, neighborhood, school, workplace, communities, and the global environment.

Another case shown in “Place Matters” is a Laotian immigrant that lived in Richmond, California. He suffered from heart disease and is at risk of sudden death even though he was not a tobacco user, had no family history of diabetes, and no family history of heart disease at a young age. Since his heart disease did not result from those aforementioned factors then the next possible factor was the environment. He lived in an area where petrochemical companies constantly emitted an immense amount of pollutants every year. Stores that sold tobacco, liquor, and fast food were easily found in this neighborhood. What were not easily found was fresh produce, quality housing, and safe public places. His environment had a high rate of asthma, hospitalization, diabetes, and lower life expectancy (Lee, 2008). His case showed the significance of an individual’s local environment in relation to their health and wellness.

However, at the global level, globalization has allowed conglomerates to have more access to resources around the world. This accessibility to resources contributes to the global

environmental crisis that we are all facing at the moment. Of all the conglomerates and industries that contribute to environmental degradation, the most detrimental industry is animal agriculture (Hyner, 2015). “Livestock and their byproducts account for at least 32,000 million tons of carbon dioxide (CO<sub>2</sub>) per year, or 51% of all worldwide greenhouse gas emissions” (Goodland & Anhang, 2009). “Animal agriculture is responsible for 18% of greenhouse gas emissions, more than the combined exhaust from all transportation” (Food and Agriculture Organization, 2006). Research by Hyner (2015) discussed that the driving factor of environmental degradation all points to the human reliance on animal products. Environmental degradation includes climate change, ocean dead zones, fisheries depletion, species extinction, deforestation, health issues and many more (Hyner, 2015). These global environmental issues all contribute to the risk of developing chronic diseases among people.

In recent decades, environmental documentaries have been trending because they showed the detrimental cost of attempting to sustain animal agriculture. A few examples include “Earthlings” (Monson et al., 2005), “Cowspiracy: The Sustainability Secret” (Andersen & Kuhn, 2014), and “Before the Flood” (Stevens et al., 2016). These documentaries showed evidence of the global environmental degradation. Industrial agricultural farming caused many issues such as pesticide toxicity, water pollution, junk food from commodity crops, and antibiotic resistant bacterium. These issues harm the health and safety of workers, consumers, downstream neighbors, and animals (Union of Concerned Scientists [USC], n.d.). Industrial farming also increases the depletion of soil fertility, irrigation costs, soil erosion and biodiversity loss (USC, n.d.) Most people are unaware of these hidden costs of meat and how much effort is put into producing one pound of meat. These factors that are mentioned contribute to the global environmental crisis which affects the health of everyone living on Earth.

**Nutrition.** Socioeconomic status (SES) also affects the quality of food that people buy because people with low SES may be lacking in resources (Robinson, 2009). According to the Office of Disease Prevention and Health Promotion (2018), the current dietary guidelines for Americans from the year 2015 to 2020 is to make shifts to healthier eating. The main focus of the dietary shift is to transform unhealthy eating patterns into healthy eating patterns. A healthy eating pattern include a variety of nutrient-dense food, healthy beverage choices, and avoiding highly processed foods that are carcinogenic. An example of carcinogenic food is processed meat, as reported by the World Health Organization (2015). The definition of a variety of nutrient-dense food include a variety of vegetables, whole fruits, grains, fat-free or low fat dairy products, a variety of protein which include lean meat, seafood, poultry, eggs, in addition to legumes, soy products, nuts and seeds, oils from plants (Office of Disease Prevention and Health Promotion, 2018).

Although the current dietary guideline advises to avoid certain foods in order to increase healthy eating behaviors; there is still an issue that is not addressed directly. The issue with this dietary guideline is that this diet include dairy, eggs, meat and seafood. The reasons aforementioned about industrial agricultural farming causes damage and increase environmental degradation which affect social determinants of health.

### **Precision Medicine**

Another current approach in addressing health disparities and inequities is in the paradigm shift of healthcare. Healthcare changed from a reactive approach in medicine to a preventative approach. Preventative medicine is viewed as holistic because preventative medicine approaches the treatment of disease from a person's lifestyle. This addresses the causes instead of the effects (Clarke, 1974). An example of preventative medicine is precision medicine.

Precision medicine is considered a personalized approach that addresses preventative care for each individual differences through lifestyle, environment, biology and genetic traits (National Institute of Health All of Us Research Program, 2018). Advancement in precision medicine give medical professionals insight on the biological and environmental factors on how to approach a patient's well being, predict the most effective treatment, and tailor new treatments according to specific genetic traits (Dankwa-Mullan, Bull & Sy, 2015).

### **Alternative Approaches in Addressing the Issues in the US Healthcare System**

#### **Food as Medicine**

As previously mentioned, recent documentaries showed the detrimental costs of animal agriculture. There is a recent trend for shifting to healthier eating behaviors that are similar to the guideline proposed by Healthy People 2020 (2018). This section provides evidence that diet is a form of preventative healthcare and that various nutritional benefits can be obtained based on the value of a good diet. A good diet requires the knowledge of which whole foods should be eaten for the prevention of chronic diseases (Pitchford, 2002).

Pitchford (2002) synthesized a collection of dietary and herbal medicine from the East such as Traditional Chinese Medicine and Ayurvedic Medicine, in addition to information from the West such as the current knowledge on nutrition. Whole foods can be healing for the body because of their various nutritional benefits. Ancient Chinese healers analyzed food in a different perspective. They classified food and disease according to observable patterns. This perspective recommends people to eat cooling food when their body is overheated or eat warming food when their body is chilled. Foods that have detoxifying properties are for people that have excessive toxins in their body. There are foods for people that have deficiencies or excessive levels of

various nutrients. Ancient Chinese healers have classified food based on the five different tastes and attributed the tastes to different organs in the human body (Pitchford, 2002).

Pitchford (2002) also addressed the various ways a person can get complete nutrition through incorporating a variety of whole foods and using medicinal herbs as a way to heal the body. They also encouraged people to adapt a vegetarian diet. For example, a common concern in the US is vitamin B12 deficiency among people that eat a plant-based diet and non-plant-based diet. Vitamin B12 can be found in algae, nutritional yeast and fermented foods because vitamin B12 is synthesized by bacteria. In recent years, the US and other technologically advanced countries have difficulties in obtaining vitamin B12 due to the over-sanitization of our foods. In third world countries, foods are populated with vitamin B12 because they do not over-sanitize their food (Pitchford, 2002).

For socioeconomically disadvantaged people, instead of taking drugs for treating diseases they could change their lifestyle habits (Polak, Pojednic & Phillips, 2015). Physicians tend to prescribe medication for patients instead of prescribing behavioral lifestyle changes, such as changing their dietary habits (Polak, Pojednic & Phillips, 2015). Research has shown that when medical students graduate from medical schools, they have reported that their education in nutrition is inadequate. The results of surveying various medical schools showed that students receive about 23.9 hours of education in nutrition (Adams, Lindell, Kohlmeier & Zeisel, 2006). This study showed that most medical students in the United States do not have enough knowledge about nutrition.

A possible long term solution is using food as medicine which reduces the risk of developing chronic diseases and financial costs of medical treatment by eating a proper diet that meets the nutritional requirements for the human body. A recommended diet could be a plant-

based diet because in recent decades there has been increased evidence that a plant-based diet is healthier and has adequate nutrition to support the body's functions (Hever, 2016). Several studies have shown a plant-based diet reduced ischemic heart mortalities, type 2 diabetes, obesity, the reliance of medication, cancer incidences, and cardiovascular disease mortalities (Barnard et al., 2009; Huang et al., 2012; Orlich et al., 2013).

Plants have myriads of nutritional benefits such as phytochemicals and fibers. These two nutrients can only be found in plants. Phytochemicals include carotenoids, glucosinolates and flavonoids, which have multiple health benefits that protect the body from developing chronic diseases (Hever, 2016). Fibers found in plants help the digestive system process food. Another health benefit of a plant-based diet is that this diet eliminate the side effects of consuming animal products (Hever, 2016).

In addition, plants that have medicinal properties are herbs and spices, which can be considered as natural drugs because of their healing properties (Pitchford, 2002). Some common medicinal herbs and spices are “clove, oregano, thyme, cinnamon and cumin” (Liu et al., 2017). For example, clove is known for possessing antimicrobial activities against various bacterium such as staphylococcus aureus (Xu, Liu, Hu, Cao, 2016). Oregano is known for possessing antimicrobial activities and antifungal properties against various bacterias (Babacan, Cengiz & Akan, 2012). Thyme also possess antimicrobial activities against pathogens, bacteria spoilage, and antifungal properties (Liu et al., 2017). Cinnamon also has antimicrobial properties and can treat diseases such as inflammation, gastrointestinal disorders, and urinary infections (Nabavi et al., 2015; Brierley & Kelber, 2011; Al-Jiffri et al., 2011). Cumin has antiseptic properties and can be used as a disinfectant (Reza, Atefeh & Faezeh, 2015).



Although medicinal herbs aid in healing, not every medicinal herb should be consumed due to the toxic undesired side effects. An example of a toxic plant used for medicinal purposes is allium. “Allium is a genus of 500 species from the Liliaceae” (U.S. Food & Drug Administration [FDA], 1985, p. 1). Some commonly known allium species include chive, garlic, leek, onion, rakkyo and shallot. The medicinal properties of allium are antimicrobial, antibacterial, antifungal and insecticidal. The undesired side effects of these plants outnumber the medicinal effects. The effects include being antinutritional and the toxicity from the plants taints milk and other food products (FDA, 1985).

Beck (2001) discovered that garlic has a toxic chemical compound called sulphone hydroxyl ion that penetrates the blood-brain barrier including the corpus callosum and the entire body. Sulphone hydroxyl ion is similar to Dimethyl Sulfoxide, which is poisonous to brain cells and higher life forms. Beck later owned Alpha-Metrics Corporation and built biofeedback equipment that demonstrated that garlic usually desynchronized the brain waves. His test subjects appeared clinically dead on the encephalography. He also noted that the toxins in garlic affect the mind and concentration abilities, which produced headaches and short attention spans.

Another example of medicinal food that causes toxins is onion. There are several studies that have shown the long lasting toxic effects of onions which may cause allergies, intestinal gas, diarrhea, gastroesophageal reflux, and anemia (Allen, Mellow, Robinson & Orr, 1990; Davidson, London & Ladewig, 2010; Fujii, Dale & Beutler, 1984; Chang et al., 2010; National Institutes of Health National Institute of Diabetes and Digestive and Kidney Diseases, 2016). Onions are also useful in ranking the environment according to the toxicity level due to the ability of onion cells absorbing heavy metal ions in the soil (Fiskesjo, 1988).

### **Traditional Chinese Medicine (TCM)**

Traditional Chinese Medicine also known as TCM emerged from ancient China (National for Complementary and Integrative Health [NIH], 2017). The foundation of TCM is built on the completed collection of medical practices which were compiled into a book called the Yellow Emperor's Inner Canon also known as Huang Di Nei Ching which was written around the first or second century B.C. This work include two texts which are Suwen and Lingshu (UnSchuld, 2003). TCM include various methods to heal a person's mind and body. Some well known methods are Herbal Medicine, Acupuncture, Tai Chi, Qi Gong, Tui Na (massage), dietary therapy and other methods. TCM approaches medicine in a holistic method by looking into all the possible factors that may increase the risk of developing the initial disease and possible comorbid conditions that may have developed afterwards (NIH, 2017).

There is a population group that are not completely satisfied with conventional medicine in the US therefore they seek Traditional Chinese Medicine (Lu & Lu, 2014). Acupuncture and Herbal Medicine are among the most commonly used TCM therapy (NIH, 2017). Acupuncture does not involve drug injections, instead acupuncturists uses needles (Lu & Lu, 2014). Acupuncture needles are safe since the development of the disposable sterile needles which are regulated by the FDA (Ernst & White, 2001; NIH, 2017). Chinese Herbal medicine is natural and milder than western drugs and can be "complementary to each other for synergizing therapeutic effects" (Lu & Lu, 2014).

In the United States, TCM has been categorized as Alternative Medicine since TCM is not completely integrated in the current US healthcare system. In the past, insurance companies did not provide insurance coverage. Thus, people that see TCM practitioners or other CAM therapies would have to use their out-of-pocket expenses to pay for the treatment. "In the United States, consumers spend over \$34 billion per year on CAM therapies (MacLennan, Wilson,

Taylor, 2002). Research has shown, after economic evaluations, CAM therapies may be considered cost-effective for some common conditions such as acupuncture for migraines or manual therapy for neck pain (Herman, Craig & Caspi, 2005). However, there has been an increasing trend for insurance companies to cover more CAM such as Acupuncture, Yoga, Tai Chi and massage therapy (P. Firth, personal communication, April 18, 2018).

Although the usage of TCM is growing around the world because of its therapeutic benefits, “the fundamental issue hindering its acceptance by the Western medicine community and integration into mainstream healthcare is still the lack of robust evidence from the Evidence-Based Medicine perspective” (Fung & Linn, 2015). The lack of robust evidence is the reason there need to be more support and research on the efficacy of TCM on patient care.

### **Case Study**

I traveled to Taiwan to visit an exemplary rural hospital to learn about their implementation of both conventional medicine and complementary and alternative medicine within a hospital. The purpose of this project was to use this hospital as a case study and to examine the feasibility of integrating complementary and alternative medicine. The hospital is called Chang Bing Show Chwan Memorial Hospital. I interviewed the current vice-president of the hospital who is also a physician-surgeon at the hospital. First, I will mention the history of the healthcare system in Taiwan, then describe Chang Bing Show Chwan Memorial Hospital and my experience with the hospital.

In 1995, the National Health Insurance System also known as NHI was adopted in Taiwan. This insurance system is a “government administered insurance based national healthcare system” (Wu, Majeed & Kuo, 2010). This single payment system has “good accessibility, comprehensive population coverage, short waiting times, low cost, and national

data collection systems for planning and research” (Wu, Majeed & Kuo, 2010). The healthcare system was meant to combine small insurance schemes and independent physician practitioners to avoid out-of-pocket expenses for universal health insurance coverage (Wu, Majeed & Kuo, 2010). The National Health Insurance System has different revenue sources from employers, employees, and the government at the national and the local level. There are also various government subsidy programs for people with low SES and disadvantaged populations. People are insured through six main categories and fifteen subcategories based on their job and income (Wu, Majeed & Kuo, 2010).

The NHI insurance covers 99% of the population in Taiwan. The exception are people who moved out of Taiwan and prisoners (Wu, Majeed & Kuo, 2010). Taiwanese citizens have an NHI card that identify an individual and store medical information; this card is used to “bill to the national insurer” (Wu, Majeed & Kuo, 2010). This card is used every time a person uses medical services. The healthcare payment system in Taiwan is rather quick in comparison to the healthcare system in the United States (Wu, Majeed & Kuo, 2010). The single payment system has one of the lowest administrative costs globally and the cost is usually 2% lower than the total medical spending. Taiwan’s Department of Health annually works with physicians and hospitals to set the budget and this action helped decrease the healthcare cost (Wu, Majeed & Kuo, 2010).

Aforementioned, in terms of financial costs, Taiwan’s healthcare system is more cost effective. Nobel Prize Laureate in Economics, Paul Krugman lauded the healthcare system as one of the best around the world and NHI should be used as a model for US policymakers in shaping a better healthcare system (National Policy Foundation, 2008). After creating NHI, hospitals in Taiwan are able to provide better healthcare for more people.

Chang Bing Show Chwan Memorial Hospital is located in the rural city named Changhua and is also the flagship hospital. This hospital has three buildings altogether and the hospital's design is intended to be a health park. The design concept of this hospital is to bring the best service to accommodate patients without feeling burdened while receiving care and treatment in the hospital (Show Chwan Memorial Hospital, n.d.).

I had the opportunity to tour the three buildings. At first sight, I noticed the modernization of the hospital's interior design. The concept of this hospital is for patients and family members to feel that they are not in a hospital and have the patients feel as if they are halfway healed when they enter the parameters of the hospital. The interior design of the three buildings are created to heal all the senses (J. Ku, personal communication, December 22, 2017). Healing the senses of the patients is also considered a CAM therapy because this method is approaching patients in a holistic perspective (NCCIH, 2016). For example, to heal the sense of sight, the walls each have a different colors of the rainbow and paintings were hanged on the wall. For the sense of touch, the furniture in the hospital is comfortable and appropriate for all ages. For the auditory sense, there is an electric piano playing classical music in the main entrance that soothe patients and visitors.

The main building is a hospital that includes many departments found in conventional hospitals such as a labor and delivery unit, pediatric unit, oncology unit, radiology unit, intensive care unit, emergency unit, preventive care unit, and many more. This building is mainly for patients that want to use conventional medicine or TCM. On the basement level, there is an educational anatomy museum for patients to learn more about the process of surgery (Show Chwan Memorial Hospital, n.d.).

The second building is a rehabilitation center that includes many complementary and alternative therapies. The foundation of this building is built on the 6 Rs of Lohas which are release, refine, refresh, relax, recharge, and renew (Show Chwan Memorial Hospital, n.d.). Some examples of complementary and alternative medicine are physical therapy in a gym, with a complete set of equipment that is also available for employees and dance fitness and Yoga to treat both the body and mind for people that prefer those. There is a spa room dedicated for patients that prefer massage therapy to alleviate pain. Other CAM therapies to balance the mind and reduce stress are aromatherapy, psychotherapy, light therapy, and watching humorous movies to alleviate their stress.

On the other side of this same building are rooms designed for overnight stay for patients and family members. When the hospital's president, Huang Min-Ho was pursuing his bachelor's degree, he learned the value of welcoming family participation in patient health recovery. He also learned the 5 Ps in public health which are promotion, participation, prediction, prevention and personalization (J. Ku, personal communication, December 22, 2017).

This hospital is constantly innovating to improve healthcare quality and finding methods to treat diseases by investing in the latest technology. The third building is called Asia IRCAD. This building is a global educational resource center where the hospital invites various global experts to teach and share the current medical researches. This research center also includes an educational operating room for minimally invasive surgery practice and ongoing projects to further the research in treating chronic diseases (Show Chwan Memorial Hospital, n.d.).

According to Mr. Ku (2017), the vice-president of the hospital, the fundamental mission of this hospital is to provide a world-class medical care environment and high quality healthcare services. Since they are aiming for world-class medical care, this hospital also provides medical

tourism. People around the world would come to this hospital to receive treatment because the medical expenses are cheaper in Taiwan (J. Ku, personal communication, December 22, 2017)

### **Discussions**

After reviewing the literature on the current healthcare issues in the US healthcare system, current approaches in addressing health issues, CAM, and traveling abroad to conduct a case study on another healthcare system, I learned that there are various systemic factors that contribute to developing chronic diseases. One key point I learned is that prevention is critical in maintaining health because prevention can significantly reduce the risk of developing chronic diseases. People that already have chronic diseases also can reverse symptoms by changing their diet to plant-based or use an alternative therapy because each individual has different reactions to different treatments. I think this will allow more patient interaction with their provider to see which treatment is more effective to a patient's health and wellness.

The most significant change that needs to happen in the US healthcare system is to implement better healthcare policies at the national level that will benefit myriads of people across the US. My case study on the Chang Bing Show Chwan Memorial Hospital showed that this hospital was able to encompass a variety of treatments, including complementary and alternative medicine. The variety of treatments was possible because of the hospital's President Huang. He was one of the founders that created the NHI system in Taiwan when he was elected as a legislator three times (Show Chwan Memorial Hospital, n.d.).

Since NHI was established in Taiwan, this hospital has won various global achievements in delivering world class quality patient care (Show Chwan Memorial Hospital, n.d.). The US healthcare system could improve by adopting Taiwan's healthcare policy as a model for improving our current healthcare reform law, the Affordable Care Act. By making a universal

healthcare coverage in the US, this will make the integration of complementary and alternative medicine into our current healthcare system easier. This will include the missing data that were not collected before. This will also reduce health disparities and inequities among the numerous socially constructed groups since there are already a certain population in the US that use CAM in conjunction with conventional medicine. The difference would only be that these group of people do not necessarily have to use out-of-pocket expenses anymore and treatment would become personalized. Including CAM will allow broader options and personalization for delivering health care for all groups of people in the US. For example, in Washington State there are the CLAS standards and the Diversity Inclusion Council, and the goals of both of these programs are to promote health equity and reduce health disparities. This will also specifically address the communities where the first medical contact people have is their acupuncturist. The current health insurance coverage is limited and the current system make these people find their family practitioner first to get approval and then they are referred to their acupuncturist. For some people, they may be uninsured, so they would have to pay out-of-pocket to get healthcare which does not help people that have low SES. This process is not suitable for the communities aforementioned.

Another reason to include CAM is that CAM reduces the annual cost and reliance on pharmaceutical drugs to treat chronic diseases. As previously mentioned, pharmaceutical drugs are expensive due to research, developing, clinical tests and the patent process. Pharmaceutical drugs may only be a temporary solution because many people seek and use complementary and alternative medicine to aid in healing their chronic diseases. Research has shown that simply changing diet can reduce, prevent and reverse some chronic diseases.



Currently there is a factor that hinders the integration of complementary and alternative medicine. Conventional medicine practitioners claim that there is a lack of thorough research evidence on complementary and alternative medicine. To counter this concern, the National Center for Complementary and Integrative Health was established to improve the ongoing research and the efficacy of CAM therapies. Similarly, in the conventional medicine research community which supports evidence-based practice, there are also ongoing researches that suggest that there are more things to examine and discover for preventing and treating chronic diseases. In essence, both types of medicines are concurrently improving in research. Both types of medicines should integrate in order to improve and compare the different results in the findings.

### **Conclusion**

Chronic diseases are one of the major issues and leading causes of death in the US healthcare system as well as the financial expenditure crises due to various systemic factors. This paper focused on the socioeconomic factors that impact the affordability of health and healthcare among various socially constructed groups. The current US healthcare system has been implementing possible solutions to the socioeconomic issues such as social determinants of health, precision medicine and alternate solutions of integrating CAM which are Food as Medicine and Traditional Chinese Medicine. I also visited a rural hospital in Taiwan to learn about their integrative healthcare system. In addition, this hospital provide patient-oriented preventative care and education on chronic diseases. In conclusion, integrating CAM into the current U.S. healthcare system could be beneficial in personalized health, health promotion, and disease prevention in delivering patient care.

## References

- Adams, K. M., Lindell, K. C., Kohlmeier, M., & Zeisel, S. H. (2006). Status of nutrition education in medical schools. *The American Journal of Clinical Nutrition*, 83(4), 941S–944S.
- Al-Jiffri O., El-Sayed Z.M.F., & Al-Sharif F.M. (2011). Urinary tract infection with *Esherichia coli* and antibacterial activity of some plants extracts. *International Journal of Microbiology Research* 2, 1–7.
- Allen, M. L., Mellow, M. H., Robinson, M.G., Orr, W.C. (1990). The effect of raw onions on acid reflux and reflux symptoms. *American Journal of Gastroenterology*, 85(4), 377-380  
Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/2327378>
- Andersen, K., & Kuhn, K. (Producer) & Andersen, K., & Kuhn, K. (Director). (2014). *Cowspiracy: The Sustainability Secret* [Documentary Film]. United States: A.U.M. Films.
- Babacan O., Cengiz S., Akan M. (2012). Detection of antibacterial effect of oregano plant on various *Salmonella* serotypes. *Ank. Univ. Vet. Fak. Derg.* 59, 103–106.
- Barnard, N. D., Cohen, J., Jenkins, D. J., Turner-McGrievy, G., Gloede, L., Green, A., & Ferdowsian, H. (2009). A low-fat vegan diet and a conventional diabetes diet in the treatment of type 2 diabetes: a randomized, controlled, 74-wk clinical trial. *The American Journal of Clinical Nutrition*, 89(5), 1588S–1596S. doi:10.3945/ajcn.2009.26736H
- Beck, R. (2001, February/March). Is Garlic a Brain Poison? *Nexus*.

Brierley S.M., Kelber O. (2011). Use of natural products in gastrointestinal therapies. Elsevier:

*Current Opinion in Pharmacology*, 11, 604–611. doi:10.1016/j.coph.2011.09.007

Centers for Disease Control and Prevention. (2017). *Health Expenditures*. Retrieved from

<https://www.cdc.gov/nchs/fastats/health-expenditures.htm>

Centers for Disease Control and Prevention. (2012). QuickStats: Death Rate\* From

Complications of Medical and Surgical Care Among Adults Aged  $\geq 45$  Years, by Age

Group — United States, 1999–2009. Retrieved from

<https://www.cdc.gov/mmwr/preview/mmwrhtml/mm6137a6.htm>

Centers for Medicare and Medicaid National Health Expenditure Data Historical. (2018).

Retrieved from [https://www.cms.gov/research-statistics-data-and-systems/statistics-](https://www.cms.gov/research-statistics-data-and-systems/statistics-trends-and-reports/nationalhealthexpenddata/nationalhealthaccountshistorical.html)

[trends-and-reports/nationalhealthexpenddata/nationalhealthaccountshistorical.html](https://www.cms.gov/research-statistics-data-and-systems/statistics-trends-and-reports/nationalhealthexpenddata/nationalhealthaccountshistorical.html)

Chang, J. Y., Locke, G. R., McNally, M. A., Halder, S. L., Schleck, C. D., Zinsmeister, A. R., &

Talley, N. J. (2010). Impact of Functional Gastrointestinal Disorders on Survival in the

Community. *The American Journal of Gastroenterology*, 105(4), 822–832.

doi:10.1038/ajg.2010.40

Clarke, E. A. (1974). What is Preventive Medicine? *Canadian Family Physician*, 20(11), 65–68.

Country Health Rankings. (2018) *What and Why We Rank*. Retrieved from

<http://www.countyhealthrankings.org/explore-health-rankings/what-and-why-we-rank>

Dankwa-Mullan, I., Bull, J., & Sy, F. (2015). Precision Medicine and Health Disparities:

Advancing the Science of Individualizing Patient Care. *The American Journal of Public*

*Health*, 105(3), S368. doi:10.2105/AJPH.2015.302755

Davidson, M. R., London, M. L., & Ladewig, P. A. (2010). *Olds' Maternal Newborn Nursing &*

*Women's Health Across the Lifespan* (9th ed.). Prentice Hall.

- Dean, H. D., Williams, K. M., & Fenton, K. A. (2013). From Theory to Action: Applying Social Determinants of Health to Public Health Practice. *Public Health Reports*, 128(Suppl 3), 1–4.
- Edwards, E. (2012). The Role of Complementary, Alternative, and Integrative Medicine in Personalized Health Care. *Neuropsychopharmacology*, 37(1), 293–295.  
doi:10.1038/npp.2011.92
- Emanuel, E. J., & Fuchs, V. R. (2008). Who Really Pays for Health Care? The Myth of “Shared Responsibility”. *Jama Network*, 299(9), 1057-1059. doi:10.1001/jama.299.9.1057
- Ernst, E., & White A.r. (2001). Prospective studies of the safety of acupuncture: a systematic review. *The American Journal of Medicine*. 110 (6), 481-485. doi:10.1016/S0002-9343(01)00651-9
- Fineberg, H. V. (2012). A Successful and Sustainable Health System — How to Get There from Here. *The New England Journal of Medicine*, 366, 1020-1027.  
doi:10.1056/NEJMsa1114777
- Fisher, S. (Director). (2016). Before the Flood [Documentary Film]. United States. National Geographic.
- Fiskesjö, G. (1988). The Allium test — an alternative in environmental studies: The relative toxicity of metal ions. *Elsevier: Mutation Research/Fundamental and Molecular Mechanisms of Mutagenesis*, 197(2), 243-260. doi:10.1016/0027-5107(88)90096-6
- Food and Agriculture Organization. (2006). Livestock’s Long Shadow environmental issues and options. Retrieved from <http://www.fao.org/docrep/010/a0701e/a0701e00.htm>

- Fujii, S., Dale, G., & Beutler, E. (1984). Glutathione-dependent protection against oxidative damage of the human red cell membrane. *Blood*, 63(5), 1096-1101. Retrieved from <http://www.bloodjournal.org/content/63/5/1096>.
- Fung, F. Y., & Linn, Y. C. (2015). Developing Traditional Chinese Medicine in the Era of Evidence-Based Medicine: Current Evidences and Challenges. *Evidence-Based Complementary and Alternative Medicine : eCAM*, 2015, 425037. doi:10.1155/2015/425037
- Goodland, R., & Anhang, J. (2009, November/December). *Livestock and Climate Change what if the key actors are cows, pigs and chickens?*[PDF]. World Watch.
- Healthy People 2020. (2018). Social Determinants of Health. Retrieved from <https://www.healthypeople.gov/2020/topics-objectives/topic/social-determinants-of-health>
- Herman, P. M., Craig, B. M., & Caspi, O. (2005). Is complementary and alternative medicine (CAM) cost-effective? a systematic review. *BMC Complementary and Alternative Medicine*, 5, 11. doi:10.1186/1472-6882-5-11
- Hever, J. (2016). Plant-Based Diets: A Physician's Guide. *The Permanente Journal*, 20(3), 93–101. doi:10.7812/TPP/15-082
- Huang, T., Yang, B., Zheng, J., Li, G., Wahlqvist, M. L., & Li, D. (2012). Cardiovascular Disease Mortality and Cancer Incidence in Vegetarians: A Meta-Analysis and Systematic Review. *Annals of Nutrition & Metabolism*, 60, 233-240. doi:10.1159/000337301
- Hynes, C. (2015). A Leading Cause of Everything: One Industry That Is Destroying Our Planet and Our Ability to Thrive on It. *Georgetown Environmental Law Review*.

Retrieved from <https://gelnr.org/2015/10/23/a-leading-cause-of-everything-one-industry-that-is-destroying-our-planet-and-our-ability-to-thrive-on-it-georgetown-environmental-law-review/>

Jette, A. M. (2018). Responding to the Opioid Epidemic in the United States. *Oxford Academic Physical Therapy*, 98(3), 147-148. doi:10.1093/ptj/pzx120

Lee, E. (Director). (2008). *Place Matters* [Video file]. Retrieved from <https://www.kanopy.com/product/place-matters>

LeWine, H. (2015). Millions of adults skip medications due to their high cost. Retrieved from <https://www.health.harvard.edu/blog/millions-skip-medications-due-to-their-high-cost-201501307673>

Liu, Q., Meng, X., Li, Y., Zhao, C.-N., Tang, G.-Y., & Li, H.-B. (2017). Antibacterial and Antifungal Activities of Spices. *International Journal of Molecular Sciences*, 18(6), 1283. doi:10.3390/ijms18061283

Lu, W. I., & Lu, D. P. (2014). Impact of Chinese Herbal Medicine on American Society and Health Care System: Perspective and Concern. *Hindawi: Evidence-Based Complementary and Alternative Medicine*, 2014, 1-6. doi:10.1155/2014/251891

MacLennan, A. H., Wilson, D. H., & Taylor, A. W. (2002). The Escalating Cost and Prevalence of Alternative Medicine. *Elsevier: Preventative Medicine*, 35(2), 166-173. doi:10.1006/pmed.2002.1057

Maxwell, B. G. (2014). *Surprising Spike in Postoperative Cardiac Surgery Deaths May Be an Unintended Consequence of 30-Day Survival Measurements*. Retrieved from [https://www.hopkinsmedicine.org/news/media/releases/surprising\\_spike\\_in\\_postoperativ](https://www.hopkinsmedicine.org/news/media/releases/surprising_spike_in_postoperativ)

e\_cardiac\_surgery\_deaths\_may\_be\_an\_unintended\_consequence\_of\_30\_day\_survival\_m  
easurements

Medicaid. (n.d.). Retrieved from <https://www.medicaid.gov/medicaid/index.html>

*Medicaid Estate Recovery* [PDF]. (2005). Office of Assistant Secretary for Secretary of Policy & Evaluation.

Medicare (n.d.). What Medicare covers. Retrieved from <https://www.medicare.gov/what-medicare-covers/index.html>

Monson, S., Max, L., Visram, N., Harrelson, B., Razi, B.C., Q, M., et al. (Producer), & Monson, S. (Director). (2005). *Earthlings* [Documentary Films]. United States: Nation Earth

Nabavi S.F., di Lorenzo A., Izadi M., Sobarzo-Sánchez E., Daglia M., Nabavi S.M (2015). Antibacterial effects of cinnamon: From farm to food, cosmetic and pharmaceutical industries. *Nutrients*. 7, 7729–7748. doi:10.3390/nu7095359

National Center for Complementary and Integrative Health (NCCIH). (2013). Traditional Chinese Medicine: In Depth. Retrieved from <https://nccih.nih.gov/health/whatiscam/chinesemed.htm>

National Center for Complementary and Integrative Health (NCCIH). (2016). Complementary, Alternative, or Integrative Health: What's In a Name? Retrieved from <https://nccih.nih.gov/health/integrative-health>

National Institute of Diabetes and Digestive and Kidney Diseases. (NIH) (2016). Symptoms & Causes of Gas in the Digestive Tract. Retrieved from <https://www.niddk.nih.gov/health-information/digestive-diseases/gas-digestive-tract/symptoms-causes#whatfoods>

- National Center for Health Statistics. (2017). Retrieved from <https://www.cdc.gov/nchs/fastats/deaths.htm>
- National Institutes of Health All of Us Research Program. (2018). The future of health begins with you. Retrieved from <https://allofus.nih.gov/>
- National Policy Foundation. (2008). Paul Krugman: Taiwan's Health Insurance System a Model for the U.S. Retrieved from <http://www.taiwannpfnews.org.tw/english/page.aspx?type=article&mnum=112&anum=5375>
- Office of Disease Prevention and Health Promotion. (2018). 2015–2020 Dietary Guidelines for Americans. Retrieved from <https://health.gov/dietaryguidelines/2015/>
- Orlich MJ, Singh P.N., Sabaté J., Jaceldo-Siegl, K., Fan, J. Knutsen, S., Beeson, W.L., & Fraser, G.E. (2013). Vegetarian Dietary Patterns and Mortality in Adventist Health Study 2. *JAMA Internal Medicine*. 173(13), 1230–1238. doi:10.1001/jamainternmed.2013.6473
- Pfuntner, A., Wier, L. M., & Stocks, C. (2013). Most Frequent Procedures Performed in U.S. Hospitals, 2010 Statistical Brief #149. *Healthcare Cost and Utilization Project (HCUP) Statistical Briefs*. Retrieved from <https://www.ncbi.nlm.nih.gov/books/NBK132428/>.
- Pharmaceutical Research and Manufacturers of America. (2015). *Biopharmaceutical Research & Development: The Process Behind New Medicines* [PDF].
- Pitchford, P., (2002). *Healing with Whole foods* (3rd ed.). Berkeley, California: North Atlantic Books.
- Polak, R., Pojednic, R. M., & Phillips, E. M. (2015). Lifestyle Medicine Education. *American Journal of Lifestyle Medicine*, 9(5), 361–367. doi:10.1177/1559827615580307



- Reza Z.M., Atefeh J.Y., Faezeh F. (2015). Effect of  $\alpha$ -irradiation on the antibacterial activities of *Cuminum cyminum* L. essential oils in vitro and in vivo systems. *Journal of Essential Oil Bearing Plants*. 18, 582–591. doi: 10.1080/0972060X.2014.958559
- Robinson, M. (2009). Equity, justice and the social determinants of health. *Sage Publications*, 48-51. doi:10.1177/1757975909103751
- Shaffer, E. R. (2013). The Affordable Care Act: The Value of Systemic Disruption. *American Journal of Public Health*, 103(6), 969–972. doi:10.2105/AJPH.2012.301180
- Show Chwan Memorial Hospital. (n.d.). Glory Achievements. Retrieved from [http://www.show.org.tw/Show\\_eng/MileStone.aspx](http://www.show.org.tw/Show_eng/MileStone.aspx)
- Social Determinants of Health. (n.d.). Retrieved from <https://www.healthypeople.gov/2020/topics-objectives/topic/social-determinants-of-health>
- Swain, G. R. (2016). *How does economic and social disadvantage affect health?* [PDF]. Madison, WI: Focus.
- Union of Concerned Scientists. (n.d.). Animal Agriculture. Retrieved from [https://www.ucsusa.org/search/site/environmental degradation#.Ww4eG0gvxPY](https://www.ucsusa.org/search/site/environmental%20degradation#.Ww4eG0gvxPY)
- UnSchuld, P. U. (2003). *Huang Di Nei Jing Su Wen Nature, Knowledge, Imagery in an Ancient Chinese Medical Text* [PDF]. London: University of California Press Ltd.
- U.S. Department of Health and Human Services. (2018). What is the U.S. Opioid Epidemic? Retrieved from <https://www.hhs.gov/opioids/about-the-epidemic/index.html>

U.S. Food & Drug Administration. (1985). FDA Poisonous Plant Database. Retrieved from <https://www.accessdata.fda.gov/scripts/plantox/detail.cfm?id=8853>

U.S. Food and Drug Administration. (2018). Frequently Asked Questions on Patents and Exclusivity. Retrieved from <https://www.fda.gov/Drugs/DevelopmentApprovalProcess/ucm079031.htm>

Weinick, R. M., Byron, S. C., & Bierman, A. S. (2005). Who Can't Pay for Health Care? *Journal of General Internal Medicine*, 20(6), 504–509. doi:10.1111/j.1525-1497.2005.0087.x

World Health Organization. (2015). *Links between processed meat and colorectal cancer*. Retrieved from <http://www.who.int/mediacentre/news/statements/2015/processed-meat-cancer/en/>

World Health Organization. (2018). *The top 10 causes of death*. Retrieved from <http://www.who.int/mediacentre/factsheets/fs310/en/>

Wu, T.-Y., Majeed, A., & Kuo, K. N. (2010). An overview of the healthcare system in Taiwan. *London Journal of Primary Care*, 3(2), 115–119.

Xu, J., Liu, T., Hu, Q., & Cao, X. (2016). Chemical Composition, Antibacterial Properties and Mechanism of Action of Essential Oil from Clove Buds against *Staphylococcus aureus*. *Molecules*, 21(9), 1194. doi:10.3390/molecules21091194