Reid Memorial Hospital Healing Garden Series
Healthcare Healing Garden Design Series

An Honors Thesis (HONR 499)

By

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Abstract

The goal of this proposal is to improve the quality of life for both patients and staff through a series of healing gardens at Reid Memorial Hospital in Richmond, Indiana. From the results of research previously done, a rooftop visitor healing garden, a hospital staff healing garden, and a cancer patient healing garden, have been designed with the primary goal of alleviating the stresses of being in the hospital environment. To determine the best approach to accomplishing this goal, case studies and published works of leading industry professionals have been analyzed and compared to compile a set of design concerns and considerations.

To support design guidelines in the development of the healing gardens, case studies and research has been examined on healing gardens, rooftop gardens, hospital staff needs and cancer patient needs. Studies have shown that the benefits of nature can improve one’s mood, reduce stress, speed up the recovery process, and increase pain tolerances. Reid Hospital’s healing gardens are expected to become precedents for future hospital healing gardens throughout the country.
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Reid Memorial Hospital Healing Garden Series:
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REID MEMORIAL HOSPITAL HEALING GARDENS

Photo courtesy of HDR Architecture, Inc.; ©

John W Walsh
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Introduction

In a survey conducted on hospital staff, it was found that 98% reported elevated levels of stress. These elevated levels of stress lead to increased burnout rates and higher levels of stress for those in the medical profession. With 80% of nurses seeking the outdoors at some point during their shift for a break from the stressful environment, nature offers many benefits that can reduce stress and reenergize a person, which contributes to better overall patient care. It has also been found that healing gardens with no strong odor and protection from the elements allows patients with cancer to interact with nature, which in turn reduces pain levels and stress and improves both mental and physical states. Studies have shown that being in nature from 3 to 5 minutes can improve one’s mood, reduce stress, and speed up the recovery process.

The outcome of this project is a series of healing gardens for Reid Hospital located in Richmond, Indiana that will aim to reduce stress levels and improve the overall quality of life for both hospital staff as well as patients and visitors. The successful design used information learned from both successful and unsuccessful healing gardens around the country as well as through the incorporation of interviews with designers, medical administrators, and medical staff in the state of Indiana.

Following the completion of research done on healing gardens, rooftop gardens, hospital staff needs, and cancer patient needs, a set of guidelines was developed to design a series of healing gardens that reduce stress, improve the rate of recovery and reduce pain levels, as well as improve the quality of life for hospital staff, cancer patients, and all visitors to the site. It is the goal of this project that the findings will help develop a precedent that will contribute to the future design of healing gardens in medical facilities across the state of Indiana.
Introduction

Since the early 1700s, healthcare facilities have been focusing specifically on using nature as a healing component in hospital design. More recently there has been a dramatic increase in the use of healing gardens as a restorative technique. Healing gardens can be located in many spaces and can have various scales. Healing gardens also act as an escape from the stresses related to being in a hospital.

This study aims to analyze design components and considerations that go into the design of a garden for cancer patients and hospital staff. To successfully create a healing garden for a healthcare facility, one must understand what goes into healing gardens and what benefits healing gardens have on patients and staff. Once one understands the criteria for a healing garden, one must understand roof gardens and what benefits they offer as well as what should be considered when designing them. After components of the healing and rooftop gardens are understood, criteria desired by hospital staff must be carefully researched and analyzed to identify what features are specifically desired or undesired by hospital staff.

Finally, the needs of cancer patients must be studied to determine the best design solution to make the garden comfortable for those going through treatment. The following literature review examines healing gardens as a stress reduction, rooftop gardens as a location for gardens, the needs of hospital staff in therapeutic gardens, and components of healing gardens pertaining to cancer patients.

Healing Gardens

Healing gardens have been around since the 4th century BCE in ancient Greece. More advanced and designed gardens began to appear in the 1700s. Florence Nightingale was one of the first people to note the positive effects of nature in the hospital setting. Noting that fresh air, sunlight and bright flowers all had positive effects on the recovery process. Her early observations marked the beginning of studying gardens and their positive effects on the human body in terms of healing. (Marcus, Sachs, 8)

Hundreds of years later designers, health professionals and researchers have begun observing patients in gardens and noting their interactions, movements and more importantly the positive effects and changes they see. Experts such as Marni Barnes, Clare Cooper Marcus, Naomi Sachs, Martha Tyson and Roger Ulrich all have devoted much of their professional careers to examining the many benefits of healing gardens and what components create a successful garden. Through their combined research, a major benefit they have found that patients and visitors in a garden experience a positive mood change and stress reduction. The goal of this research is to examine the components and design guidelines that contribute to stress reduction in the healthcare environment through analysis of stress studies and theories, the impact of nature on the human psyche, and importance of the maintenance and well being of healing environments.

Stress reduction comes from multiple components in a garden, whether it is from flowers, trees, water features or the wildlife that lives in the garden. Stress reduction stems from feeling as if you are in control of your environment, exercising or social interaction. Multiple studies show that using healing gardens result in stress reduction, which in turn affects one's mood positively. Generally these studies have found that up to 95% of people report a change in mood after being in the garden from anywhere
between one to five minutes. (Sherman, 169) What can be taken away from these studies is that just being out in nature can positively affect a user’s mood and health positively. Therefore, in general, gardens of any size can be beneficial to patients, even if they are gardens that serve as transitional corridors from point A to point B.

In a study of the Alta Bates Medical Center done by Clare Cooper Marcus and Marni Barnes, only one out of thirty six people interviewed reported no change in mood after being in a healing garden. (Marcus, Barnes, 35) Users were asked if they felt any different after spending any time in the healing garden. An overwhelming percentage of users responded that they felt different, 80 percent of those who responded a change in mood noted that they felt less stress. This study adds value to the discussion on stress reduction and the correlation to healing gardens because it shows that the vast majority of users report a change in mood and that that change in mood positively affects their health and decreases their stress. Using this information we can examine the garden that they are using to see what features helped reduce their stress. Those features were the vibrant vegetation color, the fresh air, the running water feature and the multiple options of seating offered. The seating allowed them to talk with loved ones and the water feature helped reduce surrounding noises.

In a similar study conducted by Marcus and Barnes in gardens in Canada and Wales, they found that 95 percent of users reported a positive change in mood. (Marcus, 1) Compared to the previous study where 97 percent reported a positive change in mood we can conclude that healing gardens provide a relaxed environment in which patients and visitors report less stress. Similarly, in the study of the Canada and Wales healthcare facilities, water features and seating contributed to the success of the healing garden. Based on this one can conclude that much attention should be focused on water features and creating seating. While this is valuable, special note should be taken that every garden should not contain these features because repetition of the same elements can mask the positive effects of these elements. Just because they are elements that prove to work does not mean there are not other methods that can be just as productive. For example instead of water features to block out noise, grasses can be used to rustle in the wind or lighting can be played with to add a focal point in a healing garden.

One of the leading researchers on healing gardens is Roger Ulrich. Through many years of research and studies, he has developed a theory of supportive gardens that focuses on stress reduction. This theory states that people who are sick and that take care of those who are sick are under a great amount of stress and that when people are stressed they look to nature to help reduce their stress. (Marcus, Sachs, 24) Therefore gardens are the perfect solution for hospitals. Ulrich found four components that contribute to stress reduction: sense of control, social support, physical movement and positive natural distractions. Sense of control is a major factor in stress. Specifically in the hospital setting where you cannot control your health, what you wear, where you go, or any of your environments. It is important for a patient to feel like they can control some aspect of their life. Many studies have proven that those who have a sense of control are able to cope better with stress. Social support plays a role in a way that isn’t directly related to healing gardens, however a healing garden may act as a space for patients to receive social support. Those who have a support team behind them cheering them on often have an easier time coping with stress than those who do not. Physical movement of any kind is known to relieve stress. The benefits of exercise of both body and mind have been largely documented in the past. Creating opportunities in healing gardens allow people to control what they are doing as well as allow for opportunities for them to walk with one
another or a loved one. It can also act as motivation for what they wish to accomplish after they recover.

Positive natural distractions are anything that deters the thinking of a person towards something other than the situation they are in the clean and sterile environment, going out into nature acts them from the stress.

Studies conducted by Marcus and Barnes' help reinforce Ulrich's theory and conclusions drawn about stress reduction, specifically the components of social support and positive natural distractions. Ulrich's theory is a more updated study, which came a few years after Marcus and Barnes' study. This updated information helps prove that the groundwork has been reinforced many years later and that the methods being used are not only correct, but also are constantly improving through the years. This is valuable information to know because leading professionals on the issue back the methods and components being used. Both studies have concluded that outdoor seating allowing for social support is proven to reduce stress because it offers opportunities for patients and users to interact with loved ones. Also both studies show that offering positive distractions can allow one to escape from the environment and into an environment that "gardens invigorate and motivate the patient...promote a healthy life and mind". (Marcus, Barnes, 7) Florence Nightingale, 1800's, observed that the best medication for an ill person was "fresh air and sunlight". (Marcus, Barnes, 8) Roger Ulrich, mid 1900's, concluded that patients with the views into nature had less pain and stress than those with views of barren rooftops and the built environment. (Marcus, Barnes, 11) The underlying message that can be drawn from the previous comments and observations is that nature in the healthcare environment not only improves the human psyche, but also should be used as a tool in the healing of patients. The observations made by healthcare professionals and designers show a succession and development of healing gardens and the link of nature to stress reduction in the healthcare industry throughout time. This is valuable information because it gives evidence to the benefits of nature that informs the design process.

At the very least, in a study done by Friedman, Freier and Kahn in 2004, seeing pictures of nature is shown to have positive effects on the body. (Marcus, Barnes, 17) The link between nature and improvements to the human psyche and reduction of stress has been noted throughout the years and proves that nature, even if it is artificial, is beneficial. This information shows the value of healing gardens in the healthcare environment and the importance of its use.

When talking about stress reduction in healing gardens, it is important to consider the hospital's role in terms of contributions to the healing garden. According to an article written by Roger Ulrich, "studies of a number of hospitals strongly suggest that gardens and other nature helps to heighten patient and family satisfaction with the healthcare provider and the overall quality of care."(Ulrich, 5) Patients often stress over the quality of care they will receive. It is important for a healing garden to be well maintained to help the patient feel as though they will
receive the same, if not better care than the well-kept and manicured healing garden they can see out their window. Nature and healing gardens offer hope for improvement and recovery. When one does not have to stress over the care they are receiving their levels of stress will be kept at a minimum and their focus can be turned elsewhere, thus improving their quality of life.

From stress reduction studies and theories as well as observations on the correlation of nature and stress reduction, we are able to pull many things to consider when designing a healing garden. Visibility, privacy, options and seating are some of the main considerations that must be examined. In terms of visibility, patients and users must be able to know that the garden exists, where it is located, how to get in and out of the garden, as well as when they are able to use the garden. This can be accomplished through using signage and windows to allow people to see what the garden looks like and where it is. Lighting and having nearby nurse stations would allow there to always be eyes on the garden as well as keep the garden open 24 hours a day. Privacy is important because patients in rooms do not want people looking in at them and patients in the garden do not want people watching them. Privacy is directly linked to levels of comfort and stress. If a patient is more focused on who is watching them rather than being positively distracted, they are going to have higher levels of stress. So making it so that patients in their rooms cannot see those in the garden is important. Giving a user multiple paths and options for circulation and seating is another key component. Allowing them to feel like they can move freely or arrange seating to sit with family gives them a sense of control.

In conclusion, healing gardens act as place for meditation, relaxation and rest. The main thing to consider when designing a healing garden is to “…help users to ‘get away’, both physically and emotionally, from an interior environment that may be alien, stressful, threatening, and intimidating.”
be alien, stressful, threatening, and intimidating.”
(Marcus, Sachs, 56) Healing gardens have been around for hundreds of years and have a plethora of research studies supporting them. They offer many benefits, in particular stress reduction, which plays a large role in the health of patients and staff. A successful healing garden will offer aspects that the user may control, a place for social gatherings, physical movement and will present a positive distraction from the stresses of being in a hospital.

Rooftop Gardens

Green roofs originally migrated to the US from Europe. In ancient times, they were very basic structures with sod like plantings. In the mid 1970’s they began to develop and become more of what they are today in Germany. (Snodgrass, McIntyre, 38) There are two types of green roofs, extensive which are cheaper, lighter structures and intensive, which are more costly, but can support more weight. Determining what structure type is needed is based on what the program of the rooftop is. (Hopper, 399) Both types offer many desirable benefits. Roof gardens use space that is otherwise unavailable, they offer potential views to the surrounding landscape and they reduce energy loss and protect the structure from the elements.

While very beneficial, roof gardens have structural limitations; users are exposed to the elements, they can be difficult to access, and often are home to utility units. (Marcus, Sachs, 42) The goal of this research is to examine structural considerations of rooftop gardens and successful healthcare related rooftop gardens.

When installing a rooftop garden multiple factors come into play. Structural capabilities must be examined, the program must be defined to determine the type of rooftop garden needed, weight and wind capabilities and limitations must be looked at, as well as material selection.

According to Landscape Architecture Graphic Standards, extensive rooftop gardens are cheaper, lighter, can hold less weight (10-25 pounds per square foot), and are not intended to be accessed as an accessible garden. Intensive gardens are designed to cost more, but can hold more weight (80-150 pounds per square feet) and designed to be accessible as a garden. (Hopper, 399) The Green Roof Manual further confirms that the best type of garden for a healthcare facility’s healing garden should be an intensive garden by saying, “intensive green roofs are more conventional roof gardens...accessible for regular use...designed for people who live or work in the building.” (Snodgrass, McIntyre, 21) This information presents value to the topic because when designing a healing garden for a healthcare facility, if the program addresses having the rooftop garden being accessible then the garden must be intensive. This also means that since the structure already exists it must be looked at to see if it can support the additional weight of an intensive garden. If the garden cannot support the structure, additional structures must be installed underneath the rooftop garden in terms of support beams or decking. Both can be done in terms of retrofitting, but are an added cost that should be considered. (Hopper, 401)

Assuming the structure is fit to contain a rooftop garden, weight needs to be monitored to ensure that the structure does not get compromised. “The weight loading for gardens is no greater than the weight planned for by the architect for a simple roof”. (Hopper, 477) This statement further reinforces the idea that the average roof can support an additional garden. With this confirmation, value is added to a roof that already supports a green roof or rooftop garden because they have additional supports built in.
Many times utility units are placed on roofs, contrary to popular belief, many roofs are built to support these units so if a roof does not have one it is still structurally able to support the added weight.

“Although the building was designed with the intention of a roof garden, load tolerances were an issue throughout the process.” (Forbes, 3) This offers contrast to the previous sources by pointing out how heavy materials can get. Even though the structure is often built being able to support utility units, lightening techniques must be used at all times and in all aspects of the design. This is valuable because at all points during the design process, weight must be kept track of and additional structures must be considered. If larger features are desired, additional steps must be taken to add support to the structure. In areas where it is possible cast styrofoam blocks and cantilever supports should be added to remove additional stress on the structure. (Hopper, 478)

Materials for rooftop gardens have come a long way since the sod like plantings of the 1960’s. With technological advances, there are a plethora of lightweight materials available in the rooftop garden industry. When selecting materials it is best to learn what has worked and what has not worked. The Roof Gardens at Cancer Lifeline has had problems with their wood decking and slipping when it rains. (Marcus, Sachs, 119) After it rains the entire garden shuts down because the wood becomes slick. One possible solution for this could be found by looking at the Olson Family Garden at the St. Louis Children’s Hospital, which utilizes a “rubberized walking surface that makes it easy for those using wheelchairs and IV poles to move around.” (Marcus, Sachs, 107) This surface is slip resistant and offers additional benefits to the site. Upon a material analysis of these two gardens, it was found that wood offers a lot of possibilities when used for planters and seating, but in terms of decking; it is not always the best option. A rubberized walking surface is lightweight and does not become a slipping hazard after it rains, it is also easy to repair if need be. Finding a lightweight slip resistant surface becomes valuable to the overall research goal because healthcare facilities have enough to worry about when it comes to taking care of patients and maintaining a healing garden. The right materials for a site will be lightweight and safe and the materials used by the Olson Family Garden are just that.

Wind must be taken into account when selecting materials and determining if additional support is needed. Rooftop gardens are more vulnerable to wind than ground landscapes. In terms of plantings, roots must extend outward to allow for support for different wind directional stresses, the roots must be developed enough so that they do not break and the soil must have enough density to keep the plants anchored. (Hopper, 479) To further clarify this point, according to the Green Roof Manual, “once a root system is fully developed, a green roof assembly has good wind resistance.” (Snodgrass, McIntyre, 222) Therefore, in terms of plantings, as long as the root system is established, anchors do not need to be used to keep them from uprooting which allows for the aesthetics of the garden to be improved and offers value to the research because it explains how to avoid wind issues regarding vegetation.

In conclusion, based on the desired program for the healthcare healing garden, it was determined that an intensive roof garden would be the best fit. An intensive roof garden will be able to support the vegetation and traffic structurally. After examining the structure of the building it was also determined through research and architectural standards that the existing roof would be able to support a healing garden and if lightweight materials and strategies were used, additional support would not be needed. Additional strategies could include using cast styrofoam blocks, cantilever systems, and selecting lightweight materials.
when possible. Through examining two healthcare roof gardens' material selection it was determined that a rubberized surface, or something similar, would be a great possible option for a walkway, while wood decking is not ideal due to the possibilities of slipping. It was also determined that vegetation selection should examine the root systems because a wider root system allows the vegetation to anchor to the roof and not have any added stress during wind gusts. A successful rooftop garden will be structurally sound, use lightweight and safe materials, and use wind resistant strategies.

![Figure 2. Olson Family Garden](image)

**Hospital Staff**

Hospitals are environments where there is constant noise, nonstop movement, florescent lighting, windows that do not open and no connection to nature. These stressful conditions have led to a nursing shortage across the industry. As a direct result, in a survey conducted in 2005, 98% of nurses have high levels of stress, which over a period of time causes nurses to burnout and leave the industry for a different job. (Rosseter, 3)

Studies have proven that nature reduces stress and with 80% of nurses going outdoors at some point during their 12-hour shift (Naderi, 100) having a healing garden available would reduce nurse burnout rates. “Research has begun to appear suggesting that hospital gardens also increase staff satisfaction with the workplace, and can be advantageous in hiring and retaining qualified personnel.” (Ulrich, 9) This further confirms that there is growing research on the benefits of nature in reducing burnout rates and the value of studies that discuss what the needs of hospital staff are in terms of healing garden components. This research will examine studies done on nursing staff in relation to needs and limitations of healing gardens as well as promote the benefits of nature through the lens of a Registered Nurse.

In a study conducted by Jody Rosenblatt Naderi and Woo-Hwa Shin at St. Josephs' Regional Health Care Center on healing gardens for nurses, the majority of nurses, 52%, said that they preferred to be alone while in a healing garden. In many cases, nurses said that they were rarely in groups of more than 3 nurses or doctors while outdoors. (Naderi, 101) Activities done by hospital employees outdoors included sitting, walking, and eating with the biggest limitation of being outside being weather. Weather played a large role because there was no way of being outdoors if it were too hot or raining. (Naderi, 104) The statistics and result drawn from this study provide valuable information when designing a healing garden for hospital personnel. From the information one can conclude that privacy is very important, protection from the elements is key, and there needs to be plenty of seating.

When designing a healing garden or any landscape, it is important to know what your user group is looking for in a space. According to Mary Jo Kreitzer, “The most important feature in a healing garden is real nature-green vegetation, flowers, and perhaps a calm water element.” (Kreitzer) In the study done by Naderi and Shin on the St. Josephs' hospital staff, they asked nurses what they
looked for in a healing garden. The results of the responses were: 32% of nurses reported that they want comfortable furniture, 29% reported that they wanted to be immersed in nature, and 22% reported that they wanted space to be alone in privacy. (Naderi, 105)

They also added that a water feature for background noise is desired and that overall they were looking for a “Comfortable, Quiet, Private area”. (Naderi, 107)

Further reinforcing the benefits of water features and why they are desired, is a study done on New Yorkers whose anxiety and stress levels decreased when they were played a soundtrack of water. (Kreitzer) These two studies offer valuable information when it comes to designing a healing garden for hospital staff through a series of interviews. These interviews produced a ‘simple’ program of what hospital personnel look for in a healing garden, a place to have privacy, some background noise in the form of running water, and lush vegetation to contrast the white walls of the hospital environment.

“After a stressful event, nature very quickly produces a calming effect.” (Kreitzer) While working in a hospital, one is surrounded by people in pain and in need of help. There is a constant presence of possible stressful events, therefore nature and an escape is needed. As important as it is to know what users want, it may be more beneficial to know what will keep them from using a space and prevent them from accessing the calming effects of nature. In the study done by Naderi and Shin, they found that 36% of staff reported that they did not use a space based on the weather and the lack of cover in a space, 32% did not use the space because of the excessive use of concrete, and 12% did not use the space because it lacked privacy. (Naderi, 104) This response offers valuable information in terms of feature suggestion and material use. Weather is not a controllable factor; therefore adding an overhead structure can control spaces that are too hot or rainy. In areas where rooms overlook, vegetation can be strategically placed to hide healing garden users. The overwhelming use of concrete in the space whether it is from the walkways, furniture or planting beds was off putting and did not contrast the hospital environment. Therefore even though there was fresh air, there was no additional element to detach hospital staff from the hospital and stress levels did not decrease which contributes to nurse burnout.

In conclusion, there is a growing concern in the hospital industry of increasing levels of hospital staff burnouts contributed to heightened levels of stress. Offering tools to reduce stress can reduce these numbers can be done through the use of nature. Through a study performed by Naderi and Shin, a collective list of design needs, desires and limitations was put together to create a list design guidelines. Comments on nature and its benefits by a registered nurse further enforced the need for healing gardens in healthcare facilities. The American Association
of Colleges of Nursing is working towards creating programs to help reduce burnout rates in hospitals. Many of the programs offer grants and loans that go towards running programs. (Rosseter, 6-7) Using this information, funding should be available to promote nature and healing gardens in the healthcare industry due to the many studies that prove their benefits and success at reducing stress, the leading contributor to burnouts.

Cancer Patients

Maggie’s Centre Cancer Gardens founder, Maggie Keswick Jencks said that, “patients should not lose the joy of living in the fear of dying.” (Jencks) Healing gardens offer many benefits that help patients get through the anxiety and stress of everyday life. A setback in life should not hinder them in any manner. According to Martha Tyson, a major goal of healing gardens for cancer patients is to “Establish connections to the familiar.” (Tyson, Pg 32) Doing this allows them to move forward in life. That is why having a healing garden that is accessible and usable is not only beneficial, but also needed. Healing gardens already contain a detailed set of guidelines that help create a successful space that is therapeutic. Healing gardens often work best when they are geared toward a specific ailment, such as cancer patients. Cancer patients require more shade due to sunlight restrictions of chemotherapy, privacy, and space to walk with plenty of seating along the path, no fragrant flowers because strong scent can bring on nausea. (Marcus, Sachs, 115-117) Chemotherapy affects them in many ways and creates many limitations. These patients go through a lot to combat a life threatening disease; therefore they deserve a place to escape to that gives them hope. The following research will aim to compare two cancer patient gardens across the country to create a set of design guidelines and will also introduce a possible partner program that can contribute ideas and hope.

Ann Chamberlain who was diagnosed with breast cancer designed the Healing Garden at Mt. Zion. She designed the garden because the existing area was filled with concrete. The design process started with asking a group what they wanted in a healing garden, they responded with: private spaces, water, lighting, background noise and shade. Out of the interviews came a garden with decorative custom tiles, a visible lush green garden and pleasant sounds of water. A major concern of the garden is the strong smell of cooking that comes from the nearby kitchen. (Marcus, Sachs, 120-122) The garden offers hope to those battling cancer and is extremely successful in offering an escape to nature from the stressful environment of the hospital. This valuable healing garden shows the success of healing gardens geared toward cancer patients and also offers a list of elements that create a successful healing garden. From the experiences of the garden one is able to pose the question of how to remove outside odors that are unwanted and could drastically limit the use of the garden. The smells coming from the nearby kitchen can induce nausea and limit the use preventing patients the benefits from experiencing an escape into nature.

Senior director of design, Wendy Gettleman was quoted saying, “Our patients and families requested a living healing garden, but with a limited outdoor landscape, it wasn’t realistic, so we did the next best thing and put it inside.” (Schaller) Going a completely different direction, the Thea and James Stoneman Healing Garden
at the Dana-Farber Cancer Institute is an indoor healing garden. The garden was designed with a group of architects, landscape architects, nurses, doctors, administrators, and artists. The goal of the garden was to offer a space that separated cancer patients from the hospital environment in a safe manner. The garden offers safety, warm materials, ample lighting and seating; it is open 24/7 and is extremely visible. (Marcus, Sachs, 122-125) Located in the heart of Boston, this indoor garden offers valuable insight into the benefits of an indoor garden. Fragrances and lighting can be controlled, patients can go through chemotherapy in the garden, and it can be accessed at all times of the day, year round.

The Thea and James Stoneman Healing Garden focuses strongly on “strict infection control standards, offers a view of the garden in a plant-free environment for immunocompromised patients or those with allergies or other health issues.” (Fleming, 14) Which means that the garden is as sterile as ‘nature’ can get. With the weak immune systems of cancer patients it is important to create an environment where they are safe and don’t have to worry about getting more ill. This insight is valuable because cancer patients have a weak immune system, selecting materials and controlling as much of the vegetation as possible in terms of cleanliness and allergies is crucial to designing a garden that everyone may enjoy.

Compared to the Healing Garden at Mt. Zion, the Thea and James Stoneman Healing Garden is a bit limited on what can be done inside the garden because it is located inside. The Thea and James Stoneman Healing Garden also is an indoor hardscape with limited amounts of plantings, which takes away from the benefits of being in nature. Both gardens are successful in removing the patient from the hospital environment and shading them from sunlight. However due to the smell of cooking at Mt. Zion, and the vast hardscape of the Thea and James Stoneman Healing Garden, both gardens fail to fully emerge users into nature and offer the benefits that are to be attained therein.

Hope in Bloom is a nonprofit organization that installs small scale healing gardens at homes of cancer patients across the United States. Dehman Hershon, the founder of the program says that "being or working in a garden lowers blood pressure, relieves stress, and reduces anxiety, and in turn, these benefits allow us to regroup. It’s especially important for people who are sick to have a positive outlook because the body is apt to be more responsive to treatment and heal more quickly." (Killeen, 1) Here Hershon points out the benefits of being able to take care of your own garden and the values of nature on the human body and in the chemotherapy recovery process. Being able to see something that is living and know that you have played a role in keeping it alive offers one hope that they too can control their own destiny and beat cancer. Killeen goes on to say that just having a piece of nature does not go far enough, instead she says “Different from cut flowers, these gardens become constants in patients lives,”(Killeen, Pg 1) meaning that this is a constant life for or form of hope. A shrub is not going to die over night because it has been sitting in a glass...
of water like a cut flower. This information and organization are valuable to this project for many reasons. They offer views of healing gardens and their benefits through the scope of cancer patients and survivors as well as offering a possible funding partner for a healing garden for cancer patients in a healthcare facility. Hope in Bloom also use native plants that require less care and can survive in the environment for longer periods of time. With Hope in Bloom, not only are healing gardens in bloom, but also the hope of recovering from cancer is enhanced through the use of nature.

In Conclusion, when Jencks talked about when life throws a curve ball at you with cancer, though there is a possibility of death, it is important to take advantage of the greater things in life. Healing gardens designed specifically for cancer patients allow them to escape their problems in nature and focus on recovering. Nature has many benefits and if designed well like the Healing Garden at Mt. Zion or the Thea and James Stoneman Healing Garden, one can get away from the sterile and unfamiliar environment of the hospital. From these case studies, a set of design considerations such as odors and vast hardscapes has been completed. Hope in Bloom is a nonprofit that could be used to help fund and work on gardens for not only the hospital but also patients' homes. Through this research specific design guidelines have been formed and organizations leaders voices have been heard.

Conclusion

Through research on healing gardens, rooftop gardens, hospital staff needs, and cancer patient needs, a large number of valuable key points were found. Healing gardens have been praised for their link to nature and its healing benefits for hundreds of years. In more recent decades, healing gardens have become more prominent in the healthcare industry and have become an instrumental tool in the healing process. Rooftop gardens began as small sod like plantings and have evolved in the past 20 years to extensive landscapes on top of buildings. Through research it was found that the majority of buildings are already structurally able to support rooftop-healing gardens. It was found that hospital staff prefer to have privacy and be alone in a healing garden and that cancer patients need shade and no strong fragrances due to the effects of chemotherapy. In general, healing gardens should contain a water feature for background noise, colorful long lasting blooms, plenty of seating and lighting, slip resistant walkways, shade structures to protect from the elements, lush vegetation to fully transport one into nature, and space for privacy. Together, all of these elements contribute to the benefits of nature and help reduce stress in both patients and hospital staff.

The focus of the gardens will be to reduce stress, because it is proven that lower levels of stress contribute to a stronger immune system and better health. (Meditation) According to Sharla Wells-Di Gregorio who has a PhD in psychology, in a presentation on stress management, stress reduction leads to better physical health and an increased sense of control. (Wells-Di Gregorio) Successful healing gardens give one a sense of control compared to the lack of control they have in a healthcare facility and with their health. This research has given insight on healing garden benefits as well as contributed to a set of design guidelines that help reduce stress in cancer patients and hospital staff as well as provide a sense of control in an unfamiliar environment.

"Lower levels of stress contribute to a stronger immune system and better health"
The Problem + The Setting

Problem Statement

This study focused on the redesign and development of healing gardens for Reid Hospital in Richmond Indiana that will aim to improve the quality of life for both patients and staff. Specifically, the garden(s) focused on cancer patients and placing them in nature to reduce the stress and pain of chemo, as well as to provide an escape for those who work in the hospital, and create an accessible rooftop garden for all visitors.

Delimitations

This study will not focus on design elements for patients with Alzheimer’s or other related illnesses. This is not a garden designed for rehab purposes. This project will not gather input from patients of Reid Hospital. This study will not focus on fundraising projects.

Assumptions

Reid Hospital is looking to make their current rooftop garden accessible.

Reid Hospital is looking to add a garden for Hospital Staff.

The utility area located on the roof where the hospital staff is located produces a low humming noise that can be masked by a water feature.

The roof of Reid Hospital is sound enough or can be easily modified to support additional gardens.

Funding is available to purchase the additions.

Definitions

*Healing Garden* refers to any designed space indoor or outdoor that can be used for a variety of activities and offers restorative benefits through being in nature.

*Enabling Garden* refers to a designed space in which activities are led by a therapist for rehabilitation.

*Rooftop Garden* refers to a series of plantings above ground level that provide temperature control, hydrological benefits, recreational opportunities, and enhances the quality of life.

*Hospital Staff* specifically refers to employees of Reid hospital, including administrators, doctors, maintenance and nurses.

*Therapeutic* refers to a method of providing a cure or release from a disease or ailment.

*Patient* refers to a person who is receiving medical treatment from Reid Hospital.
Significance

Healing Garden

Healing gardens provide space that can be used for sitting, walking, looking, reflecting, phone calls, meditation, naps, rehabilitation and a variety of other needs. Research has shown they are very beneficial and offer increased pain tolerance, faster recovery time, reduced stress, and positive changes in moods. 95% of visitors to a healing garden, on average, report a positive change in mood in just 5 minutes in the garden. Implementing gardens in which patients can view during chemo, after surgery, or during recovery creates an increase in quality of life and provide a sense of control, privacy and positive distraction from illnesses.

Patient Needs

Patients who come to a hospital to receive treatment are generally in pain and are overwhelmed with stress. Being placed in a space where you can be in or view nature is proven to increase your pain tolerance, when compared to the sterile environment of a typical hospital, as well as speed up your recovery time. Reid Hospital serves a 300,000 resident area, therefore having a healing garden that patients can be in or view before or after surgery, after or during chemo, or simply while waiting for a doctor to see them can improve their quality of life and reduce stress.

Staff Needs

Hospital staff outside of administration and maintenance, work 12 hour shifts. These long shifts of saving lives and helping to heal people can be very exhausting as well as stressful. On average, 80% of nurses go outdoors at some point during their shift. A healing garden offers a place where one can go to and lay on a bench or sit in a chair and be at peace in nature, as well as reduce stress. 98% of nurses report elevated levels of stress, this statistic contributes to increasing levels of burnouts in the nursing industry. Finding a way to decrease this number is important to create longevity and experience in the profession.
Client

Reid Hospital was originally built in 1905. It opened its doors as Reid Memorial Hospital and was a leading hospital in the area for 100 years. 100 years later it became clear to the board that they needed many improvements to the existing hospital, and with room in the budget and new funding available it became clear that the best option for growth and improvement would be to build a new facility. In September of 2004, Reid began construction on a new facility north of its existing location on North Chester Boulevard. Reid Hospital opened its doors 4 years later in September of 2008. The new facility boasted trend setting technology and design principles. Today, the hospital is a non-profit organization with 217 beds. The hospital serves 5 east central Indiana counties and 2 west central Ohio counties, serving about 300,000 residents.

The hospital has won numerous awards since its reopening. It has received awards in patient safety and was listed as one of the top hospitals in the nation in 2009 and 2010 by the Hospital Value Index. Its high grade included being the best hospital in the region out of a 6 state area and the best in the state of Indiana.

Randy Kirk is a Vice President at Reid Hospital. He is also the President of the Reid Foundation. His help was used to gather general information on the hospital. Randy was very helpful and knowledgeable and was able to give information regarding views as well as information on the existing landscape.

Jaimie Quade is currently employed at Reid Hospital as a Full Time Critical Care Nurse on the night shift. She has worked at Reid for almost a year. Her expertise on the hospital as well as the everyday workings of a nurse was used to gather information regarding nurse schedules, needs, and stress.

Figure 6. The original Reid Hospital

Figure 7. The original Reid Hospital as it stands today

Figure 8. The new Reid Hospital
Figure 9. Vicinity Map: Richmond is located near the Indiana/Ohio Border

Figure 10. Reid Memorial Hospital. 71+ acres located south of I-70
Design Goals and Objectives

Design Intention

The mission of this project is to review literature to inform design decisions to use nature and its ability to heal and reduce stress, as well as to apply findings to a series of healing gardens for Reid Hospital in Richmond, Indiana. These healing gardens are meant to provide a space for hospital staff to recover and reduce stress from their work to decrease burnout rates and create longevity in the workplace, as well as provide a space to cancer patients to be placed in nature to reduce the stress and pain of chemotherapy. The redesign of an existing rooftop garden creates an accessible garden that applies the benefits of nature to all that visit the garden in a way that allows them to reduce their anxiety, pain, and stress through interactions with vegetation, material use, and views. The following goals and objectives have been developed for this healing garden series:

Goal: This project aims to develop a healing garden for cancer patients that will be visible from indoors and provide a space to relax before and after chemotherapy.

Objective 1: This will be accomplished by using structures to protect users from the elements while in the garden to allow patients to use the site and reduce levels of pain and stress.

Objective 2: This will be accomplished by using materials that are glare resistant to prevent sunlight induced nausea.

Objective 3: This will be accomplished by preventing strong odors from entering the site from adjacent areas and by not using vegetation with strong odors to prevent nausea.

Goal: This project aims to develop a private rooftop-healing garden for Hospital Staff to use throughout their 12-hour shift.

Objective 1: This will be accomplished by creating multiple rooms using vegetation and individual seating to create a private setting.

Objective 2: This will be accomplished by allowing only hospital staff to have access to the garden to allow for private time to meditate and reduce stress.

Objective 3: This will be accomplished by promoting the use of the garden throughout the 12-hour shift with scheduled times promoted by hospital administration to help reduce stress and decrease burnout rates among hospital staff.

Goal: This project aims to redesign the existing rooftop garden into an accessible space, which meets universal design standards, for patients and visitors to enjoy during their time at Reid Hospital.

Objective 1: This will be accomplished by creating 24-hour access and visibility to the rooftop garden.

Objective 2: This will be accomplished by using lightweight slip resistant materials to create a safe environment.

Objective 3: This will be accomplished by installing any support needed to help handle the additional weight added to the structure.
**Program**

**Escape**

Provide an escape from the stressful hospital environment into a naturalistic space that helps reduce stress and improve one's mood.

**Meditation**

Create a space that places one into nature and an environment where one may clear their mind.

**Rest**

Establish a space where one can reenergize one's self both physically and mentally.
Site Selection

Reid Memorial Hospital opened its brand new facility in 2008. This state of the art facility boasts numerous awards and even has an existing green roof. There was opportunity on the site to redesign the existing green roof into an accessible space and provide families with a place to interact with. Four floors of patient rooms look out onto a bare rooftop. In such a well-landscaped setting, a green alternative was needed to enrich the lives and improve the comfort level of those undergoing treatment at the hospital. Finally, the existing cancer treatment center looks out into a park lot that is often empty. There was an opportunity to create a connection with nature and really place Reid on the map for being a great cancer treatment hospital. Site inventory shown below, defined where each garden should be located based on the surrounding setting. The Family and Friends garden is located near the surgical waiting and critical care floors because those are higher stress location. The hospital staff location was selected to help alleviate the existing bare rooftop as well as an ideal location for nurses and doctors to go for a break.

Figure 11. Reid Memorial Hospital Site Inventory Map

Figure 12. Reid Memorial Hospital Inventory Diagram: North/South

Figure 13. Reid Memorial Hospital Inventory Diagram: East/West
Figure 14. Family & Friends Healing Garden. 0.09 Acres

Figure 15. Hospital Staff Healing Garden. 1.25 Acres

Figure 16. Cancer Patient Healing Garden. 1.06 Acres
Design Guidelines

The Design Guideline diagram was adapted from the guidelines presented in Therapeutic Landscapes: An Evidence-Based Approach to Designing Healing Gardens and Restorative Outdoor Spaces by Clare Cooper Marcus, Naomi A Sachs. The inner blue icons represent general healing garden design guidelines. These are typically found in any successful healing garden. Moving out from the center, there are three different guidelines categories that represent a more specific garden target or target user group. The red represents children, family, and friends. The green represents cancer patients. The yellow represents administrators, doctors, and nurses. Each icon represents a different guideline. Explanations can be found in the appendix of what each icon means, what health outcome is derived from each guideline and potential features to successfully present each design guideline.

Figure 17. Healing Garden Design Guidelines Diagram
Site Context

Figure 18. Reid Memorial Hospital Reference

Figure 19. Reid Hospital features multiple berms to screen views from the hospital interior to the parking lots. These berms are well maintained, but work best in the spring, summer, and fall.

Figure 20. Trash containers located near the cancer patient garden must be relocated to eliminate strong odors that induce nausea. The existing drive may be reused as a drop off.

Figure 21. The existing parking lot is not used on weekends, with plenty of other parking spaces, during the week staff and visitors may park elsewhere. Views in are mainly doctor offices, but should still be screened.

Figure 22. The existing rooftop garden contains no seasonal interest. Ones eye initially goes to the vegetation (red), followed immediately upwards to the sky (black).

Figure 23. Patient rooms (black) have direct views into the proposed gardens (red). This offers opportunity to create visual interest, and presents the challenge of screening views for those in the garden.
View Analysis

Figure 24. Family & Friends Healing Garden. Views in are a mix between offices and patient rooms. The major view in is the elevator bank.

Figure 25. Hospital Staff Healing Garden. Views in are all patient rooms. The green area represents screened existing areas and the black is a utility area.

Figure 26. Cancer Patient Healing Garden. Views in are mainly Doctor's offices with minor views coming from the north wing patient rooms.
User Thought Analysis

The User Thought Analysis attempts to give one the understanding of all of the emotions and events on one's mind while they are in the hospital setting. Family and Friends worry about there loved ones and the care they are receiving, nurses think about all of their patients and specific tasks relating to each one, and patients worry about their family and treatment.

What you begin to see is that all of these thoughts begin to overlap and mix with other user groups. Finding a way to alleviate these stresses presents an interesting challenge in which a possible solution are the healing gardens that are being designed.
The Reid Memorial Hospital Comprehensive Master Plan includes three healing gardens. These healing gardens focus on Family and Friends, Hospital Staff, and Cancer Patients. These gardens were created to help alleviate the stresses of dealing with the sterile hospital environment.

The Family and Friends Healing Garden uses grasses to interact with the breezes to allow for positive distraction. The lawn space and topography maze that runs through the grasses will be ideal to allow children an escape from the quite hospital setting. A multitude of seating options allows families to choose their setting, whether it is a place to eat, lie down, or sit with loved ones, there are many options to allow for the ideal escape. An umbrella instillation will create visual interest as it interacts with the sun's rays to create a vibrant setting.

The Hospital Staff Healing Garden provides multiple rooms to create a sense of destination as well as a sense of control. Staff will be able to go to their favorite room everyday for lunch, or escape into a new setting to work around the clock alone or with colleagues to help cure diseases. This is an ideal space to reenergize during a 12-hour shift. A living wall and rich canopy will provide a quiet naturalistic space in which patients have a view of nature, but not a view into spaces where doctors and nurses are resting.

The Cancer Patient Healing Garden replaces the existing underused park area behind the Medical Office building. In its place a naturalistic private space is created where patients are able to go on walks in a controlled setting and rest every 25 to 50 feet. Studies show that exercise during treatment helps reduce the effects of chemotherapy. An incubation bay is situated near a viewing garden where patients can be surrounded by nature during treatment. An indoor garden will allow patients to enjoy nature in a controlled environment year round. Canopy and vegetation has been planted to allow patients privacy throughout the year.
Reid Memorial Hospital
Healing Garden Series:

Family & Friends
Healing Garden Design
Figure 31. Family & Friends Concept A

Concept A for the Family and Friend Healing Garden introduces an art instillation based on the Agitagueda Art Festival in Portugal. This feature paired with a prairie creates a playful atmosphere that contrasts the sterile hospital environment.

Figure 32. Family & Friends Concept B

Concept B for the Family and Friend Healing Garden focuses on using a water feature along with lush green plantings to all one to immerse themselves in nature. A walking loop allows one to get fresh air and detox from the sterile hospital environment.

Figure 33. Family & Friends Concept C

Concept C for the Family and Friend Healing Garden uses the form of the hospital along with a boardwalk to allow visitors to walk through the prairie. Reclined seating allows visitors to lay back and view the prairie as it interacts with the breezes.
Figure 34. Reid Memorial Hospital: Family & Friends Plan
Family & Friends Healing Garden

<table>
<thead>
<tr>
<th>KEY</th>
<th>QTY</th>
<th>Common Name</th>
<th>Botanical Name</th>
<th>Pot Size</th>
<th>Spacing</th>
<th>Root</th>
<th>Notes</th>
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</thead>
<tbody>
<tr>
<td>PAN-NW</td>
<td>54</td>
<td>Northwind Switch Grass</td>
<td>Panicum virgatum 'Northwind'</td>
<td>2 gal</td>
<td>24&quot; O.C.</td>
<td>Cont.</td>
<td></td>
</tr>
<tr>
<td>PAN-Sh</td>
<td>112</td>
<td>Shenandoah Switch Grass</td>
<td>Panicum virgatum 'Shenandoah'</td>
<td>2 gal</td>
<td>24&quot; O.C.</td>
<td>Cont.</td>
<td></td>
</tr>
</tbody>
</table>
Figure 36. Family and Friends Healing Garden Section

*This section illustrates the relationship of the umbrella instillation as well as the topography and grass relationship.*
This green roof design transforms the existing extensive roof into an intensive roof. This allows the space to support more activity as well as larger plantings. This roof section is typical for the Hospital Staff Healing Garden as well. Below is an explanation of the layers that will be used.

The Growing Medium Layer provides nutrients for the turf and landscaping.

The Filter Sheet prevents particles from entering and clogging the drainage layer.

The Drainage Layer allows heavy runoff to be directed to the drain as well as retaining excess water to help provide moisture to plants and reduce water usage.

The Protection Mat helps limit the punctures to the root barrier layer, which over time allows the root barrier to last longer.

The Waterproof Membrane prevents moisture from building up on the roof, in turn preventing mold and mildew.

The Root Barrier helps prevent roots from penetrating the roof.
to operating waiting rooms as well as the critical care floor, the Family and Friends Healing Garden is the ideal location to be positively distracted. Whether it be by the grasses interacting with the wind, the topographic lawn space, the rock water feature, or the vibrant umbrella installation, this space will make any uncomfortable, stressful wait a bit easier.

Figure 38. Located adjacent to operating waiting rooms as well as the critical care floor, the Family and Friends Healing Garden is the ideal location to be positively distracted. Whether it be by the grasses interacting with the wind, the topographic lawn space, the rock water feature, or the vibrant umbrella installation, this space will make any uncomfortable, stressful wait a bit easier.

Figure 39. The vibrant umbrella installation brings color to an otherwise sterile hospital environment. The installation covers a wood patio with a variety of seating options for any form of social support or meditation.
Figure 40. The slight topography that runs through the lawn space and grass creates a unique environment in which children can blow off energy. The open space allows for play that contrasts the flat sterile hospital environment.
Reid Memorial Hospital Healing Garden Series:
Hospital Staff Healing Garden Design
Concept A for the Hospital Staff Healing Garden creates multiple rooms to serve as a destination for those who work in the hospital. Multiple unique rooms would help create a sense of control and overtime would allow each staff to feel as though they had their own room in the hospital.

Concept B for the Hospital Staff Healing Garden focused on using a mixture of tree canopy and arbors to screen the views into the garden. A prairie was placed closer to the hospital to allow interaction with the wind.

Abstracting the Tulip Fields in Holland and using the form of the hospital inspired concept C for the Hospital Staff Healing Garden. This design would create a serene prairie meadow effect. However with little overhead cover, this garden would be better used as a viewing garden.
Ornamental Grass Room

Rose Room

Redbud Room

Waterfall Room

Evergreen Room

Living Wall

Figure 44. Reid Memorial Hospital: Hospital Staff Plan

Original Drawing 1"=20'
Scaled Down To 25%
Figure 45. Reid Memorial Hospital: Hospital Staff Planting Plan / Plant Palette / Planting Schedule

<table>
<thead>
<tr>
<th>KEY</th>
<th>QTY</th>
<th>Common Name</th>
<th>Botanical Name</th>
<th>Pot Size</th>
<th>Spacing</th>
<th>Root</th>
<th>Notes</th>
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<tbody>
<tr>
<td>ACE-J</td>
<td>5</td>
<td>Autumn Blaze Red Maple</td>
<td>*Acer x freemanii 'Jeff red'</td>
<td>3&quot; cal.</td>
<td>Per Plans</td>
<td>B&amp;B</td>
<td></td>
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<tr>
<td>AST-SU</td>
<td>1666</td>
<td>Chinese Astilbe</td>
<td>*Astilbe chinensis var. taquetii 'Superba'</td>
<td>1 gal</td>
<td>24&quot; O.C.</td>
<td>Cont.</td>
<td></td>
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<tr>
<td>CEP-NA</td>
<td>18</td>
<td>Cow's Tail Pine</td>
<td>*Cephalotaxus harringtonia 'Nana'</td>
<td>4'</td>
<td>Per Plans</td>
<td>B&amp;B</td>
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<tr>
<td>CER-AR</td>
<td>31</td>
<td>Eastern Redbud</td>
<td>*Cercis canadensis 'Appalachian Red'</td>
<td>2.5&quot; cal.</td>
<td>Per Plans</td>
<td>B&amp;B</td>
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<td>CORN-SI</td>
<td>44</td>
<td>Tatarian Dogwood</td>
<td>*Cornus alba 'Sibirica'</td>
<td>3'</td>
<td>Per Plans</td>
<td>B&amp;B</td>
<td></td>
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<tr>
<td>HIB-AP</td>
<td>9</td>
<td>Aphrodite Rose of Sharon</td>
<td>*Hibiscus syriacus 'Aphrodite'</td>
<td>3 gal</td>
<td>Per Plans</td>
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<td>HIB-DI</td>
<td>7</td>
<td>Diana Rose of Sharon</td>
<td>*Hibiscus syriacus 'Diana'</td>
<td>3 gal</td>
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<td>LIR-BB</td>
<td>6,840</td>
<td>Big Blue Lily Turf</td>
<td>*Lilium muscari 'Big Blue'</td>
<td>3 x 3 flats</td>
<td>12&quot; O.C.</td>
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<tr>
<td>LYS-GO</td>
<td>403</td>
<td>Creeping Jenny</td>
<td>*Lysimachia nummularia 'Goldilocks'</td>
<td>1 gal</td>
<td>Per Plans</td>
<td>Cont.</td>
<td></td>
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<tr>
<td>MAG-LE</td>
<td>14</td>
<td>Kobus Magnolia</td>
<td>*Magnolia 'Legacy'</td>
<td>2.5&quot; cal.</td>
<td>Per Plans</td>
<td>B&amp;B</td>
<td></td>
</tr>
<tr>
<td>MAH-A</td>
<td>20</td>
<td>Oregon grape-holly</td>
<td>*Mahonia aquifolium</td>
<td>4'</td>
<td>Per Plans</td>
<td>B&amp;B</td>
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<tr>
<td>PAN-NW</td>
<td>1740</td>
<td>Northwind Switch Grass</td>
<td>*Panicum virgatum 'Northwind'</td>
<td>2 gal</td>
<td>24&quot; O.C.</td>
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<tr>
<td>PHY-DI</td>
<td>16</td>
<td>Diablo Ninebark</td>
<td>*Physocarpus opulifolius 'Diabolo'</td>
<td>3 gal</td>
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<td>Cont.</td>
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<tr>
<td>PIC-FA</td>
<td>9</td>
<td>Colorado Blue Spruce</td>
<td>*Picea pungens 'Fat Albert'</td>
<td>14'</td>
<td>Per Plans</td>
<td>B&amp;B</td>
<td></td>
</tr>
<tr>
<td>PIC-GS</td>
<td>9</td>
<td>Colorado Green Spruce</td>
<td>*Picea pungens 'Green Spire'</td>
<td>14'</td>
<td>Per Plans</td>
<td>B&amp;B</td>
<td></td>
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<tr>
<td>QUE-CO</td>
<td>5</td>
<td>Golden English Oak</td>
<td>*Quercus robur 'Concordia'</td>
<td>3&quot; cal.</td>
<td>Per Plans</td>
<td>B&amp;B</td>
<td></td>
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<tr>
<td>QUE-M</td>
<td>6</td>
<td>Mongolian Oak</td>
<td>*Quercus mongolica</td>
<td>3&quot; cal.</td>
<td>Per Plans</td>
<td>B&amp;B</td>
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<tr>
<td>ROS-CO</td>
<td>3</td>
<td>Country Dancer Shrub Rose</td>
<td>*Rosa 'Country Dancer'</td>
<td>3 gal</td>
<td>Per Plans</td>
<td>Cont.</td>
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</tr>
<tr>
<td>ROS-CL</td>
<td>5</td>
<td>Climbing Rose</td>
<td>*Rosa 'Climbing Mademoiselle Cécile Brünner'</td>
<td>3 gal</td>
<td>Per Plans</td>
<td>Cont.</td>
<td></td>
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<tr>
<td>ROS-DP</td>
<td>5</td>
<td>Hybrid Tea Rose</td>
<td>*Rosa 'Dolly Parton'</td>
<td>3 gal</td>
<td>Per Plans</td>
<td>Cont.</td>
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</tr>
</tbody>
</table>
Figure 46. Hospital Staff Healing Garden Section

This section illustrates the relationship between the water wall and the beginning of the evergreen screen. The side closest to the hospital (right on the section) has a more naturalistic water wall that disappears into the lush groundcover. The side near the path (left on the section) has a calmer, trickling effect. This allows for staff to run their hands along the wall. The evergreen screen protects views into the garden from the patient rooms located nearby.
Living Wall Sound Displacement

The existing utility area pictured on the top left, produces about 100 decibels of sound. This offers a unique challenge in figuring out how to manage the noise put out in order to create a naturalistic setting. The distance from the utility boxes to the existing wall is roughly 15 feet. The 10-foot wall as well as the distance from the utility boxes offsets the noise level to about 85 decibels. Placing a living wall shell over the existing wall, as shown in the image to the top right, will offset the noise decibel level by an additional 25 decibels, to roughly 60 decibels. (Refer to the appendix for a more detailed list of typical decibel levels.) That is the equivalent to a busy office or a loud conversation. Adding dense vegetation as well as a water feature will wash out the noises produced by the utility units and allow for a naturalistic setting.

Figure 47.
Where once the rooftop was empty and dull, there is now a naturalistic setting complete with a water wall, a waterfall, pond, and living wall. The evergreen screen and canopy protects those inside the space from views in the garden also uses string lighting to allow for visual access throughout. Pictured here is the Redbud and Rose Room.

The rose room gives a sense of control to those who enjoy pruning and taking care of the delicate shrubs.
Figure 50. Benches located along the path offer an escape for those wishing to work in a more private setting. Covered by vegetation, these nooks offer a comfortable place to work along or rest without interruption.

Figure 51. The Magnolia Room offers a place with moveable seating for social support or a somewhat private place to relax. The beautiful fragrance of the Magnolia’s help provide a sense of escape, while not being to overpowering that they enter the cancer patient gardens.
Reid Memorial Hospital
Healing Garden Series:

Cancer Patient
Healing Garden Design
Concept A for the Cancer Patient Healing Garden features a nature loop as well as a loop with seating rooms. Rooms can be used to wait for a ride or compose oneself before or after treatment. A reflecting pool located near a drop off offers a “grand entrance” to the space.

Concept B for the Cancer Patient Healing Garden removes half of the existing parking and also features an indoor garden component. The indoor garden allows for climate control to sensitive patients undergoing treatment. A viewing garden located off of the new incubation bay allows patients to “be in” nature during treatment.

Concept C for the Cancer Patient Garden removed half of the existing parking and replaced it with a less harsh parking lot. A loop around a water feature helps bring nature into space. An open lawn space allows patients to come and lay on the grass. There are no major destination elements involved in this concept.
Figure 55. Reid Memorial Hospital: Cancer Patient Plan

Originally Drawn 1"=20'
Scaled Down To 40%
Figure 56. Reid Memorial Hospital: Indoor Cancer Patient Planting Plan / Plant Palette / Planting Schedule

Indoor Garden

<table>
<thead>
<tr>
<th>KEY</th>
<th>QTY</th>
<th>Common Name</th>
<th>Botanical Name</th>
<th>Pot Size</th>
<th>Spacing</th>
<th>Root</th>
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<tbody>
<tr>
<td>ACB</td>
<td>12</td>
<td>Artificial Cherry Blossom</td>
<td>-</td>
<td>-</td>
<td>Per Plans</td>
<td>-</td>
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</tr>
<tr>
<td>CRO-PE</td>
<td>20</td>
<td>Croton</td>
<td>Croton petras</td>
<td>3 gal</td>
<td>Per Plans</td>
<td>Cont.</td>
<td></td>
</tr>
<tr>
<td>FAT-JA</td>
<td>9</td>
<td>Japanese fatsia</td>
<td>Fatsia japonica</td>
<td>3 gal</td>
<td>Per Plans</td>
<td>Cont.</td>
<td></td>
</tr>
<tr>
<td>NEO-TR</td>
<td>25</td>
<td>Blushing Bromeliad</td>
<td>Neoregelia carolinae f. tricolor</td>
<td>1 gal</td>
<td>Per Plans</td>
<td>Cont.</td>
<td></td>
</tr>
<tr>
<td>PAN-SH</td>
<td>36</td>
<td>Shenandoah Switch Grass</td>
<td>Panicum virgatum 'Shenandoah'</td>
<td>2 gal</td>
<td>24” O.C.</td>
<td>Cont.</td>
<td></td>
</tr>
<tr>
<td>RHA-E</td>
<td>17</td>
<td>Lady Palm</td>
<td>Rhapis excelsa</td>
<td>5 gal</td>
<td>Per Plans</td>
<td>Cont.</td>
<td></td>
</tr>
</tbody>
</table>
**Figure 57. Reid Memorial Hospital: Outdoor Cancer Patient Planting Plan / Plant Palette / Planting Schedule**

Cancer Patient Healing Garden

<table>
<thead>
<tr>
<th>KEY</th>
<th>QTY</th>
<th>Common Name</th>
<th>Botanical Name</th>
<th>Pot Size</th>
<th>Spacing</th>
<th>Root</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACE-J</td>
<td>6</td>
<td>Autumn Blaze Red Maple</td>
<td><em>Acer x freemanii ‘Jeffred’</em></td>
<td>3&quot; cal.</td>
<td>Per Plans</td>
<td>B&amp;B</td>
<td></td>
</tr>
<tr>
<td>CEP-NA</td>
<td>18</td>
<td>Cow’s Tail Pine</td>
<td><em>Cephalotaxus harringtonia ‘Nana’</em></td>
<td>4'</td>
<td>Per Plans</td>
<td>B&amp;B</td>
<td></td>
</tr>
<tr>
<td>CER-AR</td>
<td>6</td>
<td>Eastern Redbud</td>
<td><em>Cercis canadensis ‘Appalachian Red’</em></td>
<td>2.5&quot; cal.</td>
<td>Per Plans</td>
<td>B&amp;B</td>
<td></td>
</tr>
<tr>
<td>COR-SI</td>
<td>37</td>
<td>Tatarian Dogwood</td>
<td><em>Cornus alba ‘Sibirica’</em></td>
<td>3'</td>
<td>Per Plans</td>
<td>B&amp;B</td>
<td></td>
</tr>
<tr>
<td>DIP-G</td>
<td>2099</td>
<td>Giade Fern</td>
<td><em>Diplazium pycnocarpon</em></td>
<td>1 gal</td>
<td>24&quot; O.C.</td>
<td>Cont.</td>
<td></td>
</tr>
<tr>
<td>MAH-A</td>
<td>21</td>
<td>Oregon grape-holly</td>
<td><em>Mahonia aquifolium</em></td>
<td>4'</td>
<td>Per Plans</td>
<td>B&amp;B</td>
<td></td>
</tr>
<tr>
<td>PAN-NW</td>
<td>489</td>
<td>Northwind Switch Grass</td>
<td><em>Panicum virgatum ‘Northwind’</em></td>
<td>2 gal</td>
<td>24&quot; O.C.</td>
<td>Cont.</td>
<td></td>
</tr>
<tr>
<td>PAN-SH</td>
<td>140</td>
<td>Shenandoah Switch Grass</td>
<td><em>Panicum virgatum ‘Shenandoah’</em></td>
<td>2 gal</td>
<td>24&quot; O.C.</td>
<td>Cont.</td>
<td></td>
</tr>
<tr>
<td>PIC-FA</td>
<td>25</td>
<td>Colorado Blue Spruce</td>
<td><em>Picea pungens ‘Fat Albert’</em></td>
<td>14'</td>
<td>Per Plans</td>
<td>B&amp;B</td>
<td></td>
</tr>
<tr>
<td>PIC-GS</td>
<td>25</td>
<td>Colorado Green Spruce</td>
<td><em>Picea pungens ‘Green Spire’</em></td>
<td>14'</td>
<td>Per Plans</td>
<td>B&amp;B</td>
<td></td>
</tr>
<tr>
<td>QUE-CO</td>
<td>8</td>
<td>Golden English Oak</td>
<td><em>Quercus rubra ‘Concordia’</em></td>
<td>3&quot; cal.</td>
<td>Per Plans</td>
<td>B&amp;B</td>
<td></td>
</tr>
<tr>
<td>TSU-SG</td>
<td>20</td>
<td>Canadian Hemlock</td>
<td><em>Tsuga canadensis ‘Stewart’s Gem’</em></td>
<td>4'</td>
<td>Per Plans</td>
<td>B&amp;B</td>
<td></td>
</tr>
</tbody>
</table>
Figure 58. Cancer Patient Healing Garden Section
This section illustrates the relationship between the incubation treatment bay and the viewing garden. Although a path is located on the other side of the viewing garden, one has a sense of escape into nature because they cannot see those on the path.

Figure 59. Cancer Patient Healing Garden Section
This section illustrates the relationship between the covered patio area and the pond. The patio area is located far enough from the main path that those in the patio area will not be concerned about those walking. The evergreen screen helps screen views into the garden from the parking lot.
This section illustrates the indoor garden. It shows the relationship between the benches and the planting beds that are raised to help screen views from other benches.
Figure 61. The covered patios located on the walking loop provide a space where one can prepare themselves before or after treatment. The shade offers protection from the sun. The surrounding plants have no fragrance, thus limiting outside factors that may induce nausea.

Figure 62. The new incubation bay offers views out into a private viewing garden. The garden uses an evergreen screen to protect views into the incubation bay for those who may be conscious about their appearance. The garden is situated so that family may be on the other side of the screen for support.
Figure 63. An indoor garden located adjacent to the incubation bays allow for a place for patients and their families to be immersed in nature in a controlled environment. Plants selected will be in bloom year round and provide a further escape from the Midwest. This is the perfect place to regroup before or after treatment.

Figure 64. The walking path offers a route for patients to take to help encourage physical exercise. Studies show that those who are active while undergoing treatment are more likely to be able to deal with the side effects of treatment. Seating ever 25 feet will provide with ample opportunity for rest.
"I go to nature to be soothed and healed, and to have my senses put in order."

- John Burroughs
Conclusion

The Reid Memorial Healing Gardens aim to improve the quality of life for Family, Friends, Patients, and Staff. By reducing stress through positive distraction and interaction with nature, these gardens provide a space that contrasts the sterile hospital environment.

Through research done, it was found that Family and Friends look for social support and above all, positive distraction from the stressful events that are happening inside the hospital. Providing space for children to play and a variety of seating, family and friends can feel like they can control an aspect of their life, while another aspect is out of their control. The umbrella instillation will provide bright happy colors that, when combined with the grasses interacting in the breeze, will create a happy environment to reduce stress.

According to studies done, many staff members prefer to have a space to escape to in nature during their shift. Many of these nurses prefer a place to rest and be alone. Providing multiple rooms will allow them to have a sense of control as well as a sense of destination. The dense canopy and vegetation will help provide a screen to the views from patient rooms.

The cancer patient garden uses a variety of evergreen plantings to help screen views, screen sunlight, and provide seasonal color. Shade and Odorless plantings will help reduce environmental triggers to nausea and vomiting that can be brought on during chemotherapy treatment.

Being three separate gardens, this project could be implemented in three separate phases. Each garden was designed to benefit the hospital. Whether it be aesthetically, financially, or prestigiously, these healing gardens will improve the quality of life for Family, Friends, Patients, and Staff by reducing the stresses that are brought on by hospital visits.
<table>
<thead>
<tr>
<th>ICON</th>
<th>DEFINITION</th>
<th>HEALTH OUTCOME</th>
<th>DESIGN GUIDELINES</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="light_bulb.png" alt="Light bulb" /></td>
<td>Aesthetic Lighting</td>
<td>Lighting allows for the garden to be used and viewed from indoors after the sun sets.</td>
<td>String lighting, Mood Lighting, Dimmed Lighting</td>
</tr>
<tr>
<td><img src="chair.png" alt="Chair" /></td>
<td>Comfortable Seating</td>
<td>Tired or stressed users need a place to sit and relax, providing comfortable furniture will allow them to enjoy nature more easily.</td>
<td>Seats with Cushions, Reclinable Seating, Chaise Lounges, Swing Seating</td>
</tr>
<tr>
<td><img src="path.png" alt="Path" /></td>
<td>Curvilinear Paths</td>
<td>Curvilinear paths are easier to navigate for those in wheelchairs. Visually, they are more naturalistic to look at than a straight path with sharp corners.</td>
<td>Loop Path, No Sharp Corners</td>
</tr>
<tr>
<td><img src="engage.png" alt="Engage" /></td>
<td>Engage Multiple Senses</td>
<td>Engaging a user with sight, sound, and touch will allow them to interact and enjoy the environment and provide them with the full healing effect of nature.</td>
<td>Plantings with different textures and heights, Different Materials, Multiple Seasons of Bloom</td>
</tr>
<tr>
<td><img src="lawn.png" alt="Lawn" /></td>
<td>Flat Lawn Area</td>
<td>Lawn areas provide a space for small informal events or gatherings as well as provide a space for one to lie down and enjoy the sun.</td>
<td>Grass area with no plantings</td>
</tr>
<tr>
<td><img src="threshold.png" alt="Threshold" /></td>
<td>Flat Thresholds and Entryways</td>
<td>Flat thresholds allow for those using wheel chairs, walking aids, strollers, or IV poles to enjoy the garden without any additional obstacles that limit mobility.</td>
<td>Slopped Entryways</td>
</tr>
<tr>
<td>ICON</td>
<td>DEFINITION</td>
<td>HEALTH OUTCOME</td>
<td>DESIGN GUIDELINES</td>
</tr>
<tr>
<td>------</td>
<td>------------</td>
<td>----------------</td>
<td>-------------------</td>
</tr>
<tr>
<td>🧐</td>
<td>Fun or Whimsical Features</td>
<td>Fun features make users smile which releases positive endorphins into the body, making people happier.</td>
<td>Art, Plantings, Water Features</td>
</tr>
<tr>
<td>🎨</td>
<td>Furniture for Rest</td>
<td>Providing a space to sit after walking or after a long stressful period and enjoy the surrounding garden will allow one to meditate in nature.</td>
<td>Reclining Seating, Chaise Lounges, Benches, Lawn Space</td>
</tr>
<tr>
<td>📐</td>
<td>Ideal Height Ratio</td>
<td>A scale of 1:3 or 1:2 (Height : Width) is most comfortable when a garden is located next to a building.</td>
<td>Plantings or structures that create a ceiling to limit the scale of the hospital</td>
</tr>
<tr>
<td>🎨</td>
<td>Ideal Softscape to Hardscape Ratio</td>
<td>Use the 70/30 rule to provide a stronger sense of nature rather than a sense of hardscape. Research shows that more benefit is gained from nature dominate spaces.</td>
<td>Use hardscape materials as paths, Use vegetation to create buffers and focal points</td>
</tr>
<tr>
<td>🎨</td>
<td>Incorporate Views</td>
<td>Framing existing views to show off the existing environment or history can help add an additional aspect to a healing garden.</td>
<td>Use vegetation to frame views out as well as frame views inside the garden</td>
</tr>
<tr>
<td>🎨</td>
<td>Minimize Glare</td>
<td>Those with medical conditions or those of old age are highly sensitive to glare. Removing glare will allow everyone to enjoy the garden.</td>
<td>Tinted concrete, granite, or wood on paths</td>
</tr>
<tr>
<td>🌿</td>
<td>Native Plants</td>
<td>Native plants require less maintenance, proved a stronger sense of place and connect users to the environment emotionally.</td>
<td>Use a Zone 6 planting palette</td>
</tr>
<tr>
<td>🕒</td>
<td>Open Year Round</td>
<td>Keeping four seasons of interest will allow the garden to be used all year, thus maximizing the benefits.</td>
<td>Create seasonal interest to allow the gardens to be open year round</td>
</tr>
<tr>
<td>🕒</td>
<td>Opportunity to Observe Wildlife</td>
<td>Wildlife such as butterflies and fish will help create a stronger sense of nature. Birds will come on their own, but should not be encouraged due to infection control issues.</td>
<td>Pond for fish, Flowers for Butterflies</td>
</tr>
<tr>
<td>🌿</td>
<td>Plantings for Privacy</td>
<td>Provide views into the garden while screening views into the hospital to allow patients to view the garden from their hospital bed.</td>
<td>Use hedges as a fence and trees to protect from overhead views, Use arbors and gazebos</td>
</tr>
<tr>
<td>🎨</td>
<td>Restful, Naturalistic Sounds</td>
<td>Pleasant noises can help mask unwanted noises or allow one to escape into nature and help one feel like they aren't in the hospital setting anymore.</td>
<td>Water Feature, Wind Chimes</td>
</tr>
<tr>
<td>🌿</td>
<td>Seats with Backs and Arms</td>
<td>Backs and arms provide comfort as well as provide assistance in sitting down as well as standing up.</td>
<td>Avoid benches without backing</td>
</tr>
<tr>
<td>🏠</td>
<td>Sense of Physical Enclosure</td>
<td>A sense of enclosure allows one to feel safe and feel like they are in a private setting. In gardens that boarder parking it allows one to feel screened from vehicles.</td>
<td>Use plantings to surround seating areas and screen views</td>
</tr>
<tr>
<td>🌿</td>
<td>Sense of Place</td>
<td>Using plants, materials, textures, and color, create a space that is a destination that provides an escape from the hospital setting.</td>
<td>Use Vegetation and Textures to create a strong Sense of a Destination</td>
</tr>
<tr>
<td>🎨</td>
<td>Subspaces with Differentiating Qualities</td>
<td>Multiple different spaces give users the opportunity to &quot;choose&quot; their setting. This fosters a sense of control in an environment where they often have no control.</td>
<td>Create multiple destinations with unique qualities</td>
</tr>
<tr>
<td>🌞</td>
<td>Sun and Shade Locations</td>
<td>Depending on the time of day or time of year, users may have different needs. Many medical conditions require that one must stay out of the sun.</td>
<td>Provide Seating with Overhead Structures or Plantings</td>
</tr>
<tr>
<td>🌊</td>
<td>Water Feature with Soothing Effect</td>
<td>Water features with loud pulsing can be irritating as well as scare many users. Soothing noises help connect users to nature.</td>
<td>Water Feature with stream like noises, No Large Splashes</td>
</tr>
</tbody>
</table>
Using features that interact with the wind can help provide a sense of distraction or stronger sense of connection with nature.

Grasses, Water Features, Open Space

Moveable seating or seating that rocks will bring kinesthetic pleasure to users as well as provide a sense of control in choosing which seating to use.

Seats with Cushions, Reclining Seating, Chaise Lounges, Swing Seating

Using familiar features will help users feel more comfortable in the healing garden setting and create a more familiar sense of place.

Native Plantings, Lawn Space

Giving children a place to run and climb and interact with will give them a distraction from their surroundings and provide them with a sense of escape.

Slopes, Lawn Space, Rocks to Climb, Moveable Seating

Parents or Relatives often need a place to meet with loved ones to help overcome stressful situations they may be dealing with.

Moveable Seating, Space to Interact or Feel Private

The hospital environment is flat, therefore providing any changes for a child will evoke happiness so they can run up and down a hill.

Slopes, Lawn Space
<table>
<thead>
<tr>
<th>ICON</th>
<th>DEFINITION</th>
<th>HEALTH OUTCOME</th>
<th>DESIGN GUIDELINES</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Comfortable Seating" /></td>
<td>Comfortable Seating</td>
<td>Staff are often on their feet for an entire shift, providing comfortable seating to take a load off will allow them to relax and enjoy nature.</td>
<td>Seats with Cushions, Reclining Seating, Chaise Lounges, Swing Seating</td>
</tr>
<tr>
<td><img src="image" alt="Dining" /></td>
<td>Dinning</td>
<td>Provide a space where staff can eat or do paperwork out in nature.</td>
<td>Tables with Moveable Seating</td>
</tr>
<tr>
<td><img src="image" alt="Place to be Alone" /></td>
<td>Place to be Alone</td>
<td>Studies show that staff tend to enjoy nature alone rather than with large groups. Giving them a room to be alone in will give them more opportunity to meditate.</td>
<td>Use hedges as a fence and trees to protect from overhead views, Multiple Rooms to Space Out</td>
</tr>
<tr>
<td><img src="image" alt="Places to Rest" /></td>
<td>Places to Rest</td>
<td>Resting from work related stress allows one to reenergize and take full advantage of being in nature.</td>
<td>Seats with Cushions, Reclining Seating, Chaise Lounges, Swing Seating. Every 25 Feet</td>
</tr>
<tr>
<td><img src="image" alt="Places to Exercise" /></td>
<td>Places to Exercise</td>
<td>Giving staff a place to walk can allow them to clear their mind and look at a patient's case in a new perspective as well as relieve any stress they have.</td>
<td>Curvilinear Path, Walking Loop</td>
</tr>
<tr>
<td><img src="image" alt="Privacy" /></td>
<td>Privacy</td>
<td>Giving staff a space to get away from patients will allow them the ability to destress and provide better care to patients.</td>
<td>Use hedges as a fence and trees to protect from overhead views, Use arbors and gazebos</td>
</tr>
<tr>
<td><img src="image" alt="Quiet" /></td>
<td>Quiet</td>
<td>Removing staff from the typical noises of a hospital into a peaceful nature setting will provide an escape as well as a stronger sense of place.</td>
<td>Water Feature, Running Stream</td>
</tr>
<tr>
<td><img src="image" alt="Social Support" /></td>
<td>Social Support</td>
<td>Providing a space where staff can meet and have consultations with peers or meetings outdoors will provide an escape from the typical hospital setting they are used to.</td>
<td>Tables with Moveable Seating, Multiple Rooms with Varying Size and Seating</td>
</tr>
<tr>
<td><img src="image" alt="Soothing sounds" /></td>
<td>Soothing sounds</td>
<td>Soothing sounds provide a stronger connection to nature and allow one to feel a sense of escape from the hospital environment.</td>
<td>Water Feature, Wind Chimes, Running Stream</td>
</tr>
</tbody>
</table>
Avoid Strong Odors

Patients undergoing treatment are very sensitive to smell. Strong scents can trigger nausea.

Avoid Vegetation with Fragrant Blooms and Eliminate other Odors

Comfortable Seating

Due to fatigue a patient may have to sit for long periods of time, uncomfortable chairs don’t allow for users to feel safe or secure in a setting.

Seats with Cushions, Reclining Seating, Chaise Lounges, Swing Seating

Control Views

Giving patients privacy at all stages of treatment is critical because they are most vulnerable while undergoing treatment.

Use hedges and other vegetation to direct views

Greenery

Providing greenery allows for a patient to escape from the sterile white hospital environment and find peace with nature.

Native Plantings

Place to be Alone

Patients need a place to meditate or deal with their frightening, possibly terminal prognosis.

Use hedges as a fence and trees to protect from overhead views, Use arbors and gazebos

Places to Rest

Fatigue is a major symptom of treatment, therefore providing many spaces to stop and rest will allow patients to enjoy the garden at their own pace.

Seats with Cushions, Reclining Seating, Chaise Lounges, Swing Seating. Every 25 Feet

Places to Walk

Research shows that physical exercise can help improve physical function and decrease fatigue, nausea, and depression.

Curvilinear Path, Walking Loop

Privacy

Cancer patients may need a place to cry or deal with their situation. Many patients are also conscious about their appearance during treatment.

Use hedges as a fence and trees to protect from overhead views, Use arbors and gazebos

Quiet

Giving a patient or loved one a quiet environment will allow them to be at one with nature and help let them meditate or think.

Water Feature, Running Stream

Shade

Critical for those who are taking chemotherapy drugs that require them to stay out of the sunlight. Shade will allow these patients to use the garden.

Trees, Arbors, Pergolas, Gazebos

Soothing Sounds

Soothing sounds provide a stronger connection to nature and allow one to feel a sense of escape from the hospital environment.

Water Feature, Wind Chimes, Running Stream
### Typical Decibel Reduction Levels

<table>
<thead>
<tr>
<th>Decibel level at noise source (dB)</th>
<th>Distance from noise receiver to noise source (feet)</th>
<th>Decibel level at noise receiver (dB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>105</td>
<td>5</td>
<td>102</td>
</tr>
<tr>
<td>105</td>
<td>10</td>
<td>96</td>
</tr>
<tr>
<td>105</td>
<td>20</td>
<td>90</td>
</tr>
<tr>
<td>105</td>
<td>40</td>
<td>84</td>
</tr>
</tbody>
</table>

### Typical Decibel Levels

<table>
<thead>
<tr>
<th>Decibels</th>
<th>Example Sources</th>
<th>Health effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Silence</td>
<td>None</td>
</tr>
<tr>
<td>10</td>
<td>Breathing</td>
<td>None</td>
</tr>
<tr>
<td>20</td>
<td>Whispering</td>
<td>None</td>
</tr>
<tr>
<td>30</td>
<td>Quiet rural background noise</td>
<td>None</td>
</tr>
<tr>
<td>40</td>
<td>Library noises, quiet urban background noise</td>
<td>None</td>
</tr>
<tr>
<td>50</td>
<td>Relaxed conversation, ordinary suburban activity</td>
<td>None</td>
</tr>
<tr>
<td>60</td>
<td>Busy office or restaurant noise, loud conversation</td>
<td>None</td>
</tr>
<tr>
<td>70</td>
<td>TV volume, Freeway traffic at 50 feet (15.2 meters)</td>
<td>None; unpleasant for some</td>
</tr>
<tr>
<td>80</td>
<td>Factory noise, food processor, car wash at 20 feet (6.1 meters)</td>
<td>Possible hearing damage after lengthy exposure</td>
</tr>
<tr>
<td>90</td>
<td>Lawn mower, motorcycle at 25 feet (7.62 meters)</td>
<td>Likely hearing damage after lengthy exposure</td>
</tr>
<tr>
<td>100</td>
<td>Outboard motor, jackhammer</td>
<td>Serious damage likely after lengthy exposure</td>
</tr>
<tr>
<td>110</td>
<td>Loud rock concert, steel mill</td>
<td>May be immediately painful; damage after lengthy exposure very likely</td>
</tr>
<tr>
<td>120</td>
<td>Chainsaw, thunderclap</td>
<td>Usually immediately painful</td>
</tr>
</tbody>
</table>
## Cost Estimation

### Family & Friends Healing Garden

<table>
<thead>
<tr>
<th></th>
<th>Sq Ft</th>
<th>Units</th>
<th>Cost</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ornamental Grasses</strong></td>
<td>1274.397</td>
<td>286</td>
<td>$20</td>
<td>$5,720</td>
</tr>
<tr>
<td><strong>Lawn</strong></td>
<td>2337.1389</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Artifical</td>
<td>1274.397</td>
<td></td>
<td>$12.50</td>
<td>$29,225</td>
</tr>
<tr>
<td>Natural</td>
<td>2337.1389</td>
<td></td>
<td>$0.37</td>
<td>$865</td>
</tr>
<tr>
<td><strong>Topography</strong></td>
<td>2081.2011</td>
<td>2 ft tall</td>
<td>$15</td>
<td>2,325</td>
</tr>
<tr>
<td>155 cubic yards</td>
<td>2081.2011</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Rock Water Feature</strong></td>
<td>1064.9285</td>
<td>-</td>
<td>-</td>
<td>$10,000</td>
</tr>
<tr>
<td>Low</td>
<td>-</td>
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**Add 10%**

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## Cost Estimation

### Hospital Staff Healing Garden

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**Low End** $348,332.60

**High End** $1,509,295.66

Add 10%=

**Low End** $383,165

**High End** $1,660,225.00
## Cost Estimation

### Cancer Patient Healing Garden

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**Low End** $3,631,094.81  
**High End** $5,421,019.42

Add 10% = 
Low End $3,994,205  
High End $5,963,122
## Cost Estimation Summary

**Reid Memorial Hospital Healing Gardens**

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<td>Family and Friends</td>
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<tr>
<td>Cancer Patient</td>
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**Total Range**

|                | $4,409,025 | $7,710,530.00 |
The costs and benefits of RN turnover

Recent studies of the costs of nurse turnover have reported results ranging from about $2,000 to over $64,000 (U.S.) per nurse turnover (Advisory Board, 1999; Jones, 2005; Brien-Pallas et al., 2006; Stone et al., 2003; Waldman et al., 2004). The reasons for this variability can be attributed to a variety of factors, but principally emanate from conceptual differences, such as defining nurse turnover cost categories, as well as methodological differences, such as study designs and samples. Two of the studies cited above that ported the highest costs (Advisory Board; Jones) defined and measured more extensive turnover-related productivity losses (e.g., pre-turnover productivity of the departing nurse), while the other studies acknowledged but did not capture these productivity losses at the same level of detail. Turnover costs, in general, have been estimated to range between 0.75 to 2.0 times the salary of the departing individual (McConnell, 1999), while nurse turnover costs have been estimated at 1.3 times the salary of a departing nurse. However, these estimates may vary depending upon the human capital, e.g., the location, experience, and tenure of the nurse who leaves; the era during which the nurse parts, e.g., at the beginning versus the height of a nurse shortage; and other organizational and environmental factors, such as the local labor market and whether the organization is in a rural or urban location.

Table 3. Nurse Retention Benefits

- Reduction in advertisement and recruitment costs
- Fewer vacancies and reduction in vacancy costs
- Fewer new hires and reduction in hiring costs
- Fewer orientees and reduced orientation and training costs
- Maintained or increased productivity
- Fewer terminations and reduction in termination costs
- Decreased patient errors and increased quality of care
- Improved work environment and culture, increased satisfaction, increased trust and accountability
- Preserve organizational knowledge
- Easier nurse recruitment

Table 4. Nurse Retention Costs

- Specific program costs (e.g., nurse residency or mentoring program)
- Benefit improvements and salary increases
- Rewards and recognition events
- Ongoing education, learning and career advancement opportunities
- Tuition reimbursement
- Dedication of organizational leaders and staff focusing on nurse retention and building/maintaining relationships
- Bonus programs, stock options, and/or cash awards
- Mechanisms for communication and voicing concerns (e.g., providing anonymous suggestions, ongoing surveys, 360 degree feedback)
- Promotion and career advancement opportunities
- Creative staffing and scheduling options
- Adequate nurse staffing

Adapted From The U.S. Bureau of Labor Statistics

Adapted From The Online Journal of Issues in Nursing
Cost Benefit Analysis

\[ 500,000 (1+0.2x) + 20,000t = 50,000(0.6)(400)(0.3+0.002x)t \]
\[ 500,000 + 100,000x + 20,000t = 360,000t + 24000xt \]
\[ 500,000 + 100,000x = 340,000t + 24,000xt \]

\[ t = \frac{500,000 + 100,000x}{340,000 + 24,000x} \]

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<th>x</th>
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<tr>
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<tr>
<td>10</td>
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</tr>
<tr>
<td>15</td>
<td>2.9</td>
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Where \( t \) = time it will take for the garden to pay for itself in years

\( x = \) additional $100,000 spent

\( 400 = \) Total number of nurses employed

\( 0.6 = 60\% = \) Assumed percent of effect Healing Gardens will have on reducing stress

\( 0.3 = 30\% = \) Target goal for nurses retained

\( 500,000 = $500,000 = \) base cost for the garden

Equation Credit: Nate Hunt
Designed by Carol R Johnson Associates and Zimmer Gunsul Frasca, the Thea and James Stoneman Healing Garden at the Dana-Farber Cancer Institute, Yawkey Center for Cancer Care in Boston, Massachusetts brings an indoor garden to an urban setting. Opened in 2011, this 1,790 square foot garden is a small space nestled in a cancer center.

Inspiration for the indoor Cancer Patient garden was drawn from this garden. This garden has many pros, including that it is open year round, plants can be in bloom year round, it can be located in any climate, and it offers patients year round greenery and interaction in nature.
Designed by Studio Ivo Tavares, this umbrella instillation at the art festival in the Aveiro district of Portugal, the Umbrella Sky Project brings vibrant color to an otherwise dull space. For the past three years, this instillation has added color every July to the AgitAgueda festival.

Inspiration for the umbrella instillation in the Family and Friends garden was derived from this project. The added vibrant color will be a welcome sight to the otherwise dull and sterile hospital environment.
References


Jencks, Maggie K. "Maggie’s Centers: A Blueprint for Cancer Care." Great Architects and Designers Meet the Challenges of Cancer Care. Carnegie Museum of Art


Schaller, Bill. "New Facility Designed to Be a Model Cancer Center." Dana-Farber Cancer Institute Dedicates Yawkey Center for Cancer Care - Dana-Farber Cancer Institute Boston, MA.


Wells-Di Gregorio, Sharla, PhD. "Stress Management." The Ohio State Wexner Medical Center.
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