WOMEN AND CHILDREN’S HEALTH HUB

SITE LOCATION: PROSPER, TEXAS
Dedicated to:
I thank God for always being with me in every situation. Finally to my family, my gratitude and affection can not be expressed through writing for all that you have done to raise me to be the person I am today. I thank my mother, and I dedicate this book to you, and to all the mothers who are here with us, and to those who are no longer here. May we live lives that always make you proud of the people we are, and are going to be.

Committee:
I wish to express my gratitude for all of the Texas A&M faculty and to the design professionals who offered their design knowledge and feedback for the creation of this final study. My committee members, who contributed to this project in that they constantly pushed my design for its improvement. I would also like to offer gratitude to my classmates who have been very supportive throughout this process and in our time at design school.

ACKNOWLEDGEMENTS
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Women’s Health
Maternal Mortality

From the Global to The US perspective

There is the issue of maternal mortality, many women face complications during their labor. In some cases these difficulties become so severe that they lose their lives, after they give birth to their infants. In 2017 there were “approximately 808 women that died from preventable causes related to pregnancy and childbirth” daily around the globe (World Health Organization). The health of women and their infants is directly correlated, this may be seen with the birth outcomes. According to Unicef “More than 80 per cent of all newborn deaths are caused by preventable and treatable conditions, including complications due to prematurity or during delivery, and infections like sepsis, meningitis and pneumonia”. If these issues are preventable then we must provide buildings that offer these health services and education, so they may be a mediator for these health complications.

Global
75% Of all maternal Deaths
Caused by:
Severe bleeding (mostly bleeding after childbirth)
Infections (usually after childbirth)
High blood pressure during pregnancy (pre-eclampsia and eclampsia)
Complications from delivery
Unsafe abortion

U.S.
Maternity death rate has doubled in the past 25 years

(2017) Globally
Every day about 808 women died due to complications of pregnancy and child birth

(2018) U.S.
Every day Over 700 women die from complications related to pregnancy

There is a unique relationship between nature, health, and architecture. I believe that architecture if designed to do so may aid to elevate people’s physical and mental health. Similarly, nature has been proven to reduce an individual’s stress, restore attention, and allow the body to heal at an increased rate than in its absence. Architecture if designed intentionally may foster this relationship that people have with nature (Wilson,1984, Biophilia) Thus, becoming an aspect that may aid in the healing process. Architecture that is designed to heal.

After research, investigation, and case studies architectural and landscape design strategies were chosen for this project. The design strategies were derived from biophilic design, the elements are the spirit of place, the direct use of nature, and evoking nature. These design strategies were utilized for this project, the direct use of nature was by the use of the landscape/therapy gardens. As well as evoking nature through the building’s facade floral pattern. The spirit of the place was done by utilizing the front porch pattern, wayfinding inspired the local geography and flora, and by establishing connections between the site and the building through the facade material chosen for the building.
In health facilities stress may be particularly compromising because of the health conditions of the patients, and the delicate work that must be done by the staff in their daily tasks. Patients who have their physical body compromised are going to be more susceptible to emotional stressors. Nature may be used as a mediating tool to allow people to receive positive distractions, and physical activity that provide opportunities where they may relieve stress. There have been multiple studies that display that viewing and interacting with nature does reduce biological markers of stress, such as reduced blood pressure and lowered heart rate. In design this is manifested as Biophilic design.

**What is Biophilia?**

"Biophilia is the inherent inclination to affiliate with natural systems and processes, especially life and life-like features of the non-human environment." (Kellert, p. 3).

"We regard biophilia (which literally means love of life) as key to creating places imbued with positive emotional experiences...that are the precursors of human attachment to and caring for place." (Heerwagen and Gregory, p.227).

**Biophilic Design Principles**

- Visual Connection with Nature
- Non Visual Connection with Nature
- Aesthetics, Presence & Patterns
- Pattern Language
- Material Connection with Nature
- Emotions & Aesthetic
- Emotions of Place
- Dynamics & Difuse Light
- Connection with Natural Systems

**Design**

Biophilic design
The spirit of place.
The direct use of nature,
Evolving nature

**Architecture & Site context**
Home; defines roof
Establishing a homelike setting

**Pattern language**
Idea of home: Front porch,
How the front porch may
be used on a vertical scale.
Roof as shelter
(Alexander, Silverstein, Ishikawas).

Design Sketch A

WHERE RESEARCH AND DESIGN MEET

"evidence-based healthcare designers make critical decisions, together with informed clients, on the basis of the best available information from credible research and the evaluation of completed projects "

(2008, K.Hamilton)

Research has shown that sterile, and cold facilities may be made more habitable by having them become a setting that is more familiar to people, such as a homelike setting. Thus the investigation continues with what a homelike setting look like in this area of North Texas? In the southern United States the front porch has been utilized as a central location for social gatherings. This transition space from indoors to outdoors becomes an extension of the home. It is important as it is a place to see the activity that is occurring outside of the home, to be seen by others, but also may be a place where one may go to for solitude. The idea of home and the front porch typology was central to developing the architectural spaces.
Process
This project began with first gaining an in-depth knowledge of the site and climate, the population being served, the program, and biophilic design strategies. Then taking that information and making it applicable to the site and scope of the project.

Findings
The findings were based on needs that the population being served had, and reviewing established practices of how to meet those needs through the design. This was done as a process that ever changed the design. In the floor plans for example there is a balance of meeting the logistical and functional needs to offer the health services, but only finding what could be done to meet the psychological health of the families, patients, and staff.

WAY FINDING + BIOPHILIC DESIGN

Images of nature from Texas’s Native Landscape were chosen to become wayfinding elements for the users.

The bluebonnet was adopted as the official state flower by the Texas Legislature in 1901.

"AN ENTRANCE TRANSITION IS THE AREA BETWEEN THE STREET AND THE FRONT DOOR OF A BUILDING. WHEN IT IS MADE WELL, IT MAKES A TRANSITION FROM PUBLIC TO PRIVATE, AND THE OUTDOOR SPACE ALLOWS YOU TO BE COMFORTABLE..."

Pattern Language
The site is located in North Texas in the small yet growing town of Prosper, Texas. This town resides between the counties of Denton and McKinney. The site is unique in that it is a part of existing Cook Children Medical facilities. The facilities include an Urgent Care center, and a primary care facility. The addition of the new building will be the hospital for women and children.

**Location**
- North of Dallas, Prosper is located 32 miles from the Dallas/Fort Worth International Airport, 35 miles from Downtown Dallas, 14 miles from the Collin County Regional Airport and 55 miles from Fort Worth.

**Why Prosper, Tx?**
A review of the statistical data for maternal mortality in the US shows a variation across the different states. One of the reasons for such disparities between states is the absence of health services for women in these areas in the areas of higher mortality. The March of Dimes states these areas are counties “in which access to maternity health care services is limited or absent, either through lack of services or barriers to a woman’s ability to access that care”. These areas are present all over the United States, but more so in rural areas in comparison to their urban counterparts.

**Women and Children**
In life our mother is our first home, it is where we develop and grow, thus one’s health and life is dependent upon our mother’s initial health status. Many negative health outcomes for women and their infants may be avoided if women are given maternal health resources. According to the March of Dimes one in every 10 infants in the US is born prematurely (2019). By placing health services closer to where communities are may aid in keeping communities healthy, by offering preventive care measures, and treatment that is easily accessible in rural areas. As a stakeholder, architecture may become a platform to influence the health status for not only women, but their entire families as well.

**Information**
- As of January 1, 2019, the population was estimated at 25,630.
- The Land Area is 27 square miles.
- Located 25 minutes from 2 major airports.
- This area is defined as the blackland prairie, for the soil is made of dark black to light grey clay.
The site is located adjacent to a main highway as is the current primary means of transportation. Thus, it was necessary to view other means of transportation such as bike routes and public transportation for the health of the environment and the growing metropolitan areas of North Texas. The site does not have an established public transportation system, so for the site planning and development there will be a bus route implemented. The design of the site plan also placed two bus stops for the public to utilize.

Demographics

Total Population
25,630

Under 5 years old
8.1%

Under 35 Population
51%

Under 18 Population
35.6%

Under 5 years old
8.1%
The Contributions of Nature to Health and the Environment

What are the Benefits of Nature for people and their environments?

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Vegetation such as trees have many positive benefits to the environment; they include: improving the microclimate for an area, filtering air pollution and debris, provide oxygen, reducing storm water runoff ensuring the reduction of pollution into water systems, provide a habitat for many wine ensuring the aid of maintaining the equilibrium of food webs. Trees may also reduce the effects of flooding.

**Health Benefits**

- Roger Ulrich’s Research from (1984) and continued studies have found views to nature
- Reduce hospital stays from 2.6 to 3.67 days, particularly with patients suffering from bipolar disorder or depression
- Increased daylight in patient’s room can reduce depression and pain
- Reduce the need for sedation
- Increase patient and family satisfaction
- Reduce stress
- Improve clinical outcomes
- May help to counteract a buildup of psychological stress, thus reducing the impact of stress on physical and mental health.

**Economic Benefits**

- Integrating views to nature into an office space can save over $2,000 per employee per year in office costs, whereas over $93 million could be saved annually in healthcare costs as a result of providing patients with views to nature.

**Workplace Benefits**

- Findings suggest that the quantifiable benefits of the biophilic workplace go beyond measurable physiological outcomes.
- Greenery and daylight may play a major role in the occupant’s health as cognitive function, and both could be assessed through the measurement of subjective and objective parameters.

**Citations**

*Respect to show consideration for site’s existing resources and utilize them in a manner that does not compromise those resources for future generations.

Establishing a Homelike setting:
The Architecture of home

Based upon investigations from previous healthcare projects, it is crucial to balance the functional requirements needed to allow for spaces to work efficiently, have less medical errors, and control infection.

There is also the necessity for these spaces to be habitable, to make the spaces less stressful so patients may heal and staff may work more efficiently.

Utilizing ideas and concepts from design for aging, as well as recalling design practices that stated how spaces may feel “homelike”. These include a sense of ownership, ability to personalize the space, ability to have friends/family near, especially regards to meal times, a sense of privacy, and a sense of control.
The Patient Room and Greenery

Providing Access to Nature in Verticality

In the design there is an emphasis on the continuum of care for the woman and their infants. Women need health services for all stages of having children. They need antenatal care, care during their pregnancy, skilled care during childbirth, and support after they give birth to recover safely. In the design there are spaces for education, physical fitness, and counseling. Women may come and attend classes about childbirth, prenatal health, nutrition, physical fitness, and meet health professionals.

LABOR, DELIVERY, AND POSTPARTUM (LDRP)

The Patient Room and Greenery

LABOR, DELIVERY, AND POSTPARTUM (LDRP)

Collaboration, Communication, and Care

The team-based care model for staff and the benefits of this model were received and implemented into the establishments of the floor plans. This model is becoming more prevalent in pediatric and obstetrics care for many specialists who work more closely together to coordinate and access for the health of the patient.
The wall section on the following page displays the foundation in relationship to the dark clay soil found in this region of Texas. This needed to be adjusted to allow for the continuity between the basement and the upper levels.

The balconies required additional design to support the additional loads of the planters. The lateral bracing, for the balconies may be seen in drawing 06. The water drainage for vegetation was addressed by the variation in the floors structural beams, the beam may be displayed in the building section. This as well as the raised floor decking allowed for the transition space to the exterior.
The building is classified as construction type IIB, and an occupancy of I-2, by the 2018 IBC. The structure is class A structural steel, with columns, beams, and girders. The floor is light gauge steel joists with 2" metal decking with a 6" sitecast concrete slab. The floor to floor height is 14', there are 4 levels.

The design of the labor and delivery units were reviewed to meet the spatial and programmatic requirements of the codes set in place by Texas. The purpose of this was to provide spaces with higher levels of obstetrics care that would be able to accommodate for a wide range of situations, given its context in a rural area. In order to provide the community hospital with a high level of care that is in close proximity to growing populations.

The spaces are designed to accommodate for various inpatient flows, for the floor plans have future patient rooms if there is an increase in the patients that the hospital is having.

In order to meet all the needs for various situations, there are bereavement rooms placed in the LDRP zone to give mothers privacy and respect. There are also areas for families to gather outside the patient rooms, where they may meet together to provide the patient with social support.

Nature

Due to infection control purposes many facilities may not wish to have landscape designs that have water features. Thus the water features in this project were placed at a greater distance in terms of the building location on the site. In a similar manner there is the concern of pathogens growing from the soil in vegetation that is placed in the interior of buildings, for patient safety. The design of the balconies mediated this by allowing patients to have unhindered access to vegetation that was still outside the building, but in close proximity to their rooms.
The Facade

The Biophilic design strategy that was implemented for the facade was evoking nature.

The facade consists of ashlar masonry with horizontal and vertical copper panels, on the Northern facade there is a rhythm that is established between the copper panels and the glazing.

Copper was chosen for the facade because of its longevity as a building material in comparison to other materials. Similar to nature, its appearance alters with the changes of the seasons and time. The drawing to the left (COPPER-WEATHERING OVER TIME) displays the appearances as it would weather with the passing of time.

In order to reinforce the unique sense of place, that is Texas’s culture and history, the bluebonnets was chosen as the pattern for the facade. This species grows naturally only in Texas, thus it represents the Texas as the official state flower. The pattern for the facade varies in scale and design, this depends if it is used vertically or horizontally. The vertical pattern has 3 variations of designs, the scale is enlarged, meant to be viewed upon arrival for the building’s users. The scale for the horizontal pattern is smaller, the copper panels wrap the individual balconies of the patients. This was done to remind the viewer that each balcony is designed with vegetation for the users. The landscape was designed to meet them where they are.

COPPER FACADE

PANELS

PATTERN: BLUEBONNET (TEXAS STATE FLOWER)

WOMEN AND CHILDREN’S HEALTH HUB

DESIGNING ARCHITECTURE THAT AIDS IN THE HEALING PROCESS IS POSSIBLE IF DESIGNERS COMMUNICATE AND LISTEN TO UNDERSTAND THE NEEDS OF THE USERS OF SPACE

VIEW - MAIN ENTRANCES

SITE

This is the vehicular drop of area for the Women’s Entrance.