PERCEPTUAL BARRIERS TO THERAPETUIC LANDSCAPES IN HEALTHCARE SETTINGS IN MID-MICHIGAN

By

Emaley Baxter

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ABSTRACT

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This thesis examines perceptual barriers to, and current use of, therapeutic landscape environments in hospitals, end-of-life care, or extended care facilities. Specifically, this study investigates the factors that managers and healthcare professionals identify as important in the creation of therapeutic garden areas for their patient populations. The research also seeks to identify specific factors that prohibit investment in this type of amenity in these institutional settings. Factors that are investigated include variables such as prior experiences with therapeutic gardens along with cost-benefits, liabilities, aesthetics, functional utilities, time commitments, and maintenance concerns. The study reports on the importance of these variables in creating advocates among managers and/or healthcare staff for this type of garden in their workplace.

This thesis is dedicated to my parents,
Charles and Mary Baxter. You instilled in me
the drive to succeed and never stopped
cheering me on when I reached for the stars.

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CHAPTER I

INTRODUCTION

Over the past decade there have been numerous empirically sound studies conducted that have supported claims relating to personal health and societal benefits of therapeutic gardens in healthcare settings. However, there remains a gap in the literature as to why, despite this evidence, therapeutic landscapes have not become commonplace in the healthcare delivery setting. It is not known whether this is the result of the failure to integrate the exterior grounds of a hospital with its interior spaces; training that influences the attitudes and beliefs of healthcare professionals; and/or a failure to evaluate therapeutic gardens as a contributing factor to patient well-being and/or the healing process in healthcare institution design.

This is an exploratory study to investigate medical professionals' knowledge of, as well as perceived barriers to, the design, installation, and use of therapeutic landscapes within healthcare settings. A survey was developed that included questions on whether consensus exists among medical professionals as to what constitutes a therapeutic garden; the questions also probed whether prior knowledge of, or exposure to, a garden in a healthcare setting influences perceptions of use by staff and/or particular patient groups. In institutional settings where no garden is present, the survey asked respondents to think of an idealized therapeutic garden setting and to respond to which patient/staff group would be most likely to utilize such a garden at their place of work. The survey then asks respondents to consider possible improvements that the addition of a therapeutic garden could have on variables such as increased patient satisfaction, marketing opportunities, and environmental impacts. Additional topics addressed how a therapeutic garden would

improve the healthcare institution where the respondent is employed. The questions were then directed toward gaining an understanding of the barriers and concerns perceived by healthcare professionals when conducting treatment protocols in outdoor environments. Finally, this thesis sought to use age and the type of healthcare setting as predictive variables in determining the professionals most receptive to the idea of therapeutic gardens in healthcare settings, and how this group may become an advocacy force in the planning, design, and implementation of future gardens in their workplace.

It is intended that the findings from this survey will spark an interest among healthcare professionals to learn more about therapeutic landscapes and the benefits to healthcare delivery they can provide. Results from the survey will be used in the future to create a healthy dialogue between design professionals, such as architects and landscape architects, with medical professionals. This dialogue will enhance collaboration and the exchange of information about patient groups and treatment protocols from healthcare providers to improve the design of future therapeutic gardens.

CHAPTER II

LITERATURE REVIEW

Background

Gardens, in the generic sense of the word, have existed since the Neolithic Revolution (10,000-5,000 BC), which was the first historically verifiable revolution in agriculture. The time period consisted of the wide-scale transition of human culture from a lifestyle of hunting and gathering to one of agriculture and settlement, which in turn supported an expanding population (Bocquet-Appel, 2011). Archaeological data indicates that various forms of plant and animal domestication evolved in separate locations worldwide around 12,000 years ago, (Barker, 2009).

Over time, two types of gardens evolved: those used primarily as a food source, and those intended for pleasure and rest. For many people, past and present, gardens have offered relief from the burdens of everyday life (Berrall, 1978). Gardens often are seen as a direct link from man to the land. They serve as the physical manifestation of our connection with Earth. "Gardens have a mythology, a poetry, and a history, strongly linked to life cycles and the processes of healing, renewal, and ultimately dying" (Gerlach-Spriggs et al., 1998). Among the various types of gardens that have evolved over time, there have always been places set aside for recovery, rest, and pleasure. These places could be found in "a healing spring, a sacred grove, or a special rock or cave" (Sternberg, 2009). They occurred anywhere individuals felt a connection to the land and each other. Oftentimes, a need arose to have these restorative healing places during difficult living conditions (Cooper-Marcus and Barnes, 1999).

Indeed, in today's civilization, we are still affected by the evolutionary bonds that

have for so long tied us to nature. We are still strongly responsive in our behavioral patterns and our physiological functioning to changes and situations we find in our environment. How we react and pay attention to the environment, influences what the experience of the natural landscape means to us, and ultimately how it can heal body and mind (Kellert and Willson, 1993; Kellert et al., 2008). The idea that a built space may affect the health outcomes of a patient could not be thoroughly understood scientifically until the late twentieth-century brought advances in the understanding of brain-immune connections, and their importance to maintaining health. This burgeoning understanding of a "mind-body" connection has helped to explain the belief that physical places have the ability to set the mind at ease, indeed, even contribute to overall well-being. Likewise, those situations that trouble our emotions can promote illnesses (Cooper-Marcus and Barnes, 1995; Sternberg, 2009).

For the purpose of this study, it is important that a definition of therapeutic gardens/landscapes is established. Such a definition will set the subject of this study apart from the numerous other definitions that strive to put a name on such places. For the purpose of this study, therapeutic gardens are not considered an alternative method of therapy, but a supplementary one. As such, they do not provide cures, but rather contribute to a better sense of well-being and improved body function as well as provide functional space for the delivery of treatment outdoors (Gerlach-Spriggs et al., 1998).

Westphal (2010) presented this definition of a therapeutic garden at the annual Chicago Botanic Garden Certificate Program; the definition inspired by an article written by Gerlach-Sprigs and Healy (2010):

> "A therapeutic garden is a designed outdoor space that uses plants and other elements of nature to promote patient care and well-being while facilitating

> medical staff in the delivery of standard treatment protocols commonly used in health care settings. As such, the health services supported by a garden may be primarily palliative or rehabilitative, depending upon the patient population being served" (Westphal, 2010).

Gardens can be highly vegetated and beautiful spaces that entice individuals to travel from the confines of an interior space, like a rehabilitation facility, to an outdoor space with special amenities. Major and minor architectural elements and the organization of space in a therapeutic garden is designed to support the user, regardless of personal limitations. These garden spaces should permit the user to spend time alone or with others, to leisurely or briskly walk, to enjoy the sunshine or shade, and to address designed "challenges" that will facilitate the desired treatment outcome. They are capable of altering the mood of the patient, visitor, and care-giver while improving their sense of well-being through "ordered" design (Cooper-Marcus and Barnes, 1999). Westphal (2001) believes that therapeutic gardens can have the capacity to address five dimensions of human health: physical, biological, social, psychological, and spiritual, if they are designed carefully to work within intended treatment protocols.

History – Therapeutic Landscapes though the Ages

It is not specifically known when man first felt there was something that caused a difference in the 'ambiance' of one place versus another. Neither is it known when it was felt that a specific spot had a sort of mysterious and attractive quality. However, these ancient 'sacred groves' have had many references through antiquity. The Old Testament in the Bible (English Standard Version, 2001) states that after God formed the world, the seas and the dry land, he planted a garden in Eden (Gen. 2:8 ESV). In the *Odyssey* (Book V), Homer depicts Odysseus as being imprisoned in a cave surrounded by a grove on the island of the goddess Calypso (Homer, 1959). Homer paints the vivid image of a lush,

natural setting for the goddess' home, "…in soft meadows on either side [of the cave] the iris and the parsley flourished. It was indeed a spot where even an immortal visitor must pause to gaze in wonder and delight" (Homer, 1959). Throughout history, the concept of a sacred grove has undoubtedly been given a natural, untended quality that makes it a part of the private, romantic, and natural side of garden design rather than the public, classic, and formal side of early garden design (Thacker, 1979).

A juxtaposition of the natural 'sacred grove' with some of the earliest known gardens from Persia is essential to see the various sides of therapeutic landscapes and the variety of spaces that were noted for their restorative qualities. Sixth century BC landscapes incorporated lush green vegetation into geometrically designed space that emphasized order in elements. The structured garden elements combined to create a restful place where tensions were calmed and contemplation was encouraged (Brookes, 1987). Persian gardens offered "the outward and visible sign of an inward, invisible grace: the promise of divine order and meaning amid chaos, of ever-renewing life in the face of mortality, and of ease after travail" (Khansari et al., 1998).

Another culture that was early to embrace the therapeutic benefits of natural settings and gardens were those of Asia, specifically in the forms of the Japanese Zen garden. Gardens and religion have been inseparable in Japanese culture from its inception. Becoming prominent in the twelfth century AD, Zen gardens in particular provide restorative qualities for their visitors who hold the belief that natural elements in the garden are manifestations of the gods. As a result, many garden elements, with an attention to detail, are placed in religious institutions. These gardens are meant to provide guidance and consolation for the user, as Zen is about meditation and connecting oneself

to the universe (Goto, 2003). This practice adds an additional dimension to Japan's gardens for meditation. The Zen garden provides an opportunity for the individual to escape worldly afflictions and increase spirituality (Schaarschmidt-Richter, 1979).

Undeniably, the notion that nature is an important part in the healing process has been around for thousands of years. Going back to classical times, we see temples to Asclepius, the Greek god of healing, built on hilltops. This strategic location enabled patients who were considered to be chronically or terminally ill to visit the temple far from the noise, dirt, and heat of the city. The temple was oriented around a fresh water source and provided a magnificent view of the sea while capturing fresh breezes. Although Asclepion were not hospitals in the modern sense of the word, during a stay at such a facility, patients were encouraged to "dream" their healing prescriptions, which then became the treatment protocol of the patient. A healthy diet, pure water, social interaction, fresh air and exposure to the surrounding nature, dream interpretation, and prayer complemented the experience. The most important aspect of healing was to be found in prayer, dreams, and social support, which generated a "placebo effect" in the patient; all three of these activities were facilitated through exposure to natural forces (Westphal, 2000; Sternberg, 2009).

In the western world, other early therapeutic landscapes included the interior courtyards of Roman Valentudia (100 BC-300 AD), which were some of the earliest formal military hospitals (Westphal, 2005; Thompson and Goldin, 1975). The interior courtyards were used for ambulation following hospitalization as part of the recovery phase. While the Roman physicians of the time were unaware of the physiological processes that sped recovery, modern medical practices of the day encourage ambulation

almost immediately after surgery to avoid problems with pneumonia. Gardens during the Middle Ages (400-1400 AD) in Europe were closely linked to the church and religious orders; monasteries were used to nurse the sick, orphans, disabled, insane, and other impoverished people within a town (Horden, 1988). As cities grew and wealth was obtained, walls were built to define spaces and to provide needed security. As a result, great vertical elements were constructed throughout the city and provided the perfect structures for enclosed gardens and courtyards. These safe enclosures offered their users the universal pleasures of shelter, sun, and shade (Clay, 1909).

In the Middle Ages, a time of spiritualism and mysticism, great attention was given to the energy that was derived from spending time in the monastery cloister garden. Saint Bernard (1090-1153 AD) described the influence of the therapeutic garden on his own being when he visited the garden.

> "Within this enclosure many and various trees…make a vertical grove, which lying next to the cells of those who are ill, lightness with no little solace the infirmities of the brethren, while it offers to those who are strolling about a spacious walk…a sweet place for repose. The sick man sits upon the green lawn…he is secure, hidden and shaded from the heat of the day…for the comfort of his pain, all kinds of grass are fragrant in his nostrils. The lovely green of the herb and tree nourishes his eyes…the choir of painted birds caresses his ears…the earth breathes with fruitfulness, and the invalid himself, with the eyes, ears, and nostrils, drinks in the delights of colors, songs and perfumes" (Comito, 1978).

As the core open space of the monastery, and therefore the most important symbolic garden, the cloister garden was an essential part of life in the Middle Ages (Cooper-Marcus and Barnes, 1999). The term 'cloister' refers to an enclosed courtyard within the walls of a monastery. A covered walkway often surrounded all or part of this central courtyard (Moulleron, 2001). For the attending monks, these spaces provided reprieve on both a mental and physical level, in addition to agrarian opportunities (Tyson,

1998). Monastic hospices served several major groups of people: traveling pilgrims, the poor and infirm, as well as visitors who came to worship. Provided with a continuous flow of weary patients and visitors, the importance placed on the herbs grown in the monastery and used for healing and prayer were part of the foundation of all therapeutic procedures conducted in these monastic communities (Gale, 1967).

Medieval Latin talks about the cloister garden as the 'hortus conclusus,' or enclosed garden. This term offered a metaphor for souls consecrated to God. The cloister garden itself was designed so that it paralleled Biblical elements.

> The garden itself was divided into four squares, as in the Persian tradition and also according to the Garden of Eden legend. At the intersection of the four paths that divided the garden plots stood a well or fountain. Often the monks planted a juniper or other evergreen to symbolize the Tree of Life in Genesis. Sometimes, too, they placed statues of the saints or the Holy Family in the enclosure. The plantings consisted of grass and flowers (MacDougall and Ettinghouse, 1976; Meyvaert, 1986)

Yet, toward the end of the Middle Ages (1300-1400 AD), the religious symbols that once marked the central cloister garden were replaced with secular symbols. This led to the decline of the monastic way of life; and as a result, the vitality and use of therapeutic courtyards and cloister space also began to vanish (Gale, 1967; Tyson, 1998).

With the Reformation, dissolution of Church Priories, and major epidemics, like the Bubonic Plague (1340-1400 AD), 30%-60% of the population in Europe succumbed to disease, crop failures, and population shifts. Each of these factors contributed to a decline in the general medical care that monasteries once offered the needy (Hellinger, 1967) during the fourteenth and fifteenth centuries. As changes in politics and religion occurred, monasteries were dissolved and many governments were ill prepared to administer healthcare to the flood of immigrants coming from the countryside.

Eventually, most care for the sick and needy was handled haphazardly by Catholic and Protestant Church groups (Gerlach-Spriggs et al., 1998)

During the eras of the Renaissance and Reformation (1400-1700), hospitals did not incorporate gardens in their facilities. However, not all therapeutic landscape experiences at hospitals during this era were lost. Some Catholic institutions continued to plan for, and utilize, the covered walkways and interior courtyards in their architecture (Gerlach-Spriggs et al., 1998). In 1671, King Louis XIV had a hospital built for veterans that included numerous courtyards that were lined with trees. While the intent of building therapeutic landscapes into various places of healing was noble, many of the Protestant and Catholic hospitals took on "cathedral-esque" design elements such as placing windows so high on the wall that it was impossible to see the grounds outside (Cooper-Marcus and Barnes, 1999), and most Protestant hospitals had no patient access to the gardens whatsoever (Thompson and Goldin, 1975). It was common for both hospital types to completely wall off patients from the outdoors, fresh air, and sunlight. The British pattern of hospital design, as observed by noted English prison reformer John Howard (1726-1790) in the 1770s and 1780s, was to design the patient's rooms so that they opened out onto interior corridors (Howard, 1791).

Then a new thought by statisticians proved helpful to the resurgence of the therapeutic garden during this time period. The notion that if the success of the country could be measured by the health of the livestock, why not also judge the wealth of the nation on the health of its human subjects; "the prince who took good care of his people would prosper most" (Rosen, 1974). This prompted the creation of many military hospitals and medical services with the goals to create a national standard for hospitals

and charities.

New discoveries in the late eighteenth-century, through research in the various fields of medicine, brought about the return of therapeutic gardens by incorporating the use of outdoor spaces in hospital design (Duncum, 1964). One common idea adopted as fact during this time was the importance of hygiene. These ideas lead to nineteenth century new knowledge about infections and germ transfer. These discoveries set the grounds for the work of Koch, Pasteur and Lister on germ theory in the late nineteenth century (Park Talaro, K, 2008). The resulting finds on the importance of hygiene promoted hospital designs that focused on encouraging access to fresh air, proper cross-ventilation, and hygiene (Thompson and Goldin, 1975). Ample grounds with proper well-drained soils allowed hospitals to maximize use of the sun's directional patterns and wind flows for climate control (Gerlach-Spriggs et al., 1998).

As German theorist Christian Cay Lorenz Hirschfeld (1741-1792) wrote in an article describing the proper union between nature and medicine, a hospital setting and garden design should:

> "… be situated outside and away from cities, to allow for garden space. Hospitals should be located away from busy urban areas in a healthy and positive and inspiring location, not in valleys…but on sunny, warm, hilltops protected from the wind or on southern slopes on dry soil…A hospital should lie open, not encased by high walls, not fenced in by looming trees. The garden should be directly connected to the hospital, or even better, surrounded [by] it. Because a view from the window onto blooming and happy scenes will invigorate the patient, a nearby garden also invites patients to take a walk" (Gerlach-Spriggs et al., 1998).

Hospital design was being redefined, as seen in the Royal Infirmary of Edinburgh, a hospital built in Edinburgh, Scotland in 1729. It featured a U-shape layout, main corridors running East-West with wings on a North-South axis; this allowed the structure

to best catch the sunshine and fresh southwesterly breezes (Figure 1).

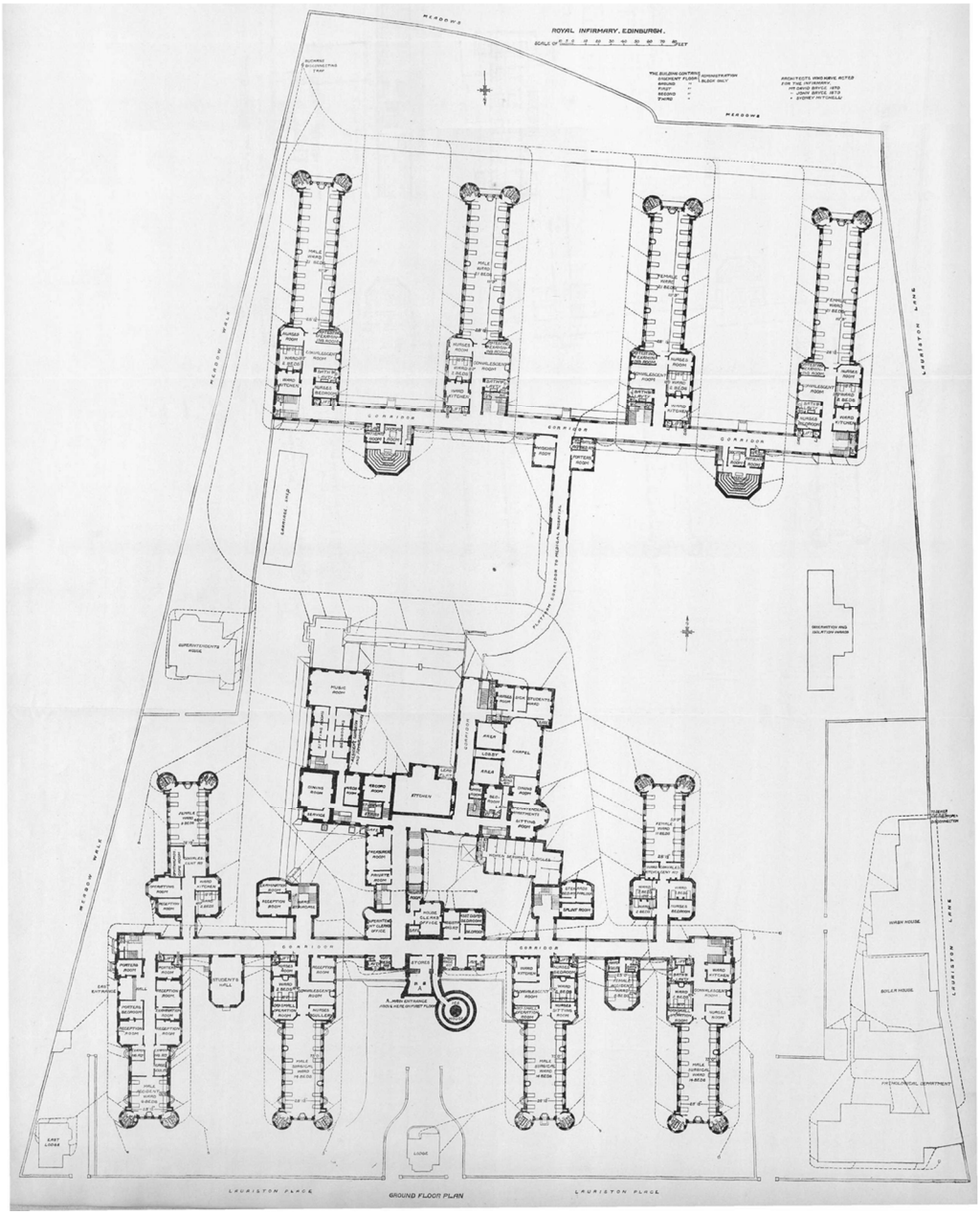

Figure 1. Hospitals and Asylums of the World: Portfolio of Plans. Henry Burdett (1891)

Not long after in 1765, the Royal Naval Hospital at Stonehouse, England served as a model for English and French hospital design (Figure 2).

Figure 2: The Royal Naval Hospital at East Stone House, Plymouth. (Author, date unknown) taken from a postcard at http://www.plymouthdata.info/htm (last accessed [August, 2013])

In this hospital, gardens and sunlight were incorporated as a main component of its design. Additionally, the "pavilion hospital" style meant that the emphasis was put on the garden and allowed for the integration of garden and hospital. Hospital design called for two or three stories that allowed a maximum amount of direct sunlight and air to enter the patients' rooms. The rectangular layout of the lawn between buildings meant that each ward had room for twenty-five beds in a lite and ventilated room with a full row of windows (Risse, 1986).

The result of military conflicts, such as the Battle of Waterloo (1815) and the Crimean War (1853-1856), allowed humanitarians, physicians, and nurses to observe the treatment and healing progress of wounded soldiers under a variety of field hospital

conditions. It was noted that after these conflicts, soldiers treated in barns and tents had a higher mortality rate than those that were taken to conventional hospitals (Churchill, 1965). Commonly known as the founder of modern nursing, Florence Nightingale played a role in helping to re-solidify the connection between the natural and medical world.

> "Second only to fresh air…I should be inclined to rank light in importance for the sick. Direct sunlight, not only daylight, is needed for speedy recovery…the being able to see out of a window, instead of looking against a dead wall; the bright colors of flowers; the being able to read in bed by the light of the window close to the bed-head. It is generally said the effect is upon the mind. Perhaps so, but it is not less so upon the body on that account…while we can generate warmth, we cannot generate daylight" (Nightingale, 1863).

In short, Nightingale described the therapeutic link between sunlight and vitamin D absorption.

The new wealth of building material (i.e., lumber) that North America offered the world and a spurt in advancing building technologies made it possible to build smaller chimneys at less cost than the old masonry piles featured in early New England houses. Also, bricks were becoming more plentiful, and therefore less expensive. The chimneys of houses became centered on the ridge at a distance of several feet in from the gables. This radical change in chimney location made possible a much more flexible floor plan. With a central hall, circulation of air, and people was considerably improved, and a much better stair arrangement could be adopted. Stairs now gave access to each additional floor and larger windows with bigger panes balanced one another in a symmetrical façade (Whitehead, 1977).

In return, the ideals of Romanticism helped to spread the notion that "nature and gardens came to be thought of once more as places of bodily and spiritual restoration" (Gerlach-Spriggs et al., 1998). Outdoor gardens were considered to be a vital component

for a healing hospital environment (Cooper-Marcus and Barnes, 1999). Gardens were once more becoming the emotionally significant contributor to healing as they were in the Middle Ages; once again regarded as a place to escape and rest from the daily toils of life (Walpole, 1943).

The patient group that perhaps benefitted the most from this revival of therapeutic environments was the mentally ill. Implementing the method called '*traitement moral'* or Moral Treatment, developed in part by Philippe Pinel (1794), called for "socializing" patients (Weiner, 1992). To create ways for patients to reassert themselves as individuals, building design focused on making the facility and treatments for the patients resemble real-life situations as opposed to the often inhumane and/or solitary confinement to which many were often subjected (Bockoven, 1972; Thompson and Goldin, 1975; Zilboorg and Henry, 1941).

For the mentally ill, small facility size, well-trained staff, and access to a rich environment allowed the Moral Treatment to be successful with this patient group. Great emphasis was placed on working in the outdoors. Gardening and caring for domestic animals became important aspects of the therapeutic routine. During the late nineteenth century, large outdoor grounds and plantings were incorporated into the mental health care facilities. (Zilboorg and Henry, 1941). By the 1880s, however, the United States stopped supporting mental facilities with adequate tax revenues in most states, and the wards quickly became over-crowed and under, or poorly staffed (Thompson and Goldin, 1975).

Mental care units were not the only facilities suffering from the ill effects of overcrowding. During the last half of the nineteenth century, immigrants from Europe

and other countries flocked to newly developing American cities. This was the time of the Industrial Revolution, and with it, a new set of social woes. Poor sanitation and increasingly poor air quality in the densely packed cities resulted in harmful and often deadly conditions (Fisher, 1986). Tuberculosis (also called "consumption") was particularly troublesome in overcrowded tenant housing. In the metropolis of London, 1 in 7 people died from consumption at the dawn of the 18th century; by 1750 that proportion grew to 1 in 5 and surged to 1 in 4 by around the start of the 19th century. The Industrial Revolution that America was experiencing, coupled with growing poverty and squalor, created the optimal environment for the propagation of the disease, just as it had in London (Chalke, 1959).

As city conditions deteriorated, a new movement to improve human welfare on a national level was created. In America, the public parks movement of the mid to late nineteenth century provided the public with outdoor spaces and access to nature as an informal healing method. At the forefront of this movement was the "father of landscape architecture", Frederick Law Olmstead. Being a first-hand observer of the terrible conditions that overcrowding had on the people of England, he became concerned about the deplorable living conditions in urban environments in America. He observed and noted that the urban-dweller often became "overcome by physical exhaustion and physiological disorganization" due to their terrible living conditions. In essence, the crowded, unclean, and unsafe housing many people found themselves residing in was causing not only various forms of bodily harm but also degrees of mental illness and general fatigue (Fisher, 1986).

As a champion of the public parks movement and creator of New York City's

Central Park, Olmstead encouraged the creation and designation of spaces set aside for nature and nature-based activities. As Fisher (1986) reports, Olmstead believed that natural environments would provide urban residents an opportunity to revitalize their bodies and minds. Olmstead also saw the ability of a park to serve as an antidote to the problems of congested city life by providing residents with outdoor park areas.

The early twentieth century saw coexistence between nature and healthcare. A common practice involved nurses wheeling patient beds onto hospital balconies, verandas, or roofs for the benefits of fresh air and sunlight. These practices again recognized nature as an integral part of treatment for ailments such as tuberculosis (Cooper-Marcus and Barnes, 1999).

Alvar Aalto, a famed early twentieth century architect, was noted for designing buildings that appeared to grow out of their surroundings. As evidenced by his style of design, he was adamant about the importance of the explicit health benefits of well-planned architecture and about the importance of nature and natural views to health and healing. An example of this philosophy, Aalto built a tuberculosis sanatorium that would later become a standard for other hospitals. It featured a wing of south facing, light-filled rooms for the patients to enjoy bright sunlight and views of the pine forest beyond their windows (Sternberg, 2009).

As the twentieth century advanced, so too did the fields of science, technology and design. New inventions in the fields of transportation and communication forever changed the way information was exchanged. Many of these new advancements lead to an increasingly complex and fast paced life for the modernized citizen. As a consequence, progress became measured by profit, efficiency, and productivity. Many

advancements in pharmaceutical, radiological, and surgical procedures warranted a demand for more specialized spaces within the hospital. This changed the relationship between the internal and external spaces; the ideals of the pavilion hospital were no longer economically possible or medically desirable.

During much of the early twentieth century, the hospital garden, with the exception of sanatoriums for tuberculosis and asylums for the mentally ill, was nearly eliminated. By the 1940s, hospitals began to function as corporate enterprises. Subsequently, hospital layouts began to resemble that of an office building. The technical advancements that were aiding in the saving of lives created many unforeseen consequences. Various pieces of equipment needed for medical procedures and building maintenance took up valuable space (Thompson and Goldin, 1975). The use of natural ventilation was replaced by air conditioning. "…outdoor terraces and balconies disappeared; nature succumbed to cars and parking lots; and indoor settings designed for efficiency were often institutional and stressful for patients, visitors, and staff" (Cooper-Marcus, 2005).

At the beginning of the twenty-first century, new trends in healthcare came as a result of a change in economic demands, the increased efficiencies in home healthcare delivery, and updated medical procedures for the treatment of many patient types. No longer were hospitals places for those with moderate illness that needed the provision of a leisurely recovery. Hospitals, due to the increasing cost of healthcare delivery, were primarily for the extremely ill. As Gerlach-Spriggs et al (1998) states,

> "…health professionals, for very practical reasons, have tended to avoid the mystery associated with healing. Foremost is the fact that the battle to make medical care scientifically based has been hard won, and still just barely so; it is a battle that continues. Second, the tests, techniques, and medications of contemporary medicine are more easily

defined and, quite simply, the quantifiable is easier to budget for. “

The ability of the therapeutic garden to survive since the time of recorded history quickly became an uncertainty in the span of a century…or so it seemed.

Contemporary Medical Practice and Hospital Design of the United States

The second half of the twentieth century saw chronic diseases replace acute infections as the major cause of death (Sahyoun et al., 2001). By the 1990s, heart disease, cancer, and stroke accounted for 60% of all deaths in the United States, with heart disease and cancer accounting for nearly a million deaths in 1997 alone. Yet, an increase in the quality of healthcare has resulted in nearly three-fourths of all deaths happening at ages 65 and older. Under existing medical conditions the typical lifespan of Americans has increased to the age of 78.9 for women and 72.5 for men, an average of 16-19 years longer than previous decades (Sahyoun et al., 2001). This brings up the issue of maintaining a high level of quality of life for the projected 70 million elderly persons by 2030, and those tasked with providing their care.

Although healthcare delivery protocols have advanced significantly in the past decades, Kaplan (1993) has shown that work environments in healthcare settings having a direct effect on worker efficiency, productivity, and satisfaction have changed little. This is surprising; since research shows that healthcare settings contribute directly to patient outcomes. Aiken et al. (2011) conducted research on the effect of work environments on hospital outcomes across nine countries. Poor hospital work environments were common and associated with negative staff outcomes and poor quality of care. Also, staff turnover rates (specifically that of nursing staff) have been found to be a frequent occurrence in developed countries.

Reasons for high staff turnover can be complex and often depend on the context of the specific study and the views of the researchers (Hayes et al., 2006, Kaplan, 1993; Mourshed and Zhao, 2012). What has been determined thus far concludes that the physical environment is linked to general staff wellbeing including injuries and stress (Kaplan and Kaplan, 2009; Trinkoff, et al, 2005; Kaplan and Kaplan, 1982). Nursing, as with most professions in the healthcare delivery industry, has a high incidence of mental fatigue (Wolf, 1988).

With the technology of today, we are beginning to understand the complex linkages between stress, health, and nature. According to Sternberg (2009), any of the connections between healing and the environment can be explained in neurochemistry. She postulated that sense of sight is highly adapted to help distinguish and identify countless features and characteristics in the world around us. This allows us to be in tune with our surroundings because of the complex connections and pathways located at the base of the brain that lead out from the visual cortex to the parahippocampal area. Sternberg (2009) states that the region where signals from the retina are first received and finally constructed into a scene depends on these "pathways" of nerve cells and increased receptor density that release endorphins, which are a form of morphine-like molecules in the brain. By looking at a beautiful scene, the brain is capable of giving the body a morphine-like high as more nerve cell receptors become active (Sternberg, 2009).

Encouraging research findings have found that individuals returning from time spent in nature are better at proof reading than those in a control group that stayed indoors (Hartig et al., 2003). "Green Exercise," or simply activity in the presence of nature, has been show to reduce stress, improve self-esteem, and enhance mood (Barton

and Pretty, 2010). Studies also have shown that when given a choice, participants imagining a stressful situation choose a natural setting in which to recover (Herzog et al., 1997, 2003). Hartig and Cooper-Marcus (2006) and Duvall (2011) further showed that affect improved and anger decreased when participants took a short walk through a forest after a stressful driving assignment. This research demonstrates the ability of nature to calm the mind and improve concentration to accomplish complicated and stressful tasks.

The work of Ulrich (2008) and Ulrich et al (2006) helped identify physical factors in the environment that affect staff outcome. This study recognized that well designed hospital environments had the potential to increase staff effectiveness and satisfaction, while reducing medical errors and hospital-acquired infections. The well-designed hospital also has the ability to decrease staff stress and injuries. Increased contact with vegetation appears to provide a low-cost, high-gain approach for both patient and employee because of improved employee effectiveness (Kaplan, 1993). As Aiken et al. (2011) showed, addressing staff satisfaction and effectiveness has importance beyond the primary concern of patient care, it relates to the quality of care the health care institution is able to provide its patients.

The Trust for Public Land sought to measure the economic value of a city park system to understand how park systems economically benefit cities. Working with economists and academics, the study identified seven measurable attributes of parks that provide economic value. These attributes are property value, health, direct use, community cohesion, clean water and air, and increased tourism. This study shows that green space imparts positive qualities to a site (Harnik and Welle, 2009). A similar study found that parks and natural, vegetated recreation spaces produce positive economic

outcomes for developers, homeowners, and local governments (Shoup and Ewing, 2010).

Financial benefit to the healthcare institution also may be affected. Healthcare expenditures account for a significant share of the national budget in most countries (Garrett et al, 2009). Ulrich (2002) reported in *Health Benefits of Gardens in Hospitals,* that the trend of spending on new and updated existing healthcare facilities in the United States averaged $15 billion annually during 1992-2002. He also found that the United Kingdom planned to spend $4 billion on new hospital construction during 2002-2005. The Texas Medical Center in Houston, Texas, projected to spend $1.8 billion on new construction between 2002-2004. New spending for hospital buildings in the state of California alone has been projected to be $14 billion by the year 2010. Additions and renovations to existing buildings also can be very costly. Northwestern University's main hospital in Chicago was renovated at a cost of $687 million. When other healthcare providing environments are considered, such as nursing homes, hospices, and rehabilitation clinics, it becomes clear that healthcare design and construction directly accounts for large amounts of money (Ulrich, 2002).

To judge the quality of healthcare delivery, professional practice standards are reviewed, but seldom become a part of the physical environment of a health facility (Devlin & Arneill, 2003). However, the concerns of patients and staff are increasingly being heard and accepted as important input in measuring healthcare quality, especially as it affects clinical outcomes (Wolf, 1988; Woodring et al., 2004). Naturally, it is the healthcare providers, the doctors, nurses, therapists, nurses' aides, etc and the administration, that encompass the user groups who spend most of their time working in the indoor environment of the healthcare delivery system. Due to the nature of building

construction and renovation procedures, it is best to design for positive health delivery effects on occupants in the early stages of the building's life cycle (Vischer, 2007). The costly nature of modifications in later stages of construction requires early decisions that insure improved health care delivery.

The opinion of healthcare providers and administration on the design of a hospital can provide valuable information and expertise to hospital designers. These are the professionals that are familiar with the physical aspects of the environment that affect various requirements of their work (Vischer, 2007). To achieve a truly "patient centered" approach to care, the environment must support a team approach including medical, nursing, and administrative personnel (Karlin and Zeiss, 2006; Cooper-Marcus and Sachs, 2014). As the hospitals of the 1950-60's are decommissioned, new opportunities for creating green space and/or therapeutic gardens to "enrich and improve the lives of patients and the environments of hundreds if not thousands of existing medical care facilities" (Ulrich, 2002) are possible.

> "[h]ealthcare administrators everywhere are under strong pressures to control or reduce costs yet increase care quality. Faced with imperative demands such as paying for costly new medical technology, administrators may often consider gardens as desirable but nonessential. Convincing the medical community to assign priority and resources usually requires providing credible evidence that gardens and plants produce benefits yet are cost-effective compared to alternative, including not providing gardens and plants (Ulrich, 2002)."

However, in light of research done on clinical and economic outcomes, the most influential data dictating decisions in healthcare, involves patient *satisfaction* in patient-centered or consumer oriented care (Ulrich, 2002).

It was the patient centered care movement of the 1990s that re-ignited the trend of therapeutic landscapes in healthcare settings. During the 1980s and 1990s, research

supporting the theory that access to, direct views of, and/or exposure to nature (and its sounds) had positive effects on health outcomes. There is a growing body of evidence that the restorative and therapeutic effects of nature scenes and sounds are measurable after only three to five minutes of exposure, as a combination of psychological/emotional and physiological changes (Ulrich et al, 1991; Alvarsson et al., 2010). Numerous studies of various spaces have all shown that views of vegetation or garden-like features have the ability to elevate levels of positive feelings such as being calm or having a sense of pleasantness. Open green space also reduces negative emotions such as fear, anger, and sadness by producing measurable changes in psychological and emotional states (Berman et al., 2008; Kjellgren and Buhrkall, 2010; Gonzalez et al., 2010; Kuo and Sullivan, 2001; Matsuoka, 2010).

Nature scenes successfully keep the viewer's interest and attention, and accordingly, can serve as pleasant distractions that may diminish stressful thoughts commonly associated with healthcare visits and other stressful situations and conditions (Kaplan, 2005; Kuo, 2001; Ottosson and Grahn, 2008; Wichrowski et al., 2005). Further research (Kuo and Taylor, 2004; Taylor and Kuo, 2009) showed that children with Attention Deficit Hyperactive Disorder (ADHD) concentrated better after a walk in a park than after a walk downtown or in a highly built environment.

Concerning the physiological component of stress recovery, "laboratory and clinical investigations have found that viewing nature settings can produce significant restoration within less than five minutes as indicated by positive changes, for instance, in blood pressure, heart activity, muscle tension, and brain electrical activity" (Ulrich, 1981; Ulrich et al., 1991; Kropela and Ylén, 2007). Studies such as these suggest the medical

plausibility for adding supplemental "doses of nature" to standard healthcare treatments.

As a result of these studies, a return to nature in the medical field is on the rise. The Howard A. Rusk Institute of Rehabilitation Medicine in New York City, attends to the "whole person." This outlook on healthcare delivery led Dr. Howard Rusk to build four gardens that function as a part of integrated clinical processes and healing environments at the facility. In urban New York City, the garden is a welcome amenity amid the skyscrapers, noise and pollution.

Rehabilitative services required by the patients of the Rusk Institute often demand weeks or months of specialized high-intensity care. Therefore, the Institute values therapeutic qualities in all aspects of design in an attempt to create a pleasant environment for long-term patients. The gardens specifically allow "escape from the clinical realm and serve as a safe means of progression from the hospital room to the outside world." It has been noted that "[t]hey are often in constant use and can have great power and meaning" (Gerlach-Spriggs et al., 1998).

The Wausau Hospital in Wausau, Wisconsin, has a layout design originating in community values and goals. Evidence of this is seen in the abundant gardens and woodland areas for patients, staff, and visitors. The building plan, designed by David Kamp, has courtyards within the main building, allowing rooms to face outside to either the landscape park or inward to the courtyard. All rooms have large windows that are lower than usual in order to provide views for the recumbent hospital patient. The figure eight layout also allows for departments to be organized within their own corridors (Figure 3). The system is continuous around the square, increasing efficiency whereby a less busy department could lend rooms without having to scatter patients and staff around

the building.

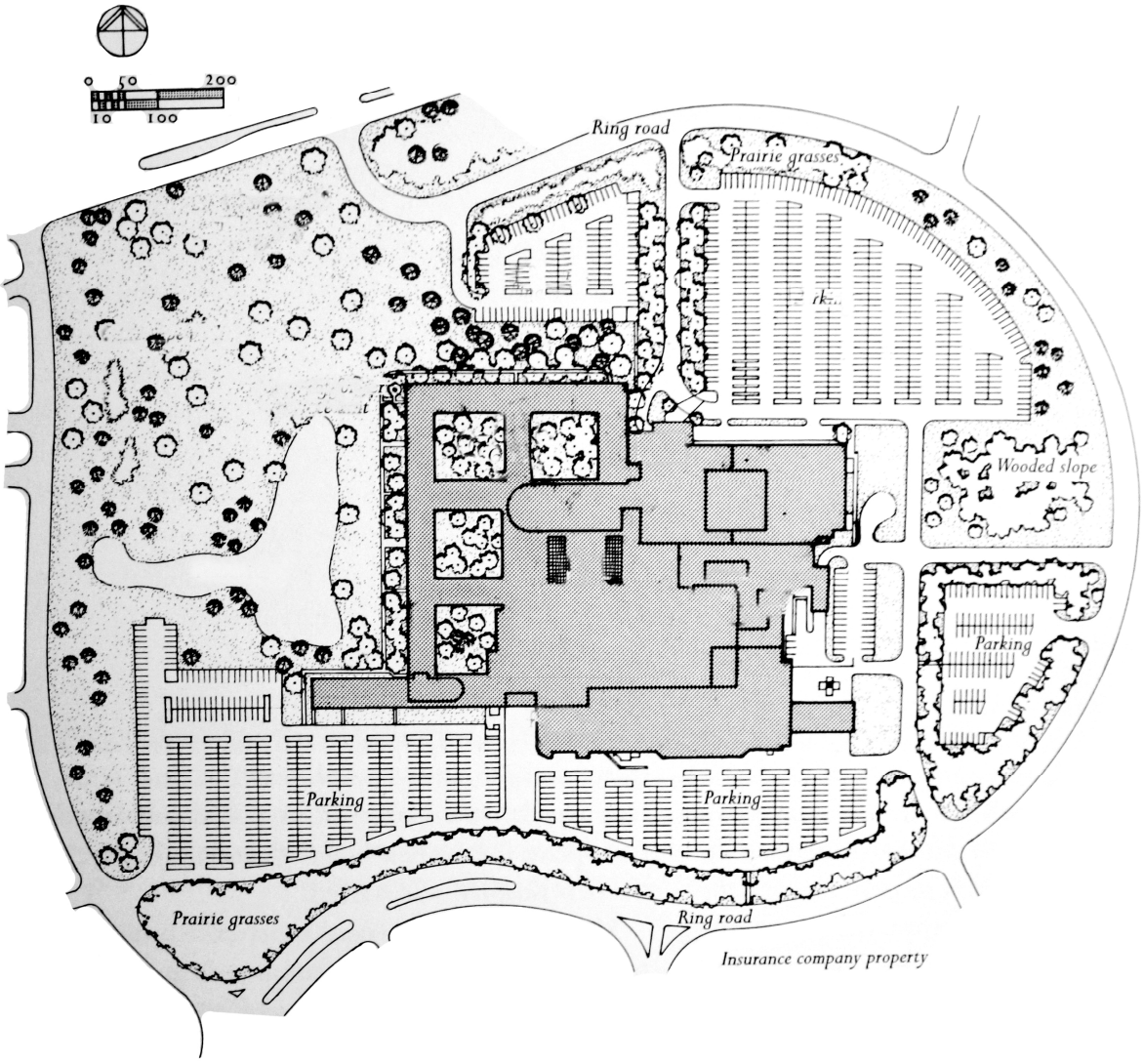

Figure 3: Wausau Hospital Site Plan (Kamp, 1998)

This hospital's setting is in a small community in Midwest America, but the tropical plantings in the enclosed courtyard atriums allow viewers the ability to escape the hospital environment and imagine themselves elsewhere. The gardens do not try to deny illness or death that is present in the hospital, but they do the job of softening, comforting, distracting, and inspiring observers to acknowledge that illness and death are part of life.

Conclusion

In light of increasingly documented physiological and psychological benefits of therapeutic landscapes on users, one might think that their presence would be commonplace in various healthcare settings. When a therapeutic landscape is present, there are positive clinical indicators such as the observable condition of a patient's blood pressure, heart rate, or pain medication intake. The presence of a therapeutic landscape also has shown positive patient/staff satisfaction that lead to lower recruitment or hiring costs due to staff turnover. These patient and staff benefits would seem to be sufficient cause and justification for the adoption of the therapeutic landscape in institutional settings, yet they are often a missing element in healthcare institutions.

CHAPTER III

AIMS OF STUDY

This study intends to address several issues surrounding therapeutic gardens in healthcare settings: 1) perceived barriers to therapeutic landscapes based on the concerns of healthcare providers and administrators; and 2) a determination of whether these professionals are aware of the multitude of benefits obtained through the presence and use of therapeutic garden space; and 3) does the presence of a therapeutic garden at work influence perceptions of barriers, use, and benefits. Healthcare providers' perceptions relating to concerns, benefits and barriers, as well as their understandings of what truly makes a landscape therapeutic, will be documented through a survey. These perceptions will be analyzed and reported to create a more thoughtful dialogue among healthcare providers, administrators, and landscape architects.

Because this is an exploratory study, the author decided to frame the experimental design as a series of "aims" rather than hypotheses. The aims are intended to answer the following questions:

1. Using a standard definition of a therapeutic garden, is there a strong consensus among healthcare workers as to what constitutes a therapeutic garden in healthcare settings?
2. Does the prior knowledge of a therapeutic garden (as defined by Westphal 2010 Gerlach-Spriggs and Healy, 2009) at a healthcare facility influence staff perceptions of benefits, barriers and/or appropriate use, for different patient populations based on current

treatment protocols and intended outcomes?

3. What concerns do medical staff express when asked to identify barriers to garden use for different patient populations irrespective of the presence or absence of a therapeutic garden at their place of work?

4. Are perceptions relating to therapeutic gardens for use with different patient populations influenced by the socio-demographics and/or educational training of medical staff?

CHAPTER IV

METHODS

This study was initiated by a comprehensive review of the literature and was concluded with an analysis of data from a hand-delivered, mail-back survey. The literature review identified four general areas of study relative to the creation, location and user groups/patient types of therapeutic gardens. Health benefits derived from therapeutic gardens in healthcare settings also were also reviewed. One of the areas where little information on therapeutic gardens existed in the literature was the area addressing perceived barriers to the installation of gardens in contemporary health care settings. This lack of information led to speculation as to cause, and eventually, to formulation of aims that would drive the study. It was decided that a survey of current healthcare providers would be undertaken for the purpose of gathering information on perceived barriers to therapeutic gardens. The target group for the survey was healthcare professionals working in the mid-Michigan area, within a one-hour to one and a half hour drive of Lansing, Michigan, at various types of medical facilities (i.e., hospitals, end-of-life care, and extended care facilities). Conducting an internet search for the types of medical facilities listed above resulted in the contact list.

Study Population

Because this was an exploratory study, the study population was limited to actively employed healthcare workers at a variety of healthcare institutions (i.e., hospitals, end-of-life care, and extended care facilities) in the mid-Michigan area. The area was largely defined by a driving distance of 1.5 hours (Figure 4). Conducting an online search for the variety of healthcare institutions listed above within the defined

distance, identified forty-three (43) medical facilities in the study area. Once a medical facility was found through this online search, the head administrator, the head nurse, volunteer coordinator or community relations representative of the facility was contacted by telephone. Eleven (11) facilities agreed to participate in the study. These eleven health care facilities included two hospitals, six nursing homes, and three extended care facilities and created a potential pool of 300 healthcare providers as participants in the study (Table 1).

Survey Instrument

A survey was developed that consisted of a cover letter on Michigan State University letterhead and a survey instrument consisting of nine questions probing perceptions relating to therapeutic gardens in healthcare settings and a tenth question that gather information on the respondent.

A standard definition of a therapeutic garden as initially described in an article by Gerlach-Spriggs and Healy (2010) and modified for widespread use by Westphal (2010) introduced the concept of therapeutic gardens to the respondents. This was done to frame the concept of a therapeutic garden as a designed space intended for health care delivery of select treatment protocols, depending on patient audience and to establish baseline data on the respondents' agreement with the concept. As such, a therapeutic garden differs from the more popular, but less patient-targeted, designed green spaces for health purposes like "healing", "meditation", "reflective", and "respite" gardens (Tyson, 1998; Cooper-Marcus and Barnes, 1999; Squire, 2002). The respondent's level of agreement helped the researcher determine the level of ambiguity in responses to the next question involving "the presence or absence of such a garden at a respondent's place of work";

without this baseline information, it would be difficult to determine the validity and reliability of the respondents' subsequent answers. The definition also helped to eliminate confusion emanating from unstructured, non-programmed outdoor green spaces at a medical facility from true therapeutic gardens with targeted patient populations, structured treatment protocols, medical staff intervention, and medically-defined therapeutic outcomes. The definition reads as follows:

> "A therapeutic garden is a designed outdoor space that uses plants and other elements of nature to promote patient care and well-being while facilitating medical staff in the delivery of standard treatment protocols commonly used in health care settings. As such, the health services supported by a garden may be primarily palliative or rehabilitative, depending upon the patient population being served" (Westphal, 2010).

Ten questions followed this definition that focused on respondent perception of therapeutic garden use by patients and other healthcare providers at their place of work; actual or idealized garden size; and whether the therapeutic garden is or should be used/designed for multiple uses, other than the delivery of treatment protocols (like special events, staff use, etc.).

Based on whether a therapeutic garden existed at a participant's place of work, the next set of questions asked respondents to indicate their perceived frequency of use by different patient groups at the healthcare facility (both in actuality if a garden existed, and ideally, if a garden did not exist) and the perceived healthcare worker(s) most likely to exercise use of a therapeutic garden with a patient group. Responses for the former question involved circling a response that ranged from "none" to "a lot" or "not applicable"; the latter question used a 5 point, Likert-like scale, ranging from "1-very unlikely" to "5-very likely". Size of the garden could be described in acres or dimensions; and multi-use responses could be indicated with a "yes" or "no", with a

"yes" soliciting an open response. The purpose of this section of the survey was to see what patient groups were perceived as being the most appropriate users of a therapeutic garden and who in the healthcare delivery system was the most likely to take patients out into a therapeutic garden for treatment protocols. Actual or idealized size of the garden was asked to determine if a particular patient group was tied to a certain sized garden in reality or ideally. The questions of multi-use were made to determine if respondents perceived a therapeutic garden as having a single function or multiple functions.

The next section of the survey asked respondents to think about other benefits (beyond patient care) that therapeutic gardens might serve in health care settings. These other benefits included marketing advantages for the facility, environmental protection, staff and care-giver satisfaction, etc. The purpose of this question was to determine how restrictively a respondent viewed the design and ultimate use of a therapeutic garden in their health care facility. If health care workers viewed the garden as a single use—i.e., treatment delivery for certain patient populations—then designer options would focus singularly on that use and the patient groups identified; but if health care workers viewed the garden for use beyond patients, then a whole different array of uses could be incorporated into a therapeutic garden's design, in addition to treatment. A five-point Likert-like scale was use to rank various "other benefits" with "1-very unlikely" to "5-very likely". An open-ended response for other benefits was made available to the respondents with the same scaling mechanism.

The set of questions following benefits beyond patient care inquired about perceived barriers to having a therapeutic garden in healthcare facilities, in general. Most of these questions focused on a lack of knowledge about some aspect of therapeutic

gardens in healthcare settings. For example, a perceived staff barrier may be a "lack of knowledge about plants, about patient limitations, or about scientifically validated health benefits"; others barriers may focus on budget priorities and staffing. This section really probed the perceptual barriers held by healthcare professionals when considering a therapeutic garden in their workplace. A five point, Likert-like scale similar to the other sub-sections of the survey was used to collect information on barriers perceived by healthcare professionals, with scaling being "1-very unlikely" and "5-very likely"; an open-ended scaled blank was provided for additional perceived barriers.

Lastly, respondents were asked about their own professional concerns relating to having a therapeutic garden installed at their place of work. This sub-section was formulated to see if some of the concerns that frequently have been mentioned anecdotally in the literature have merit. Using a five-point, Likert-like scale, respondents could indicate a "1-low concern" to "5- high concern"; items included concerns of safety, liability, maintenance, etc. A blank was provided for a concern not listed, followed by the same scale. Finally, a question regarding personal advocacy for therapeutic gardens in a respondent's workplace concluded the data gathering on therapeutic gardens.

Question 10 was constructed to provide background information on the respondent and their professional training and work experience. This battery of questions allowed the other responses to come into context with the respondent's perceptions about therapeutic gardens and their use in healthcare settings. A few socio-demographic questions involving age and gender were followed by several questions on professional fields and degrees, workplace experience, years of professional service, etc. The respondents' were asked to report their professional

field of work (N=55). Answers were grouped into fields to make up the following group identities:

Group 1 Administration: administrators, owners, coordinators, accountants (n=12; 21.8%).

Group 2 "Hands-On" Care Givers: nurses, aides, speech and language pathologists, recreational therapists, occupational therapists, physical therapists (n=30; 60.0%).

Group 3 "Clinical" Care Givers: physicians, social workers, dietitians, psychologists/psychiatrists (n=7; 12.7%).

Group 4 Building Staff: maintenance supervisors, linens/laundry managers, maintenance/janitorial staff, grounds staff, kitchen staff (n=3; 5.5%).

The survey concluded with a note of thanks.

Pre-Data Collection Phase

A pre-test survey was developed by the researcher and administered to a group of sixty-four (64) senior students enrolled in the nursing program at Michigan State University. Data from the pre-test survey was used to evaluate question ambiguity, response generation, and survey organization in an effort to improve reliability and validly in responses. For questions where participant response rate was low, the survey questions were re-evaluated in their wording and/or intent. Likewise, when survey responses proved inconsistent with the response to other questions, the survey was revised to improve question clarity. The resulting revised pre-test survey was then reissued to the same group of sixty-four (64) senior nursing students to further test the quality of questions and survey organization. The same methods as above were used to

revise and amend the final survey that was to be used on professional healthcare employees. The final survey, with cover letter as described above, went out to the professional respondents. All survey activities were approved by the Michigan State University Institutional Review Board (IRB).

Appendix A contains the revised survey and cover letter that actually went out to targeted professionals in the Mid-Michigan area.

Actual Data Collection Phase.

While the pre-test survey was being revised, an online search of various healthcare facilities (i.e., hospitals, end-of-life care, extended care facilities) in the mid-Michigan area was conducted. Head administrators, head nurses, volunteer coordinators or community relations personnel of the facility was then contacted by telephone and solicited for employee participation in the survey. If it was determined that there may be administrative or medical staff interested in the survey, packets of surveys were then hand-delivered to the hospital, end-of-life care, or extended care facility by the researcher; a stamped, self-addressed envelope accompanied each survey.

An optional contact card was included with the survey; this card gave respondents the option to receive the overall survey results and/or to permit researchers to clarify any responses to the survey on therapeutic gardens. Return of the card was voluntary. Respondent institutions received the packets in February 2013 (Table 1) and individual respondents had approximately 30 days to complete the survey and return it by mail to the university. Three hundred (300) surveys were delivered to eleven institutions, and 58 surveys were returned for a response rate of 19.33%. The distribution of healthcare professionals that participated in the study included 8 workers from hospitals, 45 workers

from “end-of-life” care facilities, and 4 workers from extended-care facilities. Of the 58 surveys returned, 100% were complete and useable.

Data Analysis

All data was tabulated in a standard Microsoft Excel format and analyzed using SPSS (Statistical Package for the Social Sciences), to generate descriptive statistics and cross-tabulations. Tables 2- 20 contain responses to the various questions in the survey.

CHAPTER V

RESULTS

Eleven (11) healthcare facilities in the mid-Michigan area, represented by the blue markers (Figure 4) participated in the survey, while 43 healthcare facilities (red markers) chose not to participate in the study. The group of participating facilities included 2 hospitals, 6 end-of-life care facilities, and 3 extended care facilities. Survey respondents included 12 administrators (facility directors, chief of staffs), 33 "hands-on" caregivers (nurses, nurse's aids, and physical therapists), 7 "clinical" care-givers (doctors, psychologists, psychiatrists) and 3 building staff (building and grounds maintenance, culinary services) for a total of fifty-eight (58) surveys (Table 1). A non-response check of the data was not conducted because facilities were not tied to survey participants in any way due to IRB requirements; therefore, it was impossible to know who had or had not completed

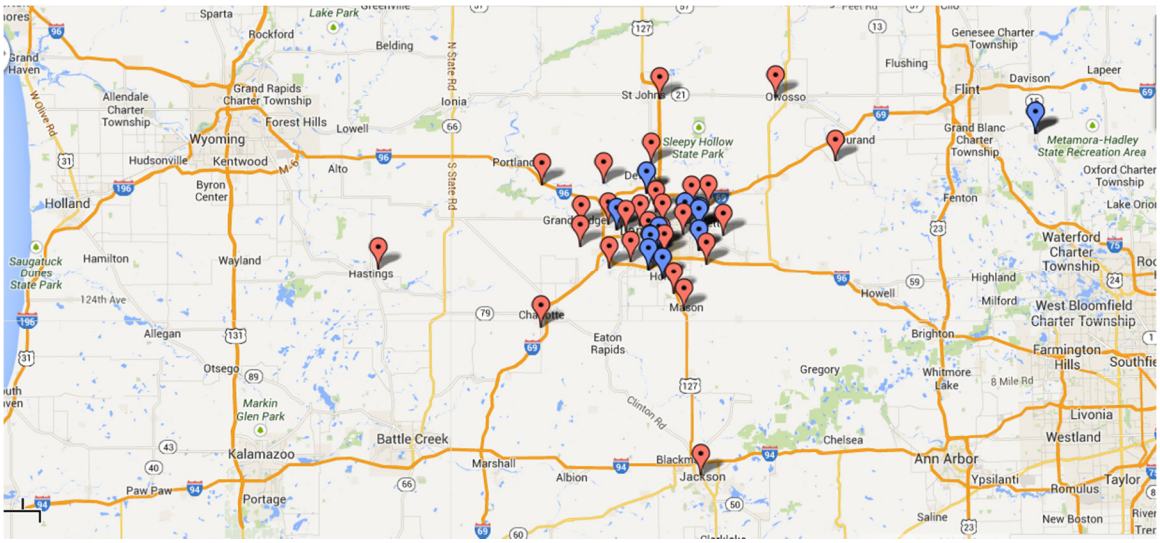

Figure 4: Location of Participating Facilities in Mid-Michigan (Google Maps)

the survey at a particular healthcare facility. In retrospect, the use of colored surveys,

matched to specific participating facilities would have provided that type of information without violating anonymity.

Frequency of responses from the 58 surveys provided descriptive information on both participants and perceived garden use for patient treatment. Tables 2-11 contain the frequency of responses to each of the questions in the survey; brief synopses of the responses follow. Where appropriate, tables have been constructed to illustrate the data. Tables can be found in Appendix B.

Questions relating to agreement with the definition, prior knowledge of therapeutic gardens, and prior experience with therapeutic gardens (Q 1, 2, and 3). The first question asked respondents to indicate how strongly they agreed or disagreed with a standard definition of a therapeutic garden. Over ninety (90%) percent of the respondents said that they strongly agreed (n= 38; 65.5%) or agreed (n= 16; 27.6%) with the given definition while less than 7.0% said they disagreed or felt neutral (n =4; 6.9%) about the definition. When asked if they had heard of, or had worked in, an environment with therapeutic gardens prior to the survey, 48 respondents, (n= 48; 82.8%), said that they had heard of, or were familiar with, gardens prior to the survey, and only 9 respondents (16.0%) had no previous experience with this type of garden.

Using the same definition of therapeutic gardens, the participants were asked to indicate whether such a garden existed at their workplace. Of the various healthcare institutions participating in the survey, 54.0% of respondents (n=29) said they did not have a therapeutic garden available at their workplace, while 46.0% (n=25) did have a therapeutic garden at their workplace. Four respondents had no response. Because the perception of the gardens held by the respondent would depend largely upon their

personal interaction with such landscapes, this question divided the population into those that "had therapeutic gardens" and those that "did not have therapeutic gardens" at their workplace. See Tables 2-4.

The next set of questions (Q4) was directed towards those with a therapeutic garden at their workplace (Q4 a-d) while those respondents with no therapeutic garden at their workplace were directed to go to Q5 a-d.

Responses to Question 1: Agreement with the Definition of Therapeutic Garden (Q4a). Respondents who indicated that they have a therapeutic garden at their current workplace (n= 25) were asked to rate their perception of the frequency of use for six various patient types. The patient types included patients under psychiatric care, orthopedic care, hospice care, oncology care, cardiac care, or dementia care. Hospice care at 31.8% (n=22), psychiatric care 17.4% (n= 23), and dementia care at 33.3% (n = 24) scored the highest as the most common patient groups using the gardens. The groups observed least likely to use the garden were the orthopedic care and cardiac care patients 4.5% (n=1). The option to suggest another observed patient type found the most frequently mentioned "other group" was long-term care patients (n=2). See Table 5.

Respondent's perceived frequency of garden use for patients and non-patients at places of work having a therapeutic garden (Q4b). The professionals rated as the most likely to use the gardens with patients by all respondents were the therapists (mean=3.45) followed by aids (mean=3.38) while family members were rated as the highest (mean=4.08). The most common "other group" mentioned were activities and recreation staff members. The least likely member of staff observed to interact with patients in the existing therapeutic garden were doctors at (mean=1.13) and nurses (mean=2.13).

Doctors scored the lowest standard deviation of 0.34. See Table 6.

Approximate size of existing therapeutic garden (Q4c). Survey respondents were asked to report on the approximate square footage of the existing therapeutic garden at their workplace location. The average existing garden was 2,500 square feet. The range of gardens was 100 square feet to 22,780 square feet.

Other uses for existing therapeutic gardens (Q4d). Respondents were asked to think about the garden in terms of its potential use for other purposes besides viewing, strolling, sitting, or therapeutic activities. About one-third of the respondents (32%; n=8) indicated that other activities took place in their garden space. Of those 25 respondents that indicated their work place had therapeutic gardens being used for other uses, the most common use was for social events such as ceremonies, parties, and celebrations.

Respondent's perceived frequency of garden use for different patient groups at places of work NOT having a therapeutic garden (Q5a). Respondents who indicated that they did not have a therapeutic garden at their current workplace were asked to rate their perception of the anticipated frequency of use for various patient types. The same set of patient types from Question 4 was given. All respondents scored a higher rate of use than the perceptions of those respondents at institutions with a garden present. The idealized amount of therapeutic garden use by patient groups showed that the dementia care group would be thought of as the "most likely" group to use the garden at 62.5% (n= 20). Oncology and hospice care also were thought of as "very likely" to use the garden at 36.7% (n= 11) and 39.4% (n= 13) respectively. The least likely patient groups thought to use the garden were those in cardiac care at 16.7% (n= 5) and orthopedic 16.7% (n= 5) care. Two respondents indicated that "patients in rehabilitation programs" were "other

groups" likely to use a therapeutic garden (Table 7).

Respondent's perceived frequency of garden use for patients and non-patients at places of work NOT having a therapeutic garden (Q5b). In an idealized therapeutic garden, respondents believed that family, staff or non-medical care givers were the most likely to use a therapeutic garden. Family members were viewed as the most likely to use a therapeutic garden informally with a patient at 58.8% (n= 20); however, therapists 42.4% (n= 14) and aids 39.4% (n= 13) were the most likely to use a garden with patients undergoing a treatment regiment. Family members and therapists had the highest mean value, 4.32 (sd=.98) and 4.03 (sd=1.05), respectively. The group perceived to be the least likely to interact with patients in a therapeutic garden for medical purposes were the doctors 64.5% (n= 20) and nurses 21.9% (n= 7). The mean value for doctors was 1.58 (sd=.96) and the nurses was 2.72 (sd=1.37). "Other groups" identified as being "very likely" to use the garden with patients were volunteers (n=2), social service workers (n=2), therapeutic recreation professionals (n=2), and activities managers (n=3). See Table 8.

Approximate size of an idealized therapeutic garden (Q5c). Survey respondents indicated that the approximate square footage for an idealized therapeutic garden at their workplace location ranged from 36 square feet to 3,600 square feet; the mean value was 1,000 square feet.

Other uses for idealized therapeutic garden (Q5d). When asked to think about potential uses for a therapeutic garden beyond its use for therapy, seventy-nine percent (79.3%; n=23) envisioned the garden being used for other uses. Thirty-four percent (34.5%; n= 10) stated the garden could be used for social events such as ceremonies,

parties, and celebrations. Another seventeen percent (17.2%; n= 5) thought the garden could be used for community engagement activities such as garden clubs and herb/ vegetable gardens for the healthcare facilities' use. Other suggested possible uses included increased marketing opportunities, wildlife habitat, and group exercise space.

The following questions brought the survey respondents back together regardless of the fact that their workplace had, or did not have, a therapeutic garden on-location.

The next set of questions asked respondents to rate the likelihood of various benefits derived at a healthcare workplace if a therapeutic garden was added.

Conditions that would improve at a respondent's place of work if a therapeutic garden were provided (N=58) (Q6). Seven possible improvements and one open-ended variable were listed as possible areas of improvement if a therapeutic garden was available in a healthcare setting. All seven received an average score above (3.0). The highest mean score was assigned to the "environment" (4.57; sd=0.62) and "general appearance" (4.59; sd=0.65). The variable with the lowest mean score for improving a person's place of work was for improved "daily patient care" (x=3.60; sd=1.00). Of the listed variables for improvement, the 58 survey respondents indicated that an improvement in the environment (n= 36; 62.1%) and general appearance (n= 38; 65.5%) would be "very likely" to occur. See Table 9.

Frequently cited barriers to therapeutic gardens at one's place of work (regardless of having or not having a therapeutic garden) (N=58) (Q7). The next set of questions (Q7) asked respondents to rate the perceived barriers to the implementation of therapeutic gardens in healthcare settings. There were 58 respondents but on occasion only 57 participants chose to respond to this section of questions. In that circumstance,

the N value was reduced by one.

Fifteen possible barriers were provided in the survey. Respondents were asked to rate them on a scale of 1= strongly disagree that this would be a barrier to 5= strongly agree that this would be a barrier. The barrier most likely to prevent the adoption of therapeutic gardens in one's institutional setting was "lack of all-weather equipment for delivering therapy outdoors" (65.5% (n=38)"strongly agree"; 29.3% (n= 17) "agree"). This variable also received the highest mean value of 4.59 (sd=0.65). Two-thirds (n=38) of the respondents said that they "agreed" or "strongly agreed" that both "a lack of time in work schedules" and "higher priorities for operating budgets" (N=57) were a barrier.

Variables that did not appear to be a barrier to the creation of therapeutic gardens in healthcare settings were "lack of family appreciation" (x=2.26; sd= 1.00) and "lack of patient knowledge" (x=2.19; sd= 1.00). Only one (1.7%) of the 58 respondents indicated that these two variables would be barriers to a therapeutic garden in their healthcare setting. See Table 10 for a full summary.

Level of perceived concern about the implementation of therapeutic gardens in healthcare settings, regardless of having or not having a therapeutic garden at one's work place (N=58) (Q8).

The next set of questions asked respondents to rate variables of concerns, relating to a therapeutic garden at one's workplace (Table 11). Respondents indicated a "high" to "very high" concern about "maintenance costs" (n= 34; 59.6%), and "staffing costs to work the garden" (n= 33; 57.9%). The variables with the lowest rating for concern was "utility limitations" (n=5; 8.8%) and "security issues" (n=4; 7.0%). Other concerns indicated by respondents included "wildlife destruction to the garden" (n=3) and "patient

access" (n=1). The range of concern values averaged from 2.60-3.63, and all variables had standard deviations above 1.1. A ranking of these variables can be found on Table 11.

Finally, a series of questions asked respondents to provide demographic data to better understand the survey population.

Likelihood of advocacy. When asked if their workplace was provided with a series of comprehensive plans, design details, and guidelines for their facility to use, would the 58 respondents be more inclined to become an advocate for therapeutic landscapes in healthcare settings. Of the population that agreed, 77.8% (n= 42) said they would become an advocate for a therapeutic garden and 22.2% (n= 12) said they would not become an advocate. The most common reasons for not being a therapeutic garden advocate were cited as "too costly to implement," "lack of time," and "lack of commitment and interest by administration."

Age. The average age of the respondents was 46 years old (sd=13.37). The youngest person was 24 and the oldest was 73.

Gender. 84.5% (n= 49) of the population was female and 15.5% (n= 9) was male (N= 58).

Professional Fields. The respondents' were asked to report their professional field of work (N=55). Answers were grouped into fields to make up the following group identities:

Group 1 Administration: administrators, owners, coordinators, accountants (n=12; 21.8%).

Group 2 "Hands-On" Care Givers: nurses, aides, speech and language

pathologists, recreational therapists, occupational therapists, physical therapists (n=30; 60.0%).

Group 3 "Clinical" Care Givers: physicians, social workers, dietitians, psychologists/psychiatrists (n=7; 12.7%).

Group 4 Building Staff: maintenance supervisors, linens/laundry managers, maintenance/janitorial staff, grounds staff, kitchen staff (n=3; 5.5%).

Professional Education Degrees. The respondents were asked to report their professional degrees in the survey. Answers were grouped into Associate, Bachelor's, Master's, PhD, and multiple degrees. Of the 51 respondents who responded with this information, two had Associate Degrees (3.9%); thirty-nine had Bachelor's Degrees (76.5%); seven had Masters Degrees (13.7%); three had PhDs (5.9%).

Workplace Type. The respondents' were asked to report their type of workplace. Answers were grouped into three groups: Group 1: Hospital (hospitals, private clinics, and multi-service clinic); Group 2: End-of-Life Care (hospice, nursing home, and assisted living); Group 3: Extended-Stay Clinic (rehabilitation centers, independent living, and adult foster care). The breakdown of those that responded with this information (N=57), Group 1: Hospital = 8 (14.0%); Group 2: End-of-Life Care= 45 (79.0%), Group 3: Extended Stay Care= 4 (7.0%).

Department. The respondents (N=53) were asked to report their assigned department. Answers were grouped into three groups: Group 1: Administration = 11 (20.7%), Group 2: Healthcare Professional = 36 (67.9%), Group 3: Building Staff = 6 (11.3%).

Years at this institution. The 57 survey participants answering this question

ranged in value from 1 to 50 years at their current place of employment. The average number of years at their current place of employment was 7.86 years of work; the standard deviation was 9.75 years.

Years of service in current profession. The 57 survey participants answering this question ranged from 1 to 49 years in their current profession, plus or minus 10.9 years (standard deviation). The average value was 14.33 years of work.

Length of working hours per week. Participants (N=58) answering this question ranged from 8 to 90 hours worked per week, plus or minus 10.46 hours (standard deviation); the average number was 41.12 hours per week of work.

Study Update Card Returned with Survey? All participants (N=58) were given the choice to request a study update upon completion of the project. Eleven (19.0%) responded "yes" while 47 (81.0%) did not return a card.

Correlations (Cross-Tabulations)

In order to answer the main questions posed in the aims of this study, a series of cross tabulations were preformed to understand the statistical correlation, if any, between select variables.

Respondent's perceived frequency of agreement on barriers to therapeutic gardens at their place of work as well as prior knowledge of the characteristics of therapeutic gardens (N=58). No perceived barrier to therapeutic gardens was found to have a statistically significant correlation with a respondent's prior knowledge of such gardens (Table 12).

Respondent's perceived frequency of agreement on barriers to therapeutic gardens at their place of work as well as the socio-demographics of the respondent

(N=58). There appeared to be strong correlations between the age of a respondent and several variables relating to perceived barriers to having a therapeutic garden in a health care setting. Some of these correlations included: "lack of knowledge about patients" (p=.010). for respondents in the 31-40 (n=9; 16.4%) and the 51-60 (n=9 16.4%) year age groups;. "lack of knowledge about family appreciation" and respondents at 31-40 (n=9; 16.4%) year old (p=.004); "lack of published health-benefit information in reputable medical journals" and respondents in the 51-60 (n=14; 25.6%) age group (p=.022); "lack of advocates" for garden areas for respondents 51-60 (n=14; 25.6%) year olds (p=.034). Table 13 lists all of the other correlations found between age and perceived barriers by respondents.

Respondent's perceived frequency of agreement on barriers to therapeutic gardens at their place of work and the professional field of the respondent (N=58). The only barrier that had a statistically significant correlation with the professional field of the respondent was "lack of time in work schedules" (p=.013). Of the 55 respondents for this question, 16 (29.0%) respondents in the administrator group view a lack of time as a barrier (Table 14).

Respondent's perceived frequency of concerns about therapeutic gardens at their place of work and prior knowledge of the characteristics of therapeutic gardens (N=58). No variables addressing possible concerns about therapeutic gardens were found to have a statistically significant correlation with a respondent's prior knowledge of such gardens (Table 15).

Respondent's perceived frequency of concerns about therapeutic gardens at their place of work and the socio-demographics of the respondent (N=58). Only two socio-

demographic variables had a statistically significant correlation; those included the age of the respondent and "maintenance costs" (p=0.013 for respondents 51-60 years old; n=14; 25.5%) and "seasonal usage" (p=.038 for respondents 51-60 years old; n=11; 20.0%). Table 16 lists this data.

Respondent's perceived frequency of concerns about therapeutic gardens at their place of work and the professional field of the respondent (N=58). A variable of concern that had a statistically significant correlation with the professional field of the respondent was "safety issues" (p=.032); building staff (n=3) rated this concern "high to very high", while hands-on care givers (n=10; 18.2%) and administrators (n=9; 16.4%) rated this issue "low to very low" as a concern (Table 17).

Respondent's perceived frequency of improvements caused by therapeutic gardens at the respondent's place of work and their prior knowledge of the characteristics of therapeutic gardens (N=58). None of the variables listed as possible "improvements" in patient care and supported by therapeutic gardens were found to have a statistically significant correlations, with a respondent's prior knowledge of such gardens (Table 18).

Respondent's perceived frequency of improvements caused by therapeutic gardens at their workplace and the age of the respondent (N=58). Improvement variables that had a statistically significant correlation with the age of the respondent included "marketing advantages" (p=.013), "the environment" (p=.004), and "general appearance" (p=.006); these correlations occurred in the 51-60 age group. Respondents who were 31-40 (n=11; 20.0%) year olds, thought "general appearance" was a statistically significant improvement (Table 19).

Respondent's perceived frequency of improvements caused by therapeutic gardens at their place of work and the professional field of the respondent (N=58). The professional field of the respondent appeared to be statistically correlated for several variables. These included "general appearance" (p=.039) and "the environment" (p=.029), with 100.0% of the building staff (n=3) and the clinical staff (n=8) indicating that a therapeutic garden was "likely" to "very likely" to make an improvement in the health care facility (Table 20).

CHAPTER VI

DISCUSSION & CONCLUSION

This chapter summarizes the most salient findings from the data and draws some conclusions and recommendations for future study.

"Aim 1" sought to find if there was a strong consensus among health care workers as to what constitutes a therapeutic garden. There was strong overall agreement with the definition of a therapeutic garden, which initiated the survey activity. This is significant to the study because a general consensus with the meaning and application of the definition focuses the respondents on this type of garden and eliminates confusion between a therapeutic garden and common gardens or green space. While all landscape types have proven to be beneficial to health and wellbeing in various capacities, the therapeutic garden definition helps to clarify purpose related to treatment outcomes in healthcare. Over half (65.5%, n=38) the responding population strongly agreed and another 27.6% (n= 16) agreed with the definition (Table 2). This data is encouraging because the first step in increasing the acceptance of, and benefit provided by, a therapeutic garden in healthcare settings is the education of the healthcare-providing sector.

Additionally, the very high occurrence of prior knowledge (Table 3) about therapeutic gardens (82.8%, n=48) also is very encouraging and suggests that healthcare professionals presently are aware of the concept that nature can be used in conjunction with traditional medicine to achieve a higher rate of positive patient treatment outcomes. Because of the high agreement with the definition and the amount of healthcare professionals indicating that they have a prior knowledge of such spaces, it is *not* felt that

these areas will pose a barrier to therapeutic landscapes in healthcare settings.

As expected, more healthcare locations reported an absence of a therapeutic garden (Table 4). What was not expected was that 43.1% (n=25) of locations participating in the survey had a therapeutic garden at their facility. However, the researcher did not physically visit and assess each location; this fact will remain a weakness in the data set. Because of this fact, it is difficult to confidently report the accuracy of the presence of a therapeutic garden even when indicated by survey respondents. What is significant about the reported presence of therapeutic gardens is the perception of the respondent that gardens and landscapes at their work places were thought to be a therapeutically beneficial and useful space for patient care.

"Aim 2" of this study asked if prior knowledge of a therapeutic garden at a healthcare facility influences staff perceptions of benefits, barriers and/or appropriate use for different patient populations based on current treatment protocols and intended outcomes. Data collected about various patient types using the garden in the presence of an *existing* space showed that certain patient groups are perceived to be more likely to use the garden than other patient groups. For example, the Orthopedic and Cardiac Care patients are about 6% likely to use the garden compared to the 40% and 50% likely use by dementia and long term care patients, respectively (Table 5). The literature supports the use and the derived benefit of therapeutic landscape exposure for all four patient groups, but clearly some groups are perceived to be underutilizing the spaces. This may be due to the perceptual view of therapeutic garden use as a "passive-palliative care experience" rather than "active-rehabilitative care experience". Psychiatric patients have a long history of being associated with healthcare facilities that value the outdoors as seen

with the asylum design of the late 19th and early 20th centuries. Oncology care patients, who were perceived to have limited use of the existing therapeutic gardens (n=1 among respondents), are reported to be good candidates for using therapeutic gardens (as reported in the literature). Both of these patient groups also have potential to experience the garden in a reflective, non-structured manner. Meanwhile, cardiac and stroke rehabilitation treatment protocols easily could be accommodated in a therapeutic garden with appropriate design, including dedicated "work-out stations" or use areas created for therapies commonly found in their rehabilitation facilities (e.g., for stationary bicycles, etc.)

The survey populations without an existing garden were asked to "think about an idealized therapeutic garden"; in this group, respondents anticipated that all patient groups would use the garden at a much higher frequency than those patient groups currently having physical access at other facilities having an existing garden (Table 7). The three patient groups that reported low use in the existing gardens--orthopedic, oncology, and cardiac care--also were reported to have lower use in the idealized garden; however the anticipated frequency of use for these groups was higher as reported by the survey population without a garden in their workplace. In the cases of psychological and dementia care, the frequency of high use surpassed the frequency of low use. This suggests that when thinking about an *ideal* therapeutic garden, healthcare professionals are more receptive to the use of the garden by different patient groups compared to patient groups in locations with *existing* gardens and who may be experiencing undocumented difficulties with patients in their gardens.

Concerning the frequency of staff interaction with patients in locations with a

therapeutic garden, it was clear that non-medical personal were most likely to have interaction with patients in the therapeutic garden. High use by family, 41.7% (n=24), in existing gardens and 58.8% (n=34) in the idealized perceptual gardens, is expected when compared to the high-perceived improvement in various positive attributes that a garden would have on visitor satisfaction (Tables 6-9). The very low potential that "a lack of family appreciation" ranked as being a barrier to therapeutic gardens seems to indicate that family members are perceived to have a high appreciation for a therapeutic garden at a health care site (Table 10). The low instance of nurses and doctors using the garden with patients in both the idealized and existing therapeutic garden reflects the fact that a "lack of time in schedules" is a significant barrier as is "higher priorities for staff time" for these groups in most institutional settings. This is understandable as these professionals are most likely to have more responsibilities throughout the workday that would interfere with time spent in a garden with their patient population. Therapist professionals remained equally likely to use the garden with their patients in both scenarios (Tables 6 and 8). It is thought that this could be due to the nature of responsibilities a therapist has with various patient groups. Physical and Occupational Therapy, combined with other alternative and complementary medicines, such as horticultural therapy, has been found to be possible and highly beneficial to patients when preformed outdoors.

There were no valid correlations between the presence of perceived barriers and the prior knowledge of a therapeutic garden (Table 12).

"Aim 3" was directed at what concerns medical staff express when asked to identify barriers to garden use for different patient groups irrespective of the presence or

absence of a therapeutic garden at the workplace. Tables 10 and 11 show that there was a general lack of consensus on what poses as potential barriers and concerns between the groups that had or did not have a therapeutic garden. This in and of itself is a barrier to the implementation of therapeutic landscapes and gardens in healthcare settings. No valid correlations were found between the presence of perceived concerns about therapeutic gardens and the prior knowledge pertaining to therapeutic gardens (Table 15). It was hoped that those professionals whose facilities did include a therapeutic garden would have more decisive opinions on the topic of therapeutic gardens, but they did not.

"Aim 4" looked to determine whether socio-demographics and/or the educational training of medical staff influence perception relating to therapeutic gardens for use with different patient populations. The correlations about possible barriers or concerns and the set of socio-demographic variables that had statistically valid correlations (i.e., a Pearson Chi-Square test indicated a p value at the scientifically accepted level of $p=0.05$) were "lack of patient knowledge" and "lack of knowledge about family appreciation" (Table 13). The 31-40 and 51-60 year old groups felt strongly that these two potential barriers would not affect therapeutic landscape use. It appears that respondents in the above age groups have been in their respective professional practices for a length of time long enough to allow them to be comfortable with their patient groups. They also have had more first-hand experience with family members and appear to know this group's needs as well. It is unclear why the other age groups did not also strongly disagree with these variables being barriers. A "lack of published information", "lack of advocacy groups" and "lack of appropriate patient to staff ratios" were viewed by 51-60 year olds as being a barrier (Table 12). A possible cause for this could be that members of this age group,

being the more experienced and educated professionals, place a higher value on juried publications and work experience to gain understanding and knowledge about an unfamiliar topic and then apply it to their respective work environments. A "lack of time in work schedules" and "all-weather equipment" was felt by the 31-40 year olds to be the strongest barriers. This age group represents professionals who are likely to work full schedules, raise a family, while also beginning to take on other professional roles such as administration. It is unclear as to why even younger professionals would not have a similar perception about time constraints and the lack of all-weather equipment (Table 13).

Concerning the correlation between perceived barriers and the socio-demographic of a respondent, there were significant correlations. Perceived barriers to therapeutic gardens, (Q7) were shown to exist most strongly in medical staff ages 41-50 years old.

The only statistically valid correlation between the professional field of a respondent and the agreement on a barrier to therapeutic gardens occurred for the variable "lack-of-time in work schedule" (Table 13). Among administrators, 29.0% (n=16) there was strong agreement that this was a barrier. Administrators are responsible for the proper hiring and staffing of healthcare professionals. Members of this work force could view the addition of a therapeutic garden as an unnecessary addition to the already rigorous and demanding norms of healthcare protocols. The fact that therapeutic gardens are features that do not currently include a set of reliable and valid performance standards-- based on medical outcomes that are recognized by medical professionals for different patient groups--may be a factor as well. The group that felt the second strongest about "lack of time" being a barrier were the "clinical" medical professionals. This group

consisted of physicians, psychologists, and other specialists, many of whom do not traditionally spend large amounts of time performing “hands-on care” for patients. These professionals often rotate among numerous patients of different care groups. Therefore, they might find it difficult to devote time during their day to incorporate therapeutic garden visits with their patients into the traditional role of the health care provider. The “hands on” medical professionals were split on “lack of time” being a barrier. This could be due to institutional settings, the different specializations in this group of professionals, and/or the patient groups these nurses, aides, and therapists deal with daily at their workplace.

Concerning the correlation between perceived barriers and the professional field of a respondent, there were correlations. There are perceived barriers that affect the implementation and use of therapeutic gardens in healthcare settings that are significantly influenced by the professional field of the medical staff, but is limited to the variable described as “lack of time in work schedules”.

The data suggests that the “lack of patient knowledge” and “lack of family appreciation knowledge” are two variables with the lowest barrier potential. This is expected considering that 72.7% (n= 40) of the survey population is identified as a professional caregiver, and 21.8% (n= 12) are identified with being in healthcare administration. In particular, these are two professional groups that are expected to have the highest level of knowledge about patients as well as have the highest level of interaction with families of patients on a regular basis.

Age and concern about maintenance costs (p=.013) and seasonal usage (p=.038), show that a statistically valid correlation is present (Table 16). Those respondents 51 to

60 years old had the highest concern (n=14; 25.5%) about maintenance costs. This age group also had the highest level of concern for seasonal usage (n=11; 20.0%). Overall, regardless of the p value, the highest areas of concern across the age groups included *safety issues* for 21-30 year old professionals, *maintenance costs* for 31-40 and 51-60 year olds, and *seasonal usage and maintenance* concerns for those in the 71-80 year old professional group. The 41-50 year old group did not have a strong level of concern for any particular variable.

A respondent's professional field and the level of concern that a variable exhibited in relation to the addition of a therapeutic garden in a healthcare setting was seen only in the topic of "security issues" (Table 14). Group 4: Building Maintenance (n=2; 66.7%) rated this as a high concern. In many cases, it may be the responsibility of the building staff to maintain or ensure the proper security of a new, external, use area. Conversely, Group 1: Administration professionals (n=9; 16.4%), Group 2: "Hands-On" healthcare professionals (n=10; 18.2%), and Group 3: "Clinical Care" healthcare professionals (n=6; 10.9%) rated this concern "low" to "very low". For these three latter groups, overall barriers (Table 10) and concerns (Table 11) relating to therapeutic gardens tended to focus on "time commitment and "financial dedication".

Looking at the overall improvements made to a healthcare facility due to the inclusion of a therapeutic garden (Table 9), it was clear that all suggested variables are likely to be viewed as "an improvement" to the healthcare facility. Mean values for variables that dealt with the environment (x=4.57), visitor satisfaction (x=4.36), and general appearance (x=4.59) of the workplace were rated as having the highest potential for improving the facility. Overall perception of improvement in the area of marketing

advantage also was high. This perception is important because future therapeutic gardens will depend on these gardens being seen as financially viable by all stakeholders in the healthcare delivery system.

The suggested improvement in "staff satisfaction" received a mean value of x= 3.86 in "likelihood for improvement". While this value is above the average, this average value was lower than the aforementioned variables and raises questions as to why the healthcare professionals participating in this survey would not include themselves in the population that would "very likely" benefit from a therapeutic garden. Perhaps it is a result of a lack of time.

No significant relationships between the incidence of perceived improvements caused by the presence of a therapeutic garden and the prior knowledge of a therapeutic garden were found (Table 18).

The correlations asking about likelihood of therapeutic gardens providing an improvement and the socio-demographics of the respondent supported several statistically valid correlations (Table 19). Data indicating an improvement in variables of marketing advantages, the environment, and general appearance of the workplace do have a significant relationship with certain socio-demographic variables in a population of healthcare workers. A therapeutic garden was seen by 30.1% of 51-60 year olds as being able to provide an improvement to the marketing advantage of the facility, along with the environment and the general appearance of the facility. It is reasonable for this age group to agree these variables would be enhanced. These professionals are most likely those practicing the longest, and know the importance of facility appearance to customers. It is unclear, however, why the 32-40 year olds selected only general

appearance as a benefit of the garden (to the exclusion of marketing advantage and environmental improvements).

The professional field of the respondent also had a significant relationship with improvements in the environment (p=.029) and the general appearance (p=.039) of a location (Table 20) for clinical health professionals and building staff. It is unclear what made these two groups feel so strongly while other groups of respondents ranked these two variables as less likely to occur.

Study Limitations

While this study was exploratory, there were limitations that future projects could address. First, the limited participation in the survey is indicative of the overall lack of understanding and communication between the professional fields of medicine and design. Healthcare professionals are slow to recognize the importance of the built environment to overall patient and staff health and well-being, unless a major design flaw disrupts daily operations. However, the incremental decisions made by hired design professions affect every aspect of the functional utility and aesthetic appeal of their workplace. In this study, over fifty mid-Michigan healthcare providing facilities were contacted about this study, and solicited for feedback that could improve the outdoor spaces surrounding their workplace. These facilities ranged in size from small, privately owned hospices, medium extended-stay clinics, and large regional hospitals. Only eleven facilities chose to participate. Within those eleven facilities, over 300 healthcare workers were identified as being possible survey respondents; from this population, only 58 completed and returned usable surveys. Limitations resulting from the small sample size and response rates resulted in disproportional responses for some categories of workplace

types and professional fields. Low response rates meant the data had to be condensed into smaller, more general populations to achieve measurable statistics. By doing this, the study was not able to fully address perceived barriers specific to individual professional fields or workplace types. It would be beneficial to conduct the survey on a larger, statewide or national level, by using electronic survey systems to distribute the surveys.

The survey could also have been improved if the following changes occurred in its structure and administration. For future studies of this nature, prior to survey distribution, reconnaissance to a study location could be conducted to decide if the location has a therapeutic garden setting that adheres to the definition of such gardens as set by this study. Such a visit also would provide an opportunity to personally solicit involvement of the staff in the survey. Survey results could then be checked for validity and reliability of data provided by respondents in regard to actual therapeutic gardens in the health-care settings (i.e., employee ratings of their garden space could then be compared to the ratings of the researcher). Because the survey questions addressed two possible conditions—perceived and actual gardens—the split in questions could have affected the ability of the respondent to accurately answer the desired intent of the question.

Finally, the research team had intended to determine the likelihood of therapeutic gardens to improve "the environment" in the sense of the natural surroundings and microclimate. However, since this distinction was not clearly made in the wording of the survey, it cannot be assumed that all respondents thought the same way as was intended. The responses to this question may include the entire "built environment" on the grounds of their work place when considering their responses.

Conclusion

There was found to be a strong consensus among healthcare workers as to what constitutes a therapeutic garden in the healthcare setting based on the given definition by Westphal (2009) and Gerlach-Spriggs and Healy (2009) (Aim 1). This is encouraging as it is imperative to have agreement between those in the health care and design industries to facilitate the proper implementation of therapeutic gardens and to establish performance standards for such gardens.

The second aim of this study was to see if prior knowledge of therapeutic gardens had any influence on staff perceptions of appropriate use, barriers, and/or concerns for such spaces. No significant relationships existed between prior knowledge of therapeutic gardens and perceptions of health improvements afforded patients by the presence of the garden. Likewise, there was no correlation between prior knowledge and possible concerns or barriers to having such a garden in the healthcare environment. No correlation between these variables and the healthcare worker's prior knowledge shows that regardless of a respondent's prior knowledge they already formed opinions about therapeutic gardens. What this means to the success of future therapeutic gardens is that greater efforts to educate health care workers about such spaces (and exposure to thoughtfully designed gardens) can have a positive impact on health professionals regardless of whether they knew or heard of such spaces prior to the exposure.

This study also found that many perceived barriers to therapeutic gardens exist in healthcare settings among staff, and many of these barriers are related to the function of the workplace. Specifically, the variable relating to the "amount of time" that staff could spend with patients in the garden always was viewed significantly higher than most other

variables. Likewise, the allotment of funds to support a therapeutic garden generated strong concerns over the actual or perceived monetary demands that a garden would create. Acknowledging that monetary limitations are always present in healthcare settings, the future success of therapeutic gardens will require accurate and reliable data gathering on the costs and benefits associated with these gardens. This can be obtained from healthcare facilities that currently have therapeutic gardens. These costs must include the creation, maintenance, and use of these outdoor spaces, and they must be tied to patient outcomes, and staff/family satisfaction within the healthcare setting. Having hard data to underpin the costs and benefits of these gardens will insure that the economic realities of the marketplace are included in any decision affecting a garden. Work by Ulrich (2006) suggests, that the economic benefits generated by therapeutic gardens in large regional hospitals far outweigh the initial cost of construction and long-term maintenance through customer satisfaction and repeat visitation. However, similar research on the cost-benefits of therapeutic gardens in smaller, more focused health care facilities to date has not been done, and this presents a unique opportunity for future research. As a landscape architect, or any design professional, looking to positively affect measurable health-outcomes for a variety of patient groups, staff, and families, it will be necessary to address these deficits (Aim 3).

What was perhaps the most interesting finding was that ‘a lack of all-weather equipment’ for use with patients in the garden was perceived to be the biggest barrier of all tested variables. This suggest that if there were all-weather options easily accessible or installed at the medical facility that the therapeutic garden would be a more viable option for patient use. If future collaborations between healthcare equipment manufacturers,

healthcare design professionals and the medical community were to take place, the result could be a more holistic and functional therapeutic garden environment.

The study also showed that all variables for possible areas of improvement to the healthcare setting could see a positive improvement with the presence of a therapeutic garden. Each variable for improvement received an average score of 3, meaning a therapeutic garden is over 50% likely to improve the variable in question. What is suggested by this data is that the respondent intrinsically knows that therapeutic garden space will be an improvement to the environment and the general appearance of the healthcare setting, as well as to the general health of patients, staff and visitors. This idea follows what the literature says about the human perception of health and nature.

The professional group thought most likely to be a prime advocate group (as found in this study through the combination of variables indicating low concern, strength of barrier, and high occurrence of variable-induced improvement) would be the healthcare professionals from Group 2: "hands-on" medical professionals. These professionals will likely be between 21-40 or 51-70 years old; they are more likely to be employed in a workplace type classified as Group 1: A Hospital setting that currently has a therapeutic garden installed. A secondary advocacy group would consist of professionals from Group 3: "clinical" medical professionals working in a workplace type classified as Group 2: End of Life Care. Age was an intervening variable that proved significant in this study. The most likely socio-demographic segment to serve as advocates would be in the age ranges of 21-40 and 51-70 years old, in a location that currently has a therapeutic garden installed. This group may have even stronger advocacy potential, if further education were provided on garden history, application, and

documented benefits. Continuing medical education workshops and journal articles are likely outlets for disseminating this information (Aim 4).

The ultimate lesson learned from this study is research, that enhances the validity and reliability of therapeutic site design to achieve predictive outcomes, among the various user groups in a garden is essential if both fields, landscape architects and medical professionals, hope to optimize the benefits of this feature in the workplace. This type of work is needed if any advancement in installation and utilization of therapeutic gardens in healthcare settings is to occur. Continued interaction between design and healthcare professionals through post-occupancy evaluations and continuing education requirements for both professional groups will insure that designed space evolves over time, just as changes in personnel and/or treatment protocols evolve within healthcare settings. In this manner, both the designer and the medical professional remain informed and important advocates for garden use as they seek desired health outcomes for their clients and patients, respectively.

APPENDICES

APPENDIX A

Cover Letter and Survey

MICHIGAN STATE UNIVERSITY

Dear Health Care Provider,

The Landscape Architecture Program at Michigan State University offers course work in therapeutic site and garden design. This semester we are conducting a research survey of health care providers who work with a variety of patient groups in a broad range of health care settings. This voluntary survey asks you to provide insight on your thoughts regarding the appropriateness of therapeutic gardens for the primary patient/resident population that you serve. Your employer has given us permission to contact you about your interest and knowledge pertaining to therapeutic gardens in health care settings. Information from this survey will be used to inform design professionals about the types of barriers that health care professionals currently perceive regarding gardens of this type in the environment in which you work. This type of information will significantly improve future design products generated for health care delivery settings.

The information that you provide will be pooled with other respondents from health care settings across the state to protect your confidentiality. This survey takes approximately fifteen minutes to complete. Also, please indicate on the enclosed form if you would like to get a copy of our report or if you would like to be a part of a future discussion group on the topic. The survey contains a self-addressed, stamped envelope for your convenience. Simply fold the survey, place the optional contact card on top of the survey for separation prior to opening the survey to maintain your anonymity, place them in the envelope, seal, and drop in the mail. By completing and returning the survey, your actions constitute your consent to participate in this survey, however you may withdraw or refuse to answer any particular questions.

Emaley and I would appreciate receiving your survey by Friday, March 15, 2013. At that time, we will begin tabulating the survey results for publication in mid-July. If you have any questions about this survey, its confidentiality, or your privacy concerns, please feel free to contact me directly, Dr. Joanne Westphal at (517) 353-9729 (office), (517) 256-4401 (cell) or email at westphal@msu.edu. Thank you for your time and interest. Best wishes.

Sincerely,

Dr. Joanne Westphal D.O., PhD. Professor

Emaley Baxter, Graduate Student

School of Planning, Design & Construction

Construction Management
Interior Design
Landscape Architecture
Urban & Regional Planning

314 Human Ecology Bldg
East Lansing, MI 48824

517-355-9729
Fax: 517-432-8108
Email: westphal@msu.edu
www.spdc.msu.edu

Therapeutic Gardens Survey : Instructions

The following survey solicits your views on therapeutic gardens in various health care delivery settings. Currently there are many terms used to describe a therapeutic garden (e.g. healing gardens, meditative gardens, respite gardens, etc.) To focus on the term "Therapeutic Garden", we have chosen a definition that has been widely accepted among design professionals who work primarily in the specialty field of therapeutic site design. The definition is as follows.

A therapeutic garden is a designed space (outdoor) that uses plants and other elements of nature to promote patient care and well-being while facilitating medical staff in the delivery of standard treatment protocols commonly used in health care settings. As such, the health services supported by a garden may be primarily palliative or rehabilitative, depending upon the patient population being served (Gerlach-Spriggs and Healy, 2010).

1. Based on this definition, please indicate how strongly you agree that natural settings do help to promote healing.
(Circle "1" for strongly disagree and "5" for strongly agree):

Strongly disagree 1 2 3 4 5 Strongly agree

2. Using the definition above, have you ever heard of a therapeutic garden prior to this survey?
_____ Yes _____ No _____ Do not know

3. Using the definition above, is there a therapeutic garden at your workplace?
_____Yes _____No _____ Do not know

If answer to 3 is YES, please answer Question 4. If NO, skip to Question 5.

4. a. For the therapeutic garden at your work place, rate your perception of the **frequency** of garden use for each **patient** user type (Circle One).

i. Psychiatric Care	None	A Little	Sometimes	A Lot	Not Applicable
ii. Orthopedic Care	None	A Little	Sometimes	A Lot	Not Applicable
iii. Hospice Care	None	A Little	Sometimes	A Lot	Not Applicable
iv. Oncology Care	None	A Little	Sometimes	A Lot	Not Applicable
v. Cardiac Care	None	A Little	Sometimes	A Lot	Not Applicable
vi. Dementia Care	None	A Little	Sometimes	A Lot	Not Applicable
vii. Other user (please list)	None	A Little	Sometimes	A Lot	

_____

b. For the therapeutic garden at your work place, rate your perception of the **frequency** of **staff** interaction with ANY patient group in the garden.

i. Nurses	very unlikely	1	2	3	4	5	very likely
ii. Doctors	very unlikely	1	2	3	4	5	very likely
iii. Aids	very unlikely	1	2	3	4	5	very likely
iv. Family	very unlikely	1	2	3	4	5	very likely
v. Therapists	very unlikely	1	2	3	4	5	very likely
v. Other user (please list)	very unlikely	1	2	3	4	5	very likely

_____

c. Tell us about the approximate size of the garden area at your work place (*square footage*): _____

d. Is the garden area at your work used for purposes outside of health care delivery (*e.g., staff meetings, ceremonies, events, etc.?*)
_____ Yes _____ No If yes, please describe type of use: _____

5. a. If you had a therapeutic garden at your work place, what is your perceived **frequency** of garden use for each (Circle One).

i. Psychiatric Care	None	A Little	Sometimes	A Lot	Not Applicable
ii. Orthopedic Care	None	A Little	Sometimes	A Lot	Not Applicable
iii. Hospice Care	None	A Little	Sometimes	A Lot	Not Applicable
iv. Oncology Care	None	A Little	Sometimes	A Lot	Not Applicable
v. Cardiac Care	None	A Little	Sometimes	A Lot	Not Applicable
vi. Dementia Care	None	A Little	Sometimes	A Lot	Not Applicable
vii. Other user (please list)	None	A Little	Sometimes	A Lot	

_____

b. Please rank your perceived likelihood of **staff** interaction with ANY patient group in the garden.

i. Nurses	very unlikely	1	2	3	4	5	very likely
ii. Doctors	very unlikely	1	2	3	4	5	very likely
iii. Aids	very unlikely	1	2	3	4	5	very likely
iv. Family	very unlikely	1	2	3	4	5	very likely
v. Therapists	very unlikely	1	2	3	4	5	very likely
vi. Other user (please list)	very unlikely	1	2	3	4	5	very likely

_____

c. Tell us about the approximate size of an ideal garden area (*square footage*): _____

d. If there was a garden, **could** it be used for purposes outside of health care delivery (*e.g., staff meetings, ceremonies, events, etc.*?) _____ Yes _____ No If yes, please describe type of use:

_____

6. The benefits of therapeutic gardens have tended to emphasize improvements in patient care. However, some research suggests that these gardens serve other purposes in health care setting. Do you think that a therapeutic garden at your work place would improve (*using "1" for very unlikely and "5" for very likely"*):

a. market advantage of your workplace	very unlikely	1	2	3	4	5	very likely
b. staff satisfaction with your workplace	very unlikely	1	2	3	4	5	very likely
c. patient treatment outcomes	very unlikely	1	2	3	4	5	very likely
d. the environment	very unlikely	1	2	3	4	5	very likely
e. daily patient care	very unlikely	1	2	3	4	5	very likely
f. visitor satisfaction with your workplace	very unlikely	1	2	3	4	5	very likely
g. general appearance of your workplace	very unlikely	1	2	3	4	5	very likely
h. other? (Please explain)	very unlikely	1	2	3	4	5	very likely

_____

7. The next set of questions asks you about your perceived **BARRIERS** to seeing more therapeutic gardens in health care settings. Please indicate how strongly you disagree or agree with the following factors serving as potential barriers *in general* to the presence of therapeutic gardens in health care settings *("1" for strongly disagree and "5" for strongly agree)*:

a. lack of knowledge about plants	strongly disagree	1	2	3	4	5	strongly agree
b. lack of knowledge about garden maintenance	strongly disagree	1	2	3	4	5	strongly agree
c. lack of knowledge about patient	strongly disagree	1	2	3	4	5	strongly agree
d. lack of knowledge about family appreciation	strongly disagree	1	2	3	4	5	strongly agree
e. lack of information about benefit:costs ratios of gardens in health care settings	strongly disagree	1	2	3	4	5	strongly agree
f. lack of published health-benefit information in reputable medical journals	strongly disagree	1	2	3	4	5	strongly agree
g. lack of performance standards in garden design	strongly disagree	1	2	3	4	5	strongly agree
h. lack of personal training in the use of gardens for my specialty area of medicine	strongly disagree	1	2	3	4	5	strongly agree
i. higher priorities for capital investments	strongly disagree	1	2	3	4	5	strongly agree
j. higher priorities for operating budgets	strongly disagree	1	2	3	4	5	strongly agree
k. higher priorities for staff time	strongly disagree	1	2	3	4	5	strongly agree

l. lack of advocacy groups in health care settings for demanding gardens — strongly disagree 1 2 3 4 5 strongly agree

m. lack of time in work schedules to use a garden with patients — strongly disagree 1 2 3 4 5 strongly agree

n. lack of all-weather equipment to deliver therapy outdoors — strongly disagree 1 2 3 4 5 strongly agree

o. lack of knowledge about patient:staff ratios in a garden for safety — strongly disagree 1 2 3 4 5 strongly agree

8. What, in your opinion, would be the most commonly expressed **CONCERNS** that <u>you would have</u> as a health care professional when considering the installation of a therapeutic garden in your healthcare setting *(using "1" for low concern and "5" for high concern)*:

a. maintenance costs — low concern 1 2 3 4 5 high concern

b. staffing costs to man the garden — low concern 1 2 3 4 5 high concern

c. seasonal usage — low concern 1 2 3 4 5 high concern

d. liability issues — low concern 1 2 3 4 5 high concern

e. security issues — low concern 1 2 3 4 5 high concern

f. safety issues — low concern 1 2 3 4 5 high concern

g. space limitations — low concern 1 2 3 4 5 high concern

h. utility limitations — low concern 1 2 3 4 5 high concern

i. other concern? (Please explain) — low concern 1 2 3 4 5 high concern

___

9. If a series of comprehensive plans, design details, and guidelines were available for you at your facility to use, would you be more inclined to become an ***<u>advocate</u>*** of a therapeutic garden in your work?
_____ Yes _____ No <u>If No</u>, please explain why: _____

10. *Respondent Profile:* Please tell us a little about yourself, the work that you do, and your workplace.
a. What is your age? ____
b. Gender? ____ female ____ male

c. What are your professional fields and degrees?
_____

d. Workplace type *(circle one)*:
hospital nursing home hospice adult foster care other _____

e. Department: _____

f. Years at this institution: _____

g. Total length of service in current profession (years): _____

h. Average length of working hours per week: _____

THANK YOU for participating in this survey; if you would like to receive the results of this survey or serve on a focus group that examines current barriers to therapeutic gardens in health care settings, please fill out the enclosed card, place it in the self-addressed and stamped envelope, with your survey. The survey and card will be separated upon delivery of the envelope to protect your privacy & confidentiality.

APPENDIX B

Tables of Statistical Analysis

Table 1. Name and location of eleven health care facilities located in mid-Michigan that participated in the study along with a profile of the vocations of responding health care workers.

Name of Facility	Location of Facility	Vocations of Healthcare Workers
1) Delta Retirement Center	Lansing, Michigan	Office Manager, Activities Director, Nurse
2) Wynwood of Meridian	Haslett, Michigan	Administration
3) Prestige Pines	Dewit, Michigan	Executive Director
4) Craft Care Homes	Holt, Michigan	Administration, Accounting
5) Capital Health & Rehabilitation	Lansing, Michigan	Special Education, Admissions, Dietitian, House Keeping, Physical Therapy, Nursing, Occupational Therapist, Maintenance Supervisor
6) Okemos Health Rehabilitation	Okemos, Michigan	Maintenance Supervisor, Nurse Aid, Nurse, Physical Therapist, Occupational Therapist
7) Holt Senior Care &Rehabilitation	Holt, Michigan	Administration, Nurse, Psychology
8) Pines Healthcare	Lansing, Michigan	Recreational Therapy, Nurse, Internal Medicine (D.O.)
9) Ingham County Medical Care	Okemos, Michigan	Social Work, Nurse, Dietitian, Maintenance Supervisor, Administration, Art/Recreational Therapist, Human Resources, Internal Medicine (D.O.), Internal Medicine (M.D.)
10) Bircham Hills Retirement	East Lansing, Michigan	Recreational Therapist

Table 1 (cont'd.). Name and location of eleven health care facilities located in mid-Michigan that participated in the study along with a profile of the vocations of responding health care workers.

11) McLaren Hospice Services	Flint, Michigan	Nurse, Internal Medicine (D.O.), Bereavement/Spiritual Counseling, Social Work, Psychology

Table 2. Responses to Question 1: Agreement with the Definition of Therapeutic Garden (N=58).

Range of Agreement

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	2	3	4	5

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	2	3.4	3.4	3.4
	3	2	3.4	3.4	6.9
	4	16	27.6	27.6	34.5
	5	38	65.5	65.5	100.0
	Total	58	100.0	100.0	

Table 3. Responses to Question 2: Prior Knowledge of Therapeutic Gardens (N=58).

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1 Yes	48	82.8	84.2	84.2
	2 No	9	15.5	15.8	100.0
	Total	57	98.3	100.0	
Missing	3 NR	1	1.7		
Total		58	100.0		

Table 4. Responses to a given definition of a "Therapeutic Garden" at a respondent's workplace. (N=58).

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1 Yes	25	43.1	46.3	46.3
	2 No	29	50.0	53.7	100.0
	Total	54	93.1	100.0	
Missing	3 NR	4	6.9		
Total		58	100.0		

Table 5. Respondent's perceived frequency of garden use for different patient groups at places of work having a therapeutic garden (N=25).

Patient User Group	Frequency of Garden Use				
	None 1	A little 2	Sometimes 3	A lot 4	Not Applicable 5
Psychiatric Care (N=23)	3 (13.0%)	4 (17.4%)	4 (17.4%)	4 (17.4%)	8 (34.8%)
Orthopedic Care (N=22)	7 (31.8%)	3 (13.6%)	5 (22.7%)	1 (4.5%)	6 (27.3%)
Hospice Care (N=22)	3 (13.6%)	3 (13.6%)	8 (36.3%)	7 (31.8%)	1 (4.5%)
Oncology Care (N=22)	7 (31.8%)	1 (4.5%)	5 (22.7%)	1 (4.5%)	8 (36.3%)
Cardiac Care (N=23)	6 (26.1%)	5 (21.7%)	5 (21.7%)	1 (4.3%)	6 (26.1%)
Dementia Care (N=24)	1 (4.2%)	2 (8.4%)	9 (37.5%)	8 (33.3%)	4 (16.7%)
Other Care (N=4)					
Long Term Care (n=2)				2 (100%)	
Garden Club (n=1)				1 (100%)	
Rehabilitation Care (n=1)				1 (100%)	

Table 6. Respondent's perceived frequency of garden use for patients and non-patients at places of work having a therapeutic garden (N=24).

Staff User Group	Frequency of Garden Use						
	Very Unlikely 1	Unlikely 2	Sometimes 3	Likely 4	Very Likely 5	Mean (x)	St. Dev.
Nurses (N=23)	10 (42.4%)	5 (21.7%)	5 (21.7%)	1 (4.3%)	2 (8.6%)	x=2.13	1.29
Doctors (N=23)	20 (87.0%)	3 (13.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	x=1.13	0.34
Aids (N=24)	2 (8.3%)	4 (16.7%)	6 (25.0%)	7 (29.2%)	5 (20.8%)	x=3.38	1.25
Family (N=24)	0 (0.0%)	1 (4.2%)	6 (25.0%)	7 (29.2%)	10 (41.7%)	x=4.08	0.93
Therapists (N=22)	3 (13.6%)	2 (9.0%)	3 (13.6%)	10 (45.4%)	4 (18.2%)	x=3.45	1.30
Other User (N=9)							
Recreation Staff (n=6)					6 (100%)		
Volunteers= (n=2)				2 (100%)			
Case Managers (n=1)				1 (100%)			

Table 7. Respondent's perceived frequency of garden use for different patient groups at places of work NOT having a therapeutic garden (N=32).

Patient User Group	Frequency of Garden Use				
	None 1	A little 2	Sometimes 3	A lot 4	Not Applicable 5
Psychiatric Care (N=30)	0 (0.0%)	0 (0.0%)	11 (36.7%)	12 (40.0%)	7 (23.3%)
Orthopedic Care (N=30)	0 (0.0%)	7 (23.3%)	14 (46.7%)	5 (16.7%)	4 (13.3%)
Hospice Care (N=33)	3 (9.0%)	3 (9.0%)	12 (36.4%)	13 (39.4%)	2 (6.1%)
Oncology Care (N=30)	4 (13.3%)	0 (0.0%)	8 (26.7%)	11 (36.7%)	7 (23.3%)
Cardiac Care (N=30)	3 (10.0%)	4 (13.3%)	14 (46.7%)	5 (16.7%)	4 (13.3%)
Dementia Care (N=32)	0 (0.0%)	2 (6.3%)	10 (31.3%)	20 (62.5%)	0 (0.0%)
Other Care (N=2)					
Rehabilitation Care (n=2)				2 (100%)	

Table 8. Respondent's perceived frequency of garden use for patients and non-patients at places of work NOT having a therapeutic garden (N=24).

Staff User Group	Frequency of Garden Use						
	Very Unlikely 1	Unlikely 2	Sometimes 3	Likely 4	Very Likely 5	Mean (x)	St. Dev.
Nurses (N=32)	7 (21.9%)	9 (28.1%)	7 (21.9%)	4 (12.5%)	5 (15.6%)	x=2.72	1.37
Doctors (N=31)	20 (64.5%)	6 (19.4%)	4 (13.0%)	0 (0.0%)	1 (3.2%)	x=1.58	0.96
Aids (N=33)	1 (3.0%)	3 (9.1%)	7 (21.2%)	9 (27.3%)	13 (39.4%)	x=3.90	1.13
Family (N=34)	1 (2.9%)	0 (0.0%)	6 (17.6%)	7 (20.6%)	20 (58.8%)	x=4.32	0.98
Therapists (N=33)	1 (3.0%)	1 (3.0%)	8 (24.2%)	9 (27.3%)	14 (42.4%)	x=4.03	1.05
Other User (N=14)							
Activities Manager (n=6)				3 (50.0%)	3 (50.0%)		
Therapeutic Recreation (n=4)				2 (50.0%)	2 (50.0%)		
Social Services (n=2)					2 (100%)		
Volunteers (n=2)					2 (100%)		

Table 9. Areas of landscape improvement at a respondent's place of work regardless of having or not having a Therapeutic Garden (N=58).

Improvement Variable	Range of Improvement						
	Very Unlikely 1	Unlikely 2	Sometimes 3	Likely 4	Very Likely 5	Mean (x)	St. Dev.
Market Advantage (N=58)	0 (0.0%)	4 (6.9%)	5 (8.6%)	18 (31.0%)	31 (52.4%)	x=3.79	1.24
Staff Satisfaction (N=58)	5 (8.6%)	4 (6.9%)	9 (15.5%)	20 (34.5%)	20 (34.5%)	x=3.86	1.13
Patient Treatment Outcomes (N=58)	3 (5.2%)	5 (8.6%)	8 (13.8%)	23 (39.7%)	19 (32.8%)	x=3.86	1.13
The Environment (N=58)	0 (0.0%)	1 (1.7%)	1 (1.7%)	20 (34.5%)	36 (62.1%)	x=4.57	0.62
Daily Patient Care (N=58)	2 (3.4%)	4 (6.9%)	21 (36.2%)	19 (32.8%)	12 (20.7%)	x=3.60	1.00
Visitor Satisfaction (N=58)	0 (0.0%)	4 (6.9%)	8 (24.2%)	9 (27.3%)	14 (24.4%)	x=4.36	0.85
General Appearance (N=58)	0 (0.0%)	1 (1.7%)	2 (3.4%)	17 (29.3%)	38 (65.5%)	x=4.59	0.65
Other User (N=1) Spirituality (n=1)					1 (100.0%)		

Table 10. Respondent's perceived frequency on barriers to therapeutic gardens at their place of work regardless of having or not having a therapeutic garden (N=58).

Barrier Variable	Range of Agreement						
	Strongly Disagree 1	Disagree 2	Neutral 3	Agree 4	Strongly Agree 5	Mean (x)(**rank**)	St. Dev.
Lack of Knowledge about Plants (N=58)	7 (12.1%)	8 (13.8%)	15 (25.9%)	21 (36.2%)	7 (12.1%)	x=3.22 (**10**)	1.20
Lack of Knowledge about Garden Maintenance (N=58)	4 (6.9%)	11 (19.0%)	20 (34.5%)	16 (27.6%)	7 (12.1%)	x=3.19 (**12**)	1.10
Lack of Knowledge about Patient (N=58)	17 (29.3%)	20 (34.5%)	15 (25.9%)	5 (8.6%)	1 (1.7%)	x=2.19 (**15**)	1.00
Lack of Knowledge about Family Appreciation (N=58)	16 (27.6%)	20 (34.5%)	18 (31.0%)	5 (8.6%)	1 (1.7%)	x=2.26 (**14**)	1.00
Lack of Knowledge about Benefits: Cost (N=58)	3 (5.2%)	9 (15.5%)	17 (29.3%)	20 (34.5%)	9 (15.5%)	x=3.40 (**8**)	1.00
Lack of Published Information in Health Journal (N=58)	6 (10.3%)	11 (19.0%)	16 (27.6%)	15 (25.9%)	10 (17.2%)	x=3.20 (**11**)	1.20
Lack of Garden Performance Standards (N=58)	10 (17.2%)	9 (15.5%)	24 (41.4%)	9 (15.5%)	6 (10.3%)	x=2.86 (**13**)	1.20

Table 10 (cont'd). Respondent's perceived frequency on barriers to therapeutic gardens at their place of work regardless of having or not having a therapeutic garden (N=58).

Barrier Variable	Range of Agreement						
	Strongly Disagree 1	Disagree 2	Neutral 3	Agree 4	Strongly Agree 5	Mean (x)(**rank**)	St. Dev.
Lack of Garden/ Medicine Training (N=57)	6 (10.5%)	6 (10.5%)	16 (28.1%)	21 (36.8%)	8 (14.0%)	x=3.33 (**9**)	1.10
Higher Priorities for Capital Investments (N=57)	2 (3.5%)	3 (5.3%)	17 (29.8%)	18 (31.6%)	17 (65.5%)	x=3.79 (**5**)	1.00
Higher Priorities for Operating Budgets (N=57)	1 (1.8%)	4 (7.0%)	14 (24.6%)	21 (36.8%)	17 (29.8%)	x=3.86 (**3**)	0.99
Higher Priorities for Staff Time (N=57)	2 (3.5%)	6 (10.5%)	9 (15.8%)	22 (28.6%)	18 (31.6%)	x=3.84 (**4**)	1.00
Lack of Advocacy Groups (N=57)	2 (3.5%)	4 (7.0%)	18 (31.6%)	22 (38.6%)	11 (19.3%)	x=3.63 (**6**)	0.99
Lack of Time in Work Schedules (N=57)	0 (0.0%)	1 (1.8%)	18 (31.6%)	22 (38.6%)	16 (28.1%)	x=3.93 (**2**)	0.82
Lack of All-Weather Therapy Equipment (N=57)	0 (0.0%)	1 (1.7%)	2 (3.4%)	17 (29.3%)	38 (65.5%)	x=4.59 (**1**)	0.65
Lack of Knowledge about Patient:Staff for Safety (N=57)	0 (0.0%)	10 (17.5%)	18 (31.6%)	13 (22.8%)	16 (28.1%)	x=3.61 (**7**)	1.00

Table 11. Respondent's perceived frequency of concerns related to therapeutic gardens at their place of work regardless of having or not having a therapeutic garden (N=58).

Concern Variable	Range of Concern						
	Very Low Concern 1	Low Concern 2	Neutral 3	High Concern 4	Very High Concern 5	Mean (x)(**rank**)	St. Dev.
Maintenance Costs (N=57)	5 (8.8%)	3 (5.3%)	15 (26.3%)	19 (33.3%)	15 (26.3%)	x=3.63 (**1**)	1.19
Staffing Costs to Work the Garden (N=57)	4 (7.0%)	7 (12.3%)	13 (22.8%)	16 (28.1%)	17 (29.8%)	x=3.61 (**2**)	1.23
Seasonal Usage (N=57)	5 (8.8%)	10 (17.5%)	14 (24.6%)	18 (31.0%)	10 (17.5%)	x=3.33 (**4**)	1.21
Liability Issues (N=57)	6 (10.5%)	8 (14.0%)	18 (31.6%)	18 (31.6%)	7 (12.3%)	x=3.21 (**5**)	1.16
Security Issues (N=57)	14 (24.6%)	12 (21.1%)	14 (24.6%)	13 (22.8%)	4 (7.0%)	x=2.67 (**6**)	1.20
Safety Issues (N=57)	4 (7.0%)	7 (12.3%)	19 (33.3%)	17 (29.8%)	10 (17.2%)	x=3.39 (**3**)	1.10
Utility Limitations (N=58)	13 (22.8%)	14 (24.6%)	17 (28.9%)	8 (14.0%)	5 (8.8%)	x=2.60 (**7**)	1.20
Other Concern (N=4)							
Wildlife Destruction (n=3)					3 (100.0%)		
Patient Access (n=1)					1 (100.0%)		

Table 12. Respondent's perceived frequency of agreement on barriers to therapeutic gardens at their place of work as well as prior knowledge of the characteristics of therapeutic gardens (N=58).

Barrier Variable Q7	Knowledge Q2	Range of Agreement				
	Strongly Disagree 1	Disagree 2	Neutral 3	Agree 4	Strongly Agree 5	Pearson Chi-Square (X^2)
Lack of Knowledge about Plants (N=58)						p=.383
Lack of Knowledge about Garden (N=58)						p=.445
Lack of Knowledge about Patient (N=58)						p=.754
Lack of Knowledge about Family Appreciation (N=58)						p=.822
Lack of Information about Benefit:Cost (N=58)						p=.531
Lack of Published Health-Benefit Information in Health Journals (N=58)						p=.521
Lack of Garden Performance Standards (N=58)						p=.133
Lack of Garden/Patient Training (N=57)						p=.530
Higher Priorities for Capital Investments (N=57)						p=.873
Higher Priorities for Operating Budgets (N=57)						p=.976
Higher Priorities for Staff Time (N=57)						p=.560

Table 12 (cont'd). Respondent's perceived frequency of agreement on barriers to therapeutic gardens at their place of work as well as prior knowledge of the characteristics of therapeutic gardens (N=58).

Lack of Advocacy Groups (N=57)	p=.505
Lack of Time in Work Schedule (N=57)	p=.881
Lack of All-Weather Equipment for Outdoor Therapy (N=57)	p=.630
Lack of Knowledge About Patient:Staff For Safety (N=57)	p=.790

Table 13. Respondent's perceived frequency of agreement on barriers to therapeutic gardens at their place of work as well as the socio-demographics of the respondent (N=58).

Barrier Variable Q7	Age (years) Q10a	Range of Agreement					
		Strongly Disagree 1	Disagree 2	Neutral 3	Agree 4	Strongly Agree 5	Pearson Chi-Square (X^2)
Lack of Knowledge about Patients (N=55)	21-30	5	2	2	1	0	**p=.010**
	31-40	3	6	2	0	0	
	41-50	3	4	2	0	0	
	51-60	3	6	7	3	0	
	61-70	2	1	1	0	0	
	71-80	0	1	0	0	1	
Lack of Knowledge about Family Appreciation (N=55)	21-30	5	2	3	0	0	**p=.004**
	31-40	4	5	2	0	0	
	41-50	3	2	3	1	0	
	51-60	2	4	9	4	0	
	61-70	1	2	1	0	0	
	71-80	0	1	0	0	1	
Lack of Published Health-Benefit Information in Health Journals (N=55)	21-30	0	4	4	1	1	**p=.022**
	31-40	2	3	2	3	1	
	41-50	4	0	2	3	0	
	51-60	0	1	4	8	6	
	61-70	0	1	3	0	0	
	71-80	0	1	0	0	1	

Table 13 (cont'd). Respondent's perceived frequency of agreement on barriers to therapeutic gardens at their place of work as well as the socio-demographics of the respondent (N=58).

Barrier Variable Q7	Age (years) Q10a	Range of Agreement					
		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Pearson Chi-Square (X^2)
		1	2	3	4	5	
Lack of Advocates (N=55)	21-30	0	4	4	1	1	**p=.034**
	31-40	1	3	2	3	1	
	41-50	0	0	2	3	0	
	51-60	0	1	4	8	6	
	61-70	1	1	3	0	0	
	71-80	0	1	0	0	1	
Lack of Time in Work Schedule (N=55)	21-30	0	0	7	1	1	**p=.000**
	31-40	0	0	4	5	5	
	41-50	0	0	2	3	3	
	51-60	0	0	3	4	4	
	61-70	1	0	2	0	0	
	71-80	0	1	0	1	1	
Lack of All-Weather Equipment (N=55)	21-30	0	1	7	0	1	**p=.032**
	31-40	0	3	3	3	5	
	41-50	0	0	2	4	3	
	51-60	0	4	5	3	4	
	61-70	1	0	1	2	0	
	71-80	0	1	0	1	1	

Table 13 (cont'd). Respondent's perceived frequency of agreement on barriers to therapeutic gardens at their place of work as well as the socio-demographics of the respondent (N=58).

Lack of Knowledge about Patient:Staff in Garden (N=55)	21-30	0	0	3	2	1	**p=.017**
	31-40	0	2	2	0	2	
	41-50	0	0	0	1	3	
	51-60	0	0	4	9	2	
	61-70	1	0	1	0	0	
	71-80	0	0	1	0	1	
Lack of Knowledge about Benefit:Cost (N=55)							p=.369
Lack of Knowledge about Plants (N= 55)							p=.453
Lack of Knowledge about Garden (N=55)							p=.369
Higher Priorities for Operating Budgets (N=55)							p=.143
Higher Priorities for Staff Time (N=55)							p=.284
Lack of Performance Standards (N=55)							p=.103
Lack of Personal Garden Training (N=55)							p=.079
Higher Priorities for Capital Investments (N=55)							p=.087

Table 14. Respondent's perceived frequency of agreement on barriers to therapeutic gardens at their place of work and the professional field of the respondent (N=58).

Barrier Variable Q7	Professional Field Q10c	Range of Agreement					
		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Pearson Chi-Square (X^2)
		1	2	3	4	5	
Lack of Time in Work Schedule (N=55)	Administrators	0	0	1	9	7	**p=.013**
	"Hands-On" Care	0	0	4	6	7	
	"Clinical" Care	0	0	10	6	1	
	Building Staff	0	0	2	0	1	
Lack of Knowledge about Plants (N= 55)							p=.801
Lack of Knowledge about Garden (N=55)							p=.513
Lack of Knowledge about Patients (N=55)							p=.828
Lack of Knowledge about Family Appreciation (N=55)							p=.776
Lack of Knowledge about Benefit:Cost (N=55)							p=.092
Lack of Published Health-Benefit Information in Health Journals (N=55)							p=.218
Lack of Performance Standards (N=55)							p=.372
Lack of Personal Garden Training (N=55)							p=.183

Table 14 (cont'd). Respondent's perceived frequency of agreement on barriers to therapeutic gardens at their place of work and the professional field of the respondent (N=58).

Higher Priorities for Capital Investments (N=55)	p=.342
Higher Priorities for Operating Budgets (N=55)	p=.550
Higher Priorities for Staff Time (N=55)	p=.502
Lack of Advocates (N=55)	p=.365
Lack of All-Weather Equipment (N=55)	p=.484
Lack of Knowledge about Patient:Staff in Garden (N=55)	p=.542

Table 15. Respondent's perceived frequency of concerns about therapeutic gardens at their place of work and prior knowledge of the characteristics of therapeutic gardens (N=58).

Concern Variable Q8	Knowledge Q2	Range of Concern					
		Strongly Disagree 1	Disagree 2	Neutral 3	Agree 4	Strongly Agree 5	Pearson Chi-Square (X^2)
Maintenance Cost (N=57)							p=.764
Staffing Costs for Garden (N=57)							p=.686
Seasonal Usage							p=.886
Liability Issues							p=.559
Security Issues							p=.407
Safety Issues							p=.773
Space Limitations							p=.966
Utility Limitations							p=.504

Table 16. Respondent's perceived frequency of concerns about therapeutic gardens at their place of work and the socio-demographics of the respondent (N=58).

Concern Variable Q8	Age (years) Q10a	Range of Concern					
		Very Low Concern	Low Concern	Neutral	High Concern	Very High Concern	Pearson Chi-Square (X^2)
		1	2	3	4	5	
Maintenance Costs	21-30	0	0	6	4	0	**p=.013**
(N=55)	31-40	1	2	1	6	1	
	41-50	1	1	4	1	2	
	51-60	0	0	3	6	8	
	61-70	1	0	0	2	0	
	71-80	0	0	0	0	2	
Seasonal Usage	21-30	1	2	4	3	0	**p=.038**
(N=55)	31-40	1	4	1	5	0	
	41-50	0	3	4	1	1	
	51-60	3	1	4	6	5	
	61-70	0	0	1	1	1	
	71-80	0	0	0	0	2	
Staffing Costs (N=55)							p=.061
Liability Issues (N= 55)							p=.272
Security Issues (N= 55)							p=.222

Table 16 (cont'd). Respondent's perceived frequency of concerns about therapeutic gardens at their place of work and the socio-demographics of the respondent (N=58).

Safety Issues (N= 55)	p=.309
Space Limitations (N= 55)	p=.203
Utility Limitations (N=55)	p=.189

Table 17. Respondent's perceived frequency of concerns about therapeutic gardens at their place of work and the professional field of the respondent (N=58).

Concern Variable Q8	Professional Field Q10c	Range of Concern					
		Very Low Concern	Low Concern	Neutral	High Concern	Very High Concern	Pearson Chi-Square (X^2)
		1	2	3	4	5	
Security Issues (N=55)	Administrators	4	5	6	5	0	**p=.032**
	"Hands-On" Care	7	3	7	5	1	
	"Clinical" Care	2	4	0	1	1	
	Building Staff	1	0	0	2	0	
Maintenance Costs (N= 55)							p=.519
Staffing Costs (N=55)							p=.855
Seasonal Usage (N=55)							p=.427
Liability Issues (N=55)							p=.593
Safety Issues (N=55)							p=.272
Space Limitations (N=55)							p=.444
Utility Issues (N=55)							p=.620

Table 18. Respondent's perceived frequency of improvements caused by therapeutic gardens at the respondent's place of work and their prior knowledge of the characteristics of therapeutic gardens (N=58).

Improvement Variable Q6	Knowledge Q2	Range of Likelihood					
		Very Unlikely 1	Unlikely 2	Sometimes 3	Likely 4	Very Likely 5	Pearson Chi-Square (X^2)
Marketing Advantage (N=58)							p=.814
Staff Satisfaction with Workplace (N=58)							p=.782
Patient Treatment Outcomes (N=58)							p=.385
The Environment (N=58)							p=.951
Daily Patient Care (N=58)							p=.266
Visitor Satisfaction (N=58)							p=.751
General Appearance (N=58)							p=.881

Table 19. Respondent's perceived frequency of improvements caused by therapeutic gardens at their workplace and the age of the respondent (N=58).

Improvement Variable Q6	Age (years) Q10a	Range of Concern					
		Very Unlikely 1	Unlikely 2	Sometimes 3	Likely 4	Very Likely 5	Pearson Chi-Square (X^2)
Marketing Advantage (N=55)	21-30	0	1	0	6	3	**p=.013**
	31-40	0	2	0	0	9	
	41-50	0	0	2	1	6	
	51-60	0	0	2	8	9	
	61-70	0	0	0	2	2	
	71-80	0	0	0	0	1	
The Environment (N=55)	21-30	0	0	0	6	4	**p=.004**
	31-40	0	0	0	3	8	
	41-50	0	0	0	1	8	
	51-60	0	0	1	6	12	
	61-70	0	0	0	2	2	
	71-80	0	0	0	0	1	
General Appearance (N=55)	21-30	0	0	1	3	6	**p=.006**
	31-40	0	0	0	1	10	
	41-50	0	0	0	3	6	
	51-60	0	0	1	6	12	
	61-70	0	0	0	2	2	
	71-80	0	1	0	0	1	

Table 19 (cont'd). Respondent's perceived frequency of improvements caused by therapeutic gardens at their workplace and the age of the respondent (N=58).

Staff Satisfaction with Workplace (N=55)	p=.138
Patient Treatment Outcomes (N=55)	p=.475
Daily Patient Care (N=55)	p=.600
Visitor Satisfaction (N=55)	p=.310

Table 20. Respondent's perceived frequency of improvements caused by therapeutic gardens at their place of work and the professional field of the respondent (N=58).

Improvement Variable Q6	Professional Field Q10c	Range of Concern					
		Very Unlikely 1	Unlikely 2	Sometimes 3	Likely 4	Very Likely 5	Pearson Chi-Square (X^2)
The Environment (N=55)	Administrators	0	0	1	6	14	**p=.029**
	"Hands-On" Care	0	0	0	9	14	
	"Clinical" Care	0	0	0	3	5	
	Building Staff	0	0	0	2	1	
General Appearance (N=55)	Administrators	0	0	1	5	15	**p=.039**
	"Hands-On" Care	0	0	1	7	15	
	"Clinical" Care	0	0	0	2	6	
	Building Staff	0	0	0	2	1	

Marketing Advantage (N= 55)	p=.672
Staff Satisfaction (N=55)	p=.282
Patient Treatment Outcome (N=55)	p=.114
Daily Patient Care (N=55)	p=.531
Visitor Satisfaction (N=55)	p=.795

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