ABSTRACT

Title of Thesis:	FIGHTING MATERNAL MORTALITY: INVESTIGATING THE INFLUENCE OF ARCHITECTURE ON WOMENS HEALTH AND WELLNESS
	Amanda Nicole Sparks, Master of Architecture, 2023
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Every year 700 women die of pregnancy related complications in the United States and it is estimated that half of these deaths are preventable. The maternal mortality rate (MMR), in the US is steadily rising. Making Newark, NJ (home of Rutgers University and Hospital) an ideal site for investigation.

This thesis seeks to explore how the use of community based and empathetic design, providing equitable access to nature, and life cycle planning strategies could improve care and redefine how we think about women's health care in the United States. To understand the complex topic of Maternal Mortality exploration into medical history, healthcare practices, the statistics surrounding Maternal Mortality Rate, and Postpartum Depression are necessary. While architecture alone cannot fix the problem of maternal mortality in the United States, reimagining the spaces in

which care is provided to mothers can provide a framework for changing our cultural beliefs and attitudes toward women's health and wellness.

FIGHTING MATERNAL MORTALITY: INVESTIGATING THE INFLUENCE OF ARCHITECTURE ON WOMENS HEALTH AND WELLNESS

by

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Thesis submitted to the Faculty of the Graduate School of the
University of Maryland, College Park, in partial fulfillment
of the requirements for the degree of
Masters in Architecture
2023

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Women and Medical History

Ancient Times

From ancient times women have played an important role in medicine and especially with the process of childbirth. The extent to which women were formally involved with the process of healing, however, varied greatly depending on culture and historic era. [1]

In ancient Egypt one of the key Egyptian goddesses, Isis, was associated with healing. As a result, during the Dynastic period of Egyptian history (3100-2686 BC) the priestesses of Isis were also formal healers.[2] As Egyptian culture changed, however, medicine became less associated with religion and women lost their formal roles as healers. Additionally, with the rise of embalming (a field that was exclusive to men) knowledge of anatomy expanded, although that knowledge was limited to men only.[3] Thus, further excluding women from formal knowledge and involvement in the medical field.

In ancient Greece schools of medicine and healing were also limited to men, although evidence suggests that women were not excluded from practicing healing and midwifery.[4] In Greek society women typically had fewer rights then men, this

[1] Bourdillon, Hilary. 1988. Women As Healers : A History of Women and Medicine. Women in History. Cambridge England: Cambridge University Press.
[2] Bourdillon, Hilary
[3] Bourdillon, Hilary
[4] Bourdillon, Hilary

prevented them from attending formal Greek schooling. Evidence shows, on the other hand, that women did partake in healing and midwifery and were respected for those skills.[5] Although likely a women's education in healing was orally passed down from one woman to another. The nature of women healers was similar in Roman times where we know that there were midwifes and some female healers, but that women were not considered to be physicians (a male role). [6]

Into the 14th century women typically managed the healing of ailments within the home as well as practicing midwifery. With some midwives from the middle ages, like Margery Cobbe, being famous for their skills among royalty.[7] During this period some women even wrote guides to help in the teaching of midwifery. One woman, Trotula of Salerno Italy wrote a book title the Diseases of Women, which survives to this day.[8] In fact, during the middle ages Salerno Italy was site of a famous medical school which did admit both men and women, although there were fewer women than men studying.[9] The women which had access to this kind of education were noble women of a high societal and economic class. This freedom of women to study and even be licensed to practice medicine in the middle ages did not extend to northern Europe, France or England where women were not permitted into Universities.[10] Although this does not mean that no women practiced medicine or healing in northern Europe, England or France. Monastic and parliamentary records from the time period show the employment of "wise women" and women healers.

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[5] Bourdillon, Hilary
[6] Bourdillon, Hilary
[7] Bourdillon, Hilary
[8] Bourdillon, Hilary
[9] Bourdillon, Hilary
[10] Bourdillon, Hilary

From the 14th century and onward the idea of women as doctors, surgeons, medical professionals, or licensed healers became increasingly unpopular and even criminalized. Women continued to heal their families and act as midwives but were generally not permitted to practice healing formally or professionally.[11] Eventually the fear of witches took over Europe and England and this put women and women healers in danger of accusation. The vast majority of people accused and tried of witchcraft were women. Healers were particularly vulnerable to accusation because as unlicensed healers it was believed that they could only have gotten their healing powers and knowledge from the devil himself. [12]

Figure 1, Marble plaque showing parturition scene, Ostia, Italy, 400 B (Source: Science Museum, London)

[11] Bourdillon, Hilary
[12] Bourdillon, Hilary

Despite the significant passage of time the gradual exclusion of women from the formal medical profession in the past echoes in the present. Medical bias against women is still struggled with today and women still are underrepresented in the medical field. Ultimately, the wrongs of the past formed a strong bedrock for discrimination and mistreatment of women in the present day. Following chapters will explore medical bias as well as more recent examples of modern day injustices against mothers that have contributed to a feeling of distrust that is driving many women to seek alternative health care and support.

Medical Bias

Overview of Bias

Bias effects how we interpret information. Our subjective perception of information, how we seek information out, or what information we ignore all constitutes bias. There are many ways that bias can be manifested and when subjective interpretation of information occurs it is hard to rule out bias as a factor in the conclusions drawn from information. In fact, searching for specific information in and of itself is a form of bias.[13] However, biased information is not inherently incorrect and what is most important is to understand what bias is affecting the information, rather than ignoring the information all together. It is important to note that bias can be, and is often, completely subconscious.

In the medical profession the foundation of medical study and information has been focused on the male body. The focus on the male body and comparative

[13] Kaptchuk, Ted J. "Effect Of Interpretive Bias On Research Evidence." BMJ: British Medical Journal 326, no. 7404 (2003): 1453-455. http://www.jstor.org/stable/25454853.

disregard for the study of the female body reflects the commonly held belief that women's bodies are essentially the same as men's bodies but disrupted by hormones and female sex organs. The belief being that the female body is the same as the male body, just with different sex organs. Therefore, it is unnecessary to study the female body because understanding the male body will provide sufficient information. On the other hand, it is also believed that the differences in women's bodies make them less suitable to medical study (i.e. drug trials). That because women have different hormones and sex organs, they would disrupt proper study of illnesses, procedures, or medication. Both assuming equality or assuming differences when that is not always the case is a form of bias that colors the medical profession and effects diagnoses, treatment, and health outcomes for both men and women.[14]

Bias Against Women

Bias against women in the medical profession appears in many different forms. From bias inherent in how the medical profession has historically studied and practiced medicine to the extent to which women are represented in the body of health care providers. For example, in medical textbooks there tends to be an inclination to prefer to study the male body rather than the female body, the exception being when the focus of the images is the female sexual organs. This bias against women in the foundational element of medical education and could be indicative of, and perpetuate, a larger problem.[15]

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[14] Ruiz, M. Teresa, and Lois M. Verbrugge. "A Two Way View of Gender Bias in Medicine." Journal of Epidemiology and Community Health (1979-) 51, no. 2 (1997): 106-09. http://www.jstor.org/stable/25568422.

[15] "Sex and Gender Bias in Medical Textbooks." Reproductive Health Matters 3, no. 5 (1995): 144-45. http://www.jstor.org/stable/3775451.

As far as bias among medical professionals, women and especially women of color represent only a small portion of medical community which still tends to be primarily white and male. Additionally, women that are as equally qualified as their male counterparts tend to receive fewer opportunities or honors in the field. These unfortunate facts support the presence of bias against women, and women in color in medicine and healthcare.[16]

Racial Bias

Medical bias is also rampant against people of color, who tend not to be believed and who are, shockingly, also still perceived to have distinct anatomical characteristics that separate them from white people. In explanation, some medical practitioners still believe that black people have thicker skin than their white counterparts. This misconception is not true and the fact that such information is believed by anyone in healthcare services is concerning. Additionally, people of color tend not to be believed by medical professionals, mistrust between doctors and patients prevents the open dialogue that is necessary to receive quality care. This breakdown ends up putting patients at risk and making it harder for them to receive care.[17]

Medical bias is a reality that effects who can enter the medical profession, what is studied, and what quality of care a person receives. These factors stack the

[16] BHATT, WASUDHA. "THE LITTLE BROWN WOMAN: Gender Discrimination in American Medicine." Gender and Society 27, no. 5 (2013): 659-80. http://www.jstor.org/stable/43669822.
[17] Hoffman, Kelly M., Sophie Trawalter, Jordan R. Axt, and M. Norman Oliver. "Racial Bias in Pain Assessment and Treatment Recommendations, and False Beliefs about Biological Differences between Blacks and Whites." Proceedings of the National Academy of Sciences of the United States of America 113, no. 16 (2016): 4296-301. https://www.jstor.org/stable/26469319.

cards against women being properly represented in the field as well as in medical study. This directly effects the quality of care any woman can receive. Particularly in the case of women of color where racial bias isolates women of color and creates obstacles to receiving quality care, the consequences of which can be fatal. Understanding the existence of the biases is crucial to being able to combat them through proper education of women and healthcare practitioners.

Health and Wellness

Differentiating Health from Wellness

It is important for the purpose of this thesis to make a distinction between health and wellness. Simply put, health deals with the physical body being free from illness or injury. Wellness on the other hand is a wholistic term to describe the state of complete physical, mental and social wellbeing. The term wellness does not just look inward on the state of the body, mind and emotional wellbeing, but simultaneously looks outward at a person's interactions with others and the world. This definition of wellness is supported by the World Health Organization and is the basis for how they define health and differentiate true health from simply being free of illness or injury.[18] Therefore, it is possible to be healthy but not "well". People can be free of illness or injury but suffering from depression or isolation.

[18] "Frequently Asked Questions." World Health Organization. World Health Organization. Accessed October 18, 2019. https://www.who.int/about/who-we-are/frequently-asked-questions.

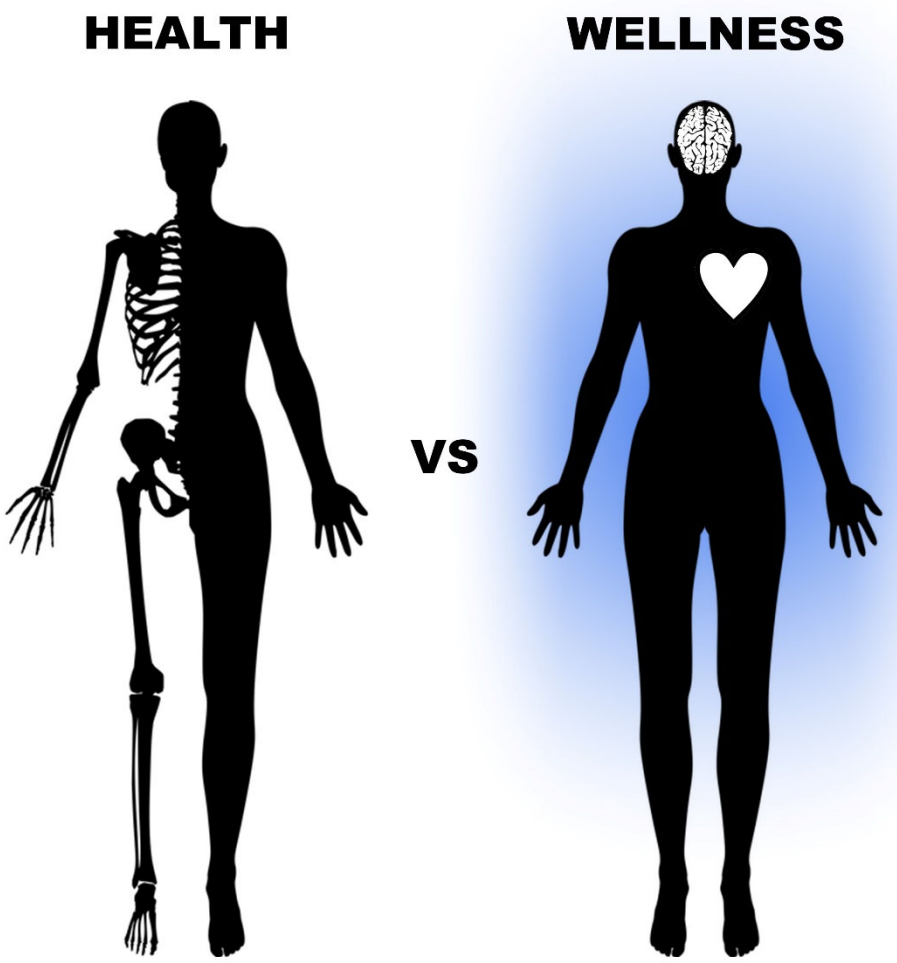

Figure 2, Health VS Wellness (Source: Author)

This thesis seeks to explore the concept of wellness as it applies to Maternal Mortality, therefore the issue is not to just provide a space in which a doctor or healthcare practitioner can safely perform their duties related to the health of women but that the environment, services, and programing of the building facilitate a women's journey to achieve wellness. Ultimately, striving for wellness is a goal that transcends race, and socio-economic status. This thesis prioritizes total wellness for all women in the face of rising maternal mortality.

Chapter 2: Maternal Mortality

What is Maternal Mortality

Trends in the United States

Since the Centers for Disease Control and Prevention (CDC) began collecting data on maternal mortality in 1986-1987 there has been a steady rise in maternal deaths from 7.2 deaths per 100,000 live births to 17.2 deaths per 100,000 live births in 2015.[19] The CDC reports that it cannot, or has not yet, determined why the Maternal Mortality rate has been steadily rising. Thanks to the Pregnancy Mortality Surveillance System which yearly collects information from all fifty states as well as the District of Columbia and New York City, it has been possible to track the deaths of all women who died during pregnancy or up to one year after pregnancy. The death certificates of these women as well as the connected birth certificates or fetal death certificates are then used to calculate the national average.[20]

[19] "Pregnancy Mortality Surveillance System | Maternal and Infant Health | CDC." Centers for Disease Control and Prevention. Centers for Disease Control and Prevention. Accessed October 18, 2019. https://www.cdc.gov/reproductivehealth/maternalinfanthealth/pregnancy-mortality-surveillance-system.htm.
[20] "Pregnancy Mortality Surveillance System | Maternal and Infant Health | CDC."

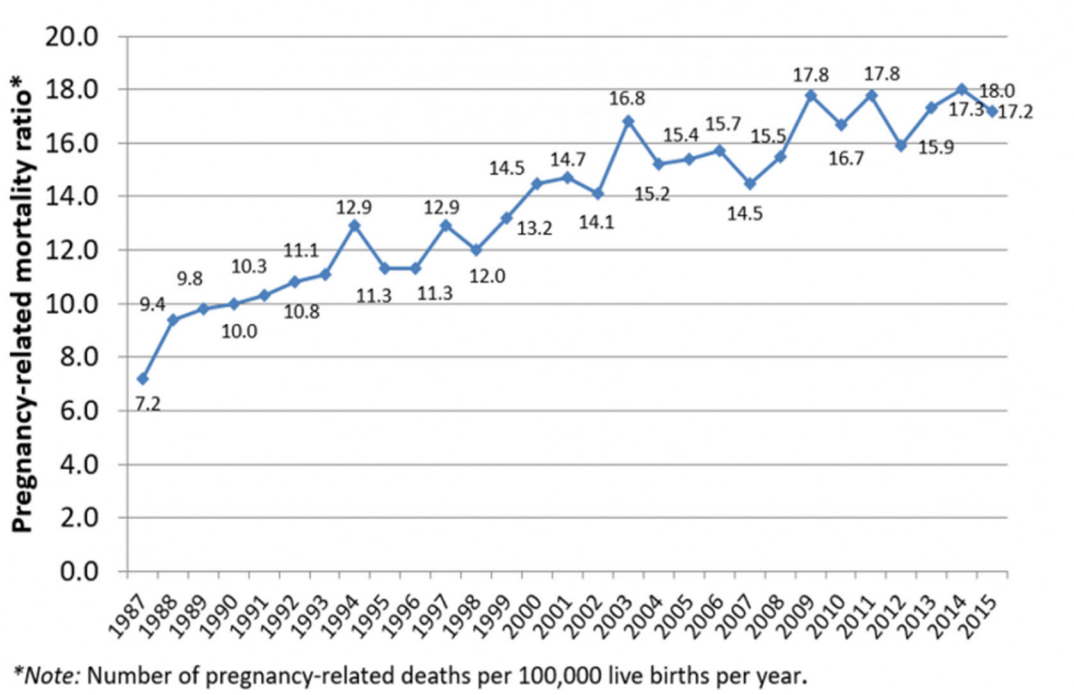

Figure 3, Trends in pregnancy-related mortality in the United States: 1987-2015 (Centers for Disease Control and Prevention)

In recent years, the most common causes of death for mothers and pregnant women are infection, hemorrhage, cardiomyopathy, thrombotic pulmonary embolism, cardiovascular accident, hypertensive disorder of pregnancy, and amniotic fluid embolism. It is important to note, however, that in nearly seven percent of maternal deaths the cause of death is unknown. Anesthesia complications make up only .3 percent of maternal deaths. Additionally, other undescribed cardiovascular and non-cardiovascular conditions that are not further specified by the CDC are the two leading causes of death. Women with preexisting conditions like hypertension,

diabetes or heart problems are even more likely to die than their otherwise healthy counterparts.[21]

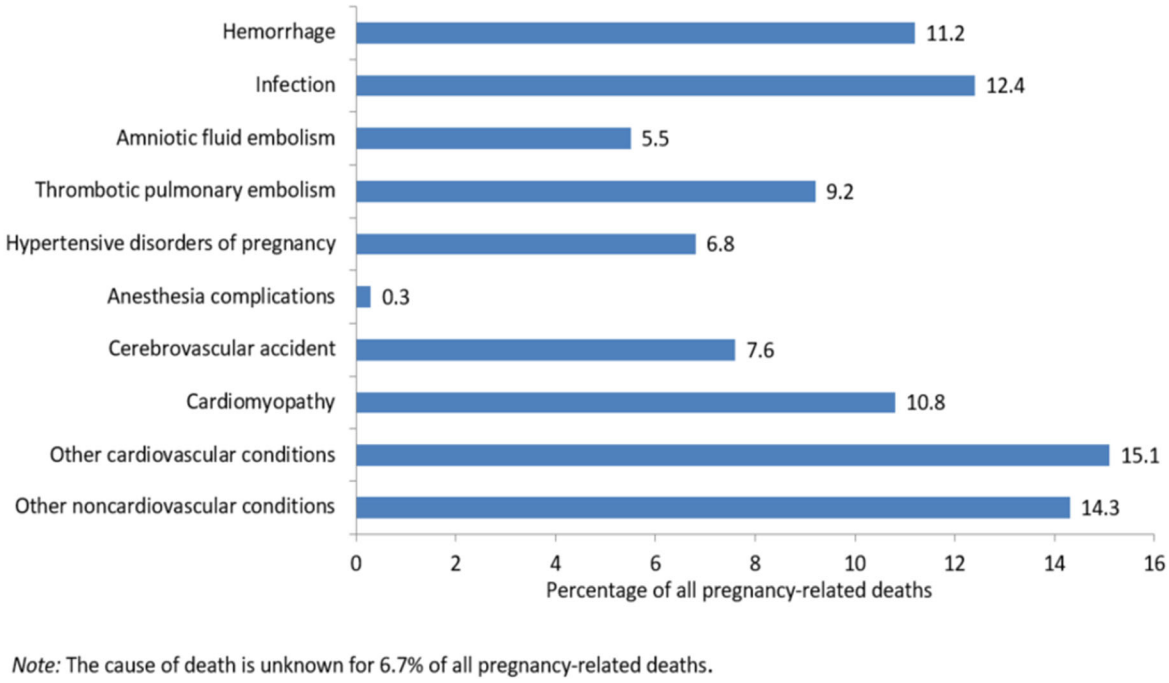

Figure 4, Causes of pregnancy-related death in the United States: 2011-2015 (Centers for Disease Control and Prevention)

It's also important to note that in the US a distinct racial disparity in maternal mortality exists with minorities typically dying at far greater rates then white women. For black women the maternal mortality rate is 42.8 deaths per 100,000 live births, followed by 32.5 deaths per 100,000 live births for Native American populations, and 14.2 deaths per 100,000 live births for Asian/Pacific Islander. White women have a rate of 13.0 deaths per 100,000 live births while Hispanic women have a rate of 11.4 deaths per 100,000 live births.[22] These statistics suggest that racial bias plays a role in the quality of care and health outcomes experienced by people of color.

[21] "Pregnancy Mortality Surveillance System | Maternal and Infant Health | CDC."
[22] "Pregnancy Mortality Surveillance System | Maternal and Infant Health | CDC."

Maternal mortality in the United States varies greatly from state to state. California has a maternal mortality rate of 4 per 100,000 live births, significantly lower than the national average. Following California, the states with the lowest maternal mortality are Massachusetts, Nevada, Connecticut and Colorado. On the other hand, Louisiana has the highest Maternal mortality with a rate of 58.1 deaths per 100,000 live births, shockingly higher than the national average. Following Louisiana, the states with the highest maternal mortality are Georgia, Indiana, Arkansas, and New Jersey. [23]

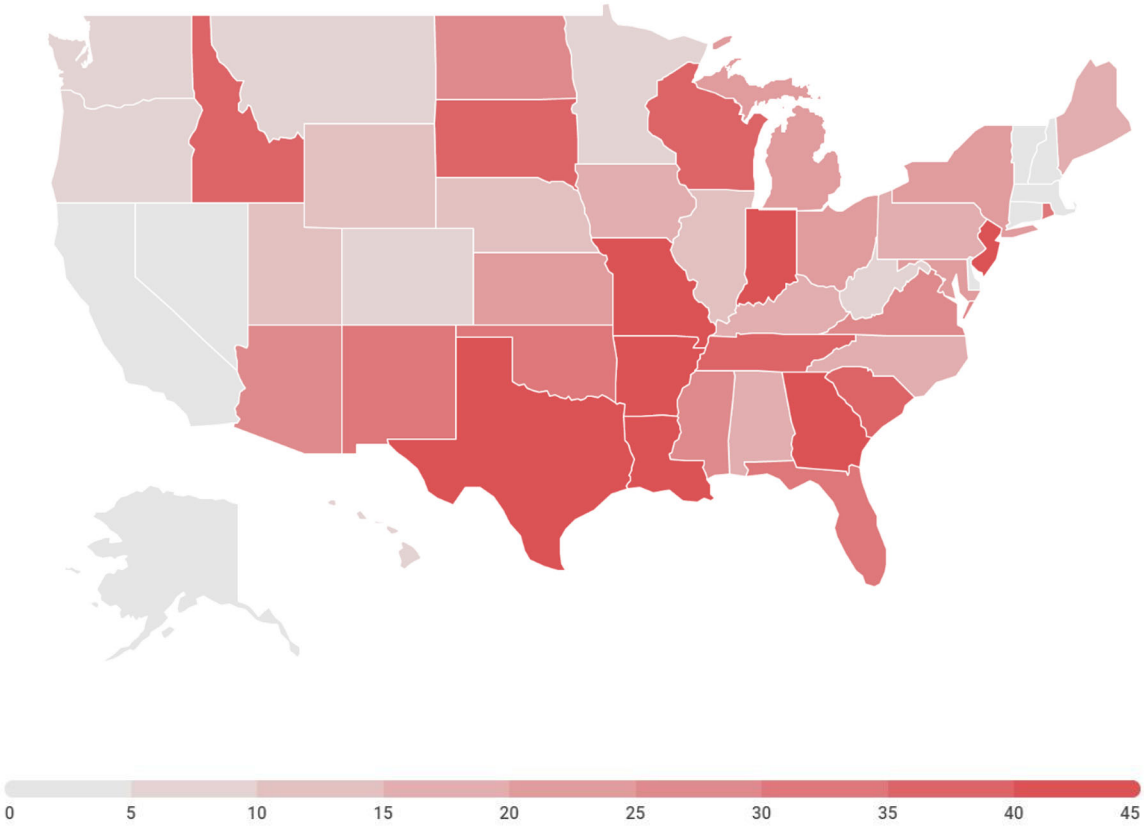

Figure 5, Maternal mortality rates by state (Source: Ungar/Simon, USA Today, 10/26)

[23] "The States with the Highest (and Lowest) Maternal Mortality, Mapped." Advisory Board Daily Briefing. Advisory Board, November 9, 2018. https://www.advisory.com/daily-briefing/2018/11/09/maternal-mortality.

World Trends

While on average maternal mortality across the globe has been gradually decreasing, the United States is the only developed country in the world that instead of a stable or decreasing maternal mortality rate, have been experiencing a steady increase in maternal mortality.[24]

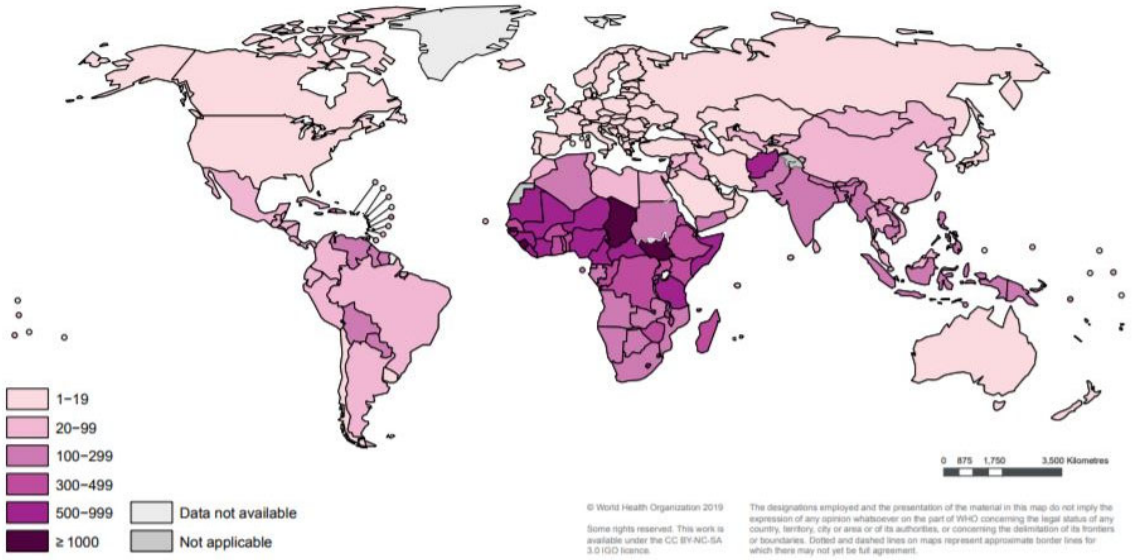

Figure 6, Maternal mortality ratio (MMR, maternal deaths per 100 000 live births), 2017 (World Health Organization 2019)

Globally in 2017 there were roughly 295,000 maternal deaths, a thirty five percent decrease compared to the roughly 451,000 maternal deaths that occurred in 2000.[25] This is an encouraging global trend, however, in the worlds least developed countries the maternal mortality rate averages at about 415 deaths per 100,000 live births. Comparatively, the average maternal mortality rate for Europe is 10 deaths per

[24] Delbanco, Suzanne, Maclaine Lehan, Thi Montalvo, and Jeffery Levin-Scherz. "The Rising U.S. Maternal Mortality Rate Demands Action from Employers." Harvard Business Review. Harvard Business Review, June 28, 2019. https://hbr.org/2019/06/the-rising-u-s-maternal-mortality-rate-demands-action-from-employers.
[25] WHO, UNICEF, UNFPA, World Bank Group, and United Nations Population Division. "PDF," 2019.

100,000 live births while places like Australia and New Zealand have maternal mortality rates of 7 deaths per 100,000 live births.[26] This places the average maternal mortality rate in the United States at about double the rate of comparable developed countries. The World Health Organization makes a point that outside of factors such as migration or displacement, climate change consequences, and humanitarian crisis the key factor to reducing Maternal mortality is in providing competent care to women before, during, and after childbirth. [27]

Reliability of Maternal Mortality Calculations

Calculation Methods

Maternal mortality is a ratio created by determining the number of maternal deaths per 100,000 live births. It's important to note that maternal deaths are counted as deaths that occur during pregnancy or up to one hundred days after delivery.[28] However, some places only count maternal deaths as occurring up to forty-two days after delivery.[29] Maternal deaths determined not to be due to pregnancy related causes can be excluded from data. It is important to note that the accuracy of the death certificates in determining and recording the cause of death is paramount to accurate data. Additionally, cases in which the mother is seriously injured or suffers permanent or long-lasting injuries related to their pregnancy or birth would not be accounted for.

[26] WHO, UNICEF, UNFPA, World Bank Group, and United Nations Population Division
[27] WHO, UNICEF, UNFPA, World Bank Group, and United Nations Population Division
[28] "Pregnancy Mortality Surveillance System | Maternal and Infant Health | CDC."
[29] Delbanco, Suzanne, Maclain Lehan, Thi Montalvo, and Jeffery Levin-Scherz

Moving Forward

While on the global scale the maternal mortality of the United States may be low, the maternal mortality rate of the US is rising, while across much of the globe it is steadily decreasing. Additionally, in comparison to other developed countries, the United states has an unusually high maternal mortality rate. Ultimately, there is no clear reason why the united states is experiencing this strange increase, unlike in other parts of the world there are no mass migrations and displacements of people, no severe climate change consequences that effect daily life, and no large scale humanitarian crisis that are problems in other countries with high maternal mortality rates. This suggests that there is a failing of care before, during, and/or after childbirth, or that some women in the united states, despite being in an otherwise advanced and prosperous country, are struggling to get the care they need. As such, this thesis seeks to investigate ways in which architecture can facilitate both better access to care and better quality of care, particularly for minorities who are disproportionately affected.

Chapter 3: Trends in Obstetrics

What is the Status Quo?

1920-2019 Women, Childbirth, and the Medical Profession

As outlined earlier, practices and attitudes surrounding childbirth have changed a great deal over time and depending on cultural values. In developed countries that tend to value and follow western medical standards and practices there have been new thoughts and concerns raised around how women are giving birth. There is a tension between mothers, western medicine, doulas, and midwifes. Therefore, in the context of understanding and rethinking the medical care of expectant mothers, and expanding the idea of mothers health to the mothers total wellbeing, it is important to understand how the points of views of these various care givers and the hopes and concerns of prospective mothers.

During the industrial revolution in the united states home births and midwives became associated with the old and dirty practices of the past. Technology, hospitals, and doctors became associated with the future, and became the accepted place for births.[30] Access to technology, however, does not necessarily equate to a better standard of care, and during this transitionary period untested medical interventions resulted in many complications and deaths.[31] From the 1920's to the 1960's the hospital birth utilized scopolamine. Scopolamine is memory eliminating drug that

[30] Panazzolo, Michelle, and Ritchlyn Mohammed. "Birthing Trends in American Society and Women's Choices." Race, Gender & Class 18, no. 3/4 (2011): 268-83. www.jstor.org/stable/43496848.
[31] "Birthing Trends in American Society and Women's Choices."

takes away a person's awareness and self-control. The use of scopolamine in births put women into a "twilight sleep" where women fully experienced the pain of childbirth while being robbed of their autonomy.[32] During a scopolamine birth women were strapped into "twilight sleep cribs" delivery beds complete with padding and restraints in order to limit the damage that a women could do to themselves through violent thrashing, a side effect of the drug induced haze the women were experiencing.[33] Eventually, the danger and harm of scopolamine became recognized, aided by the public outcry of women, and it became illegal to administer scopolamine to a pregnant woman.[34]

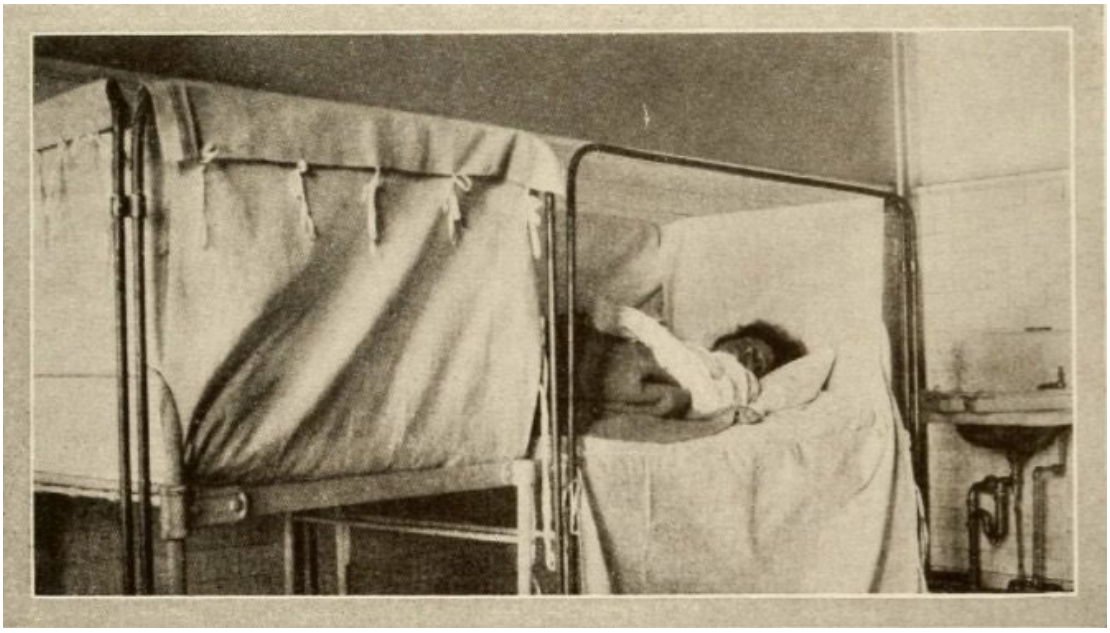

Figure 7, A patient in twilight sleep ready for examination, (Scopolamine-Morphine Anesthesia/Public Domain)

[32] "Birthing Trends in American Society and Women's Choices."
[33] Aron, Nina Renata. "Restraints, Hallucinations, and Forgotten Pain Were the Norm on Midcentury Maternity Wards." Medium. Timeline, January 17, 2018. https://timeline.com/restraints-hallucinations-and-forgotten-pain-were-the-norm-on-midcentury-maternity-wards-46909123c4f7.
[34] "Restraints, Hallucinations, and Forgotten Pain Were the Norm on Midcentury Maternity Wards."

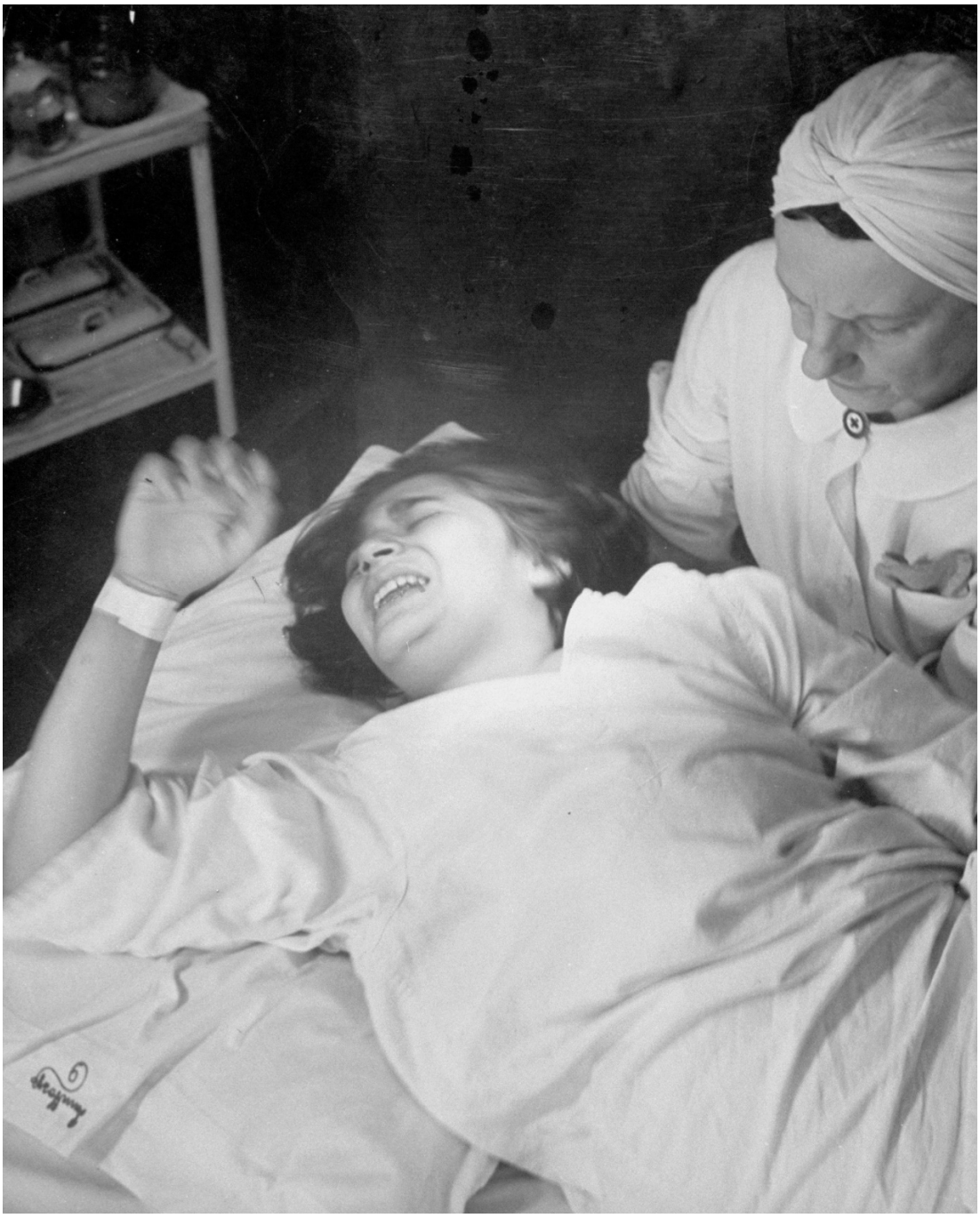

Figure 8, A woman thrashing on a hospital bed during childbirth in 1944, (Alfred Eisenstaedt/The Life Picture Collection/Getty Images)

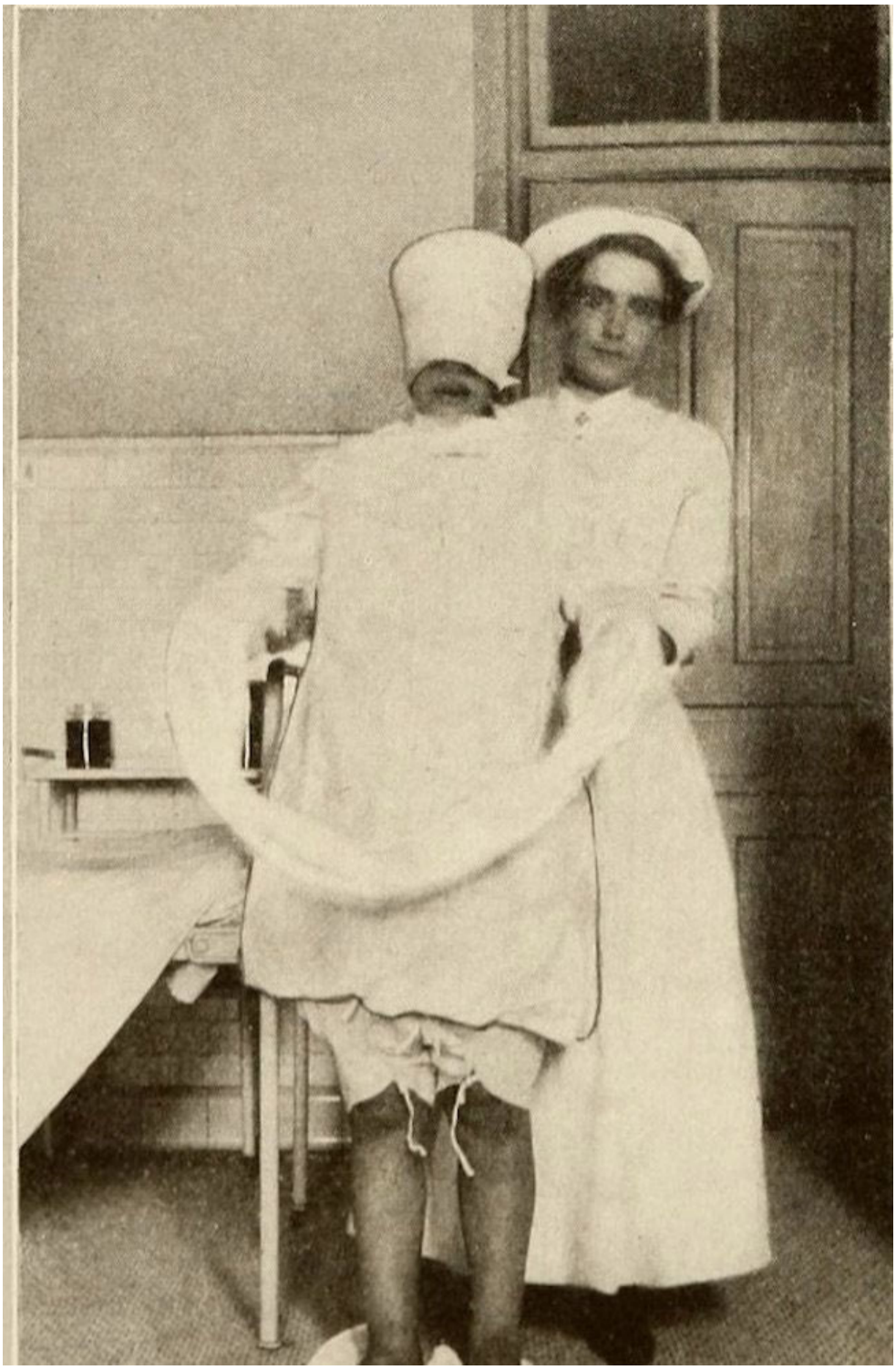

Figure 9, A patient prepared for twilight sleep, (Scopolamine-Morphine Anesthesia/Public Domain)

As a strong reaction against the birthing practices of the 1920-1960's between the 1960's and 70's there came a resurgence in the popularity of home births and a

change in how medical births are performed.[35] Ultimately, however, most American women still give birth in hospitals to this day.

According to the CDC there were 2,621,010 vaginal deliveries in the United States in 2017 while caesarian deliveries accounted for 1,232,339 births, meaning that 32% of all births in the united states were c-sections.[36] Statistics show that the risk of needing a transfusion, having a ruptured uterus, unplanned hysterectomy (surgical removal of the uterus), or being admitted to the intensive care unit drastically increases when a woman has a c-section.[37]

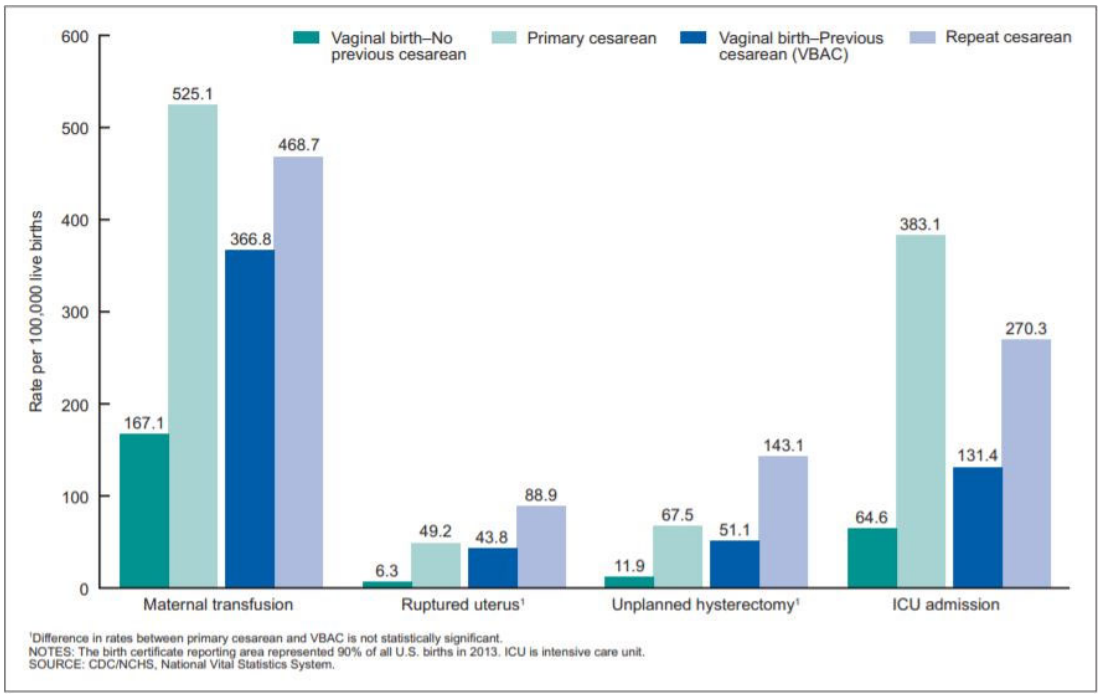

Figure 10, Maternal morbidity, by method of delivery and previous cesarean history: 41-state and District of Columbia reporting area, 2013, (Centers for Disease Control and Prevention)

[35] "Birthing Trends in American Society and Women's Choices."
[36] Martin, Joyce A, Brady E Hamilton, Michelle JK Osterman, Anne K Driscoll, and Patrick Drake. "PDF," November 7, 2018.
[37] Curtin, Sally C, Kimberly D Gregory, Lisa M Korst, and Sayeedha F.G. Uddin. "PDF," May 20, 2015.

While some c-sections are medically necessary, the rate of c-sections in the United States suggest that some c-sections performed on women are medically unnecessary.[38]

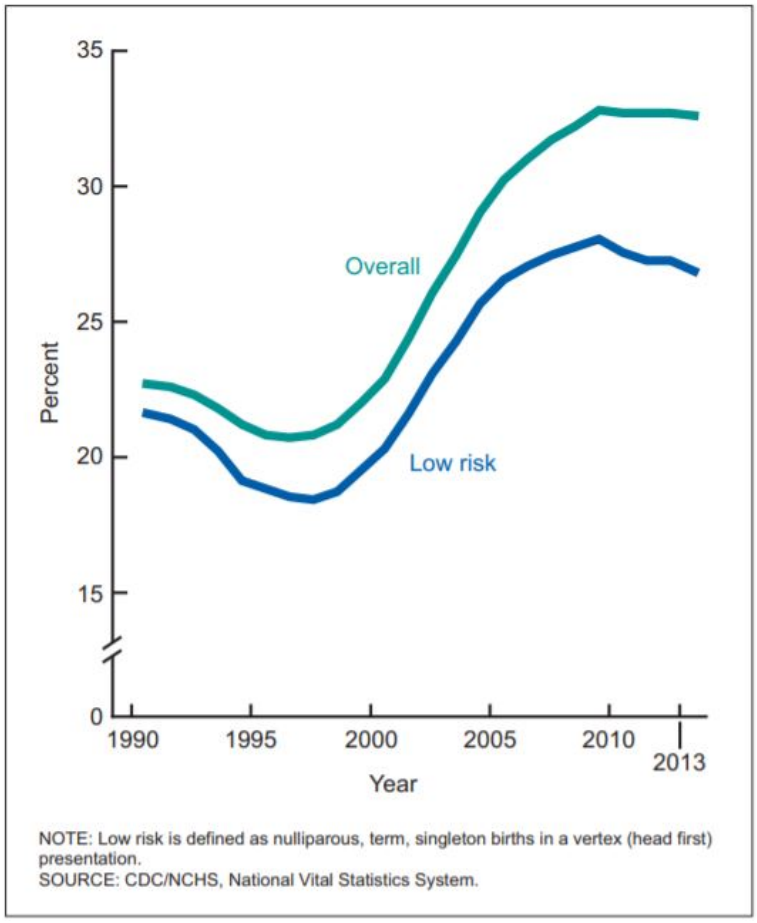

Figure 11, Overall cesarean delivery and low risk cesarean delivery: United States, Final 1990-2012 and preliminary 2013, (Centers for Disease Control and Prevention)

When coupled with the facts that c-sections pose greater risks to women, are harder to recover from, and make successive pregnancies more dangerous as well, when possible low risk and healthy mothers should strive for vaginal delivers. Vaginal

[38] Osterman, Michelle JK, and Joyce A Martin. "PDF," November 5, 2014.

deliveries can be natural or aided with the help of contraction causing medicine and pain relief.

While things have come a long way in terms of women's overall health and wellbeing in birthing practices since the days of scopolamine, an event that was traumatizing for many and robbed all women of their autonomy during birth, the rise in maternal mortality in the United States and the high rate c-sections shows that the system is still failing to provide women with healthcare that supports a mothers total wellbeing. Ultimately, in recent years the popularity of midwifes, doulas, and home births have increased as women seek a more holistic form of care.

Understanding Alternative and Supplemental Care

Why seek Alternative or Supplemental Care?

Increased interest in and use of alternative or supplemental care for births such as; home births, use of birth centers, the use of a doula, and/or the use of a midwife have been on the rise in many developed countries that otherwise utilize modern western medicine like the United States, The United Kingdom, and Australia. Overall, many women seem to be motivated by the desire to be more comfortable and have more control over their birth experience.[39] Other women are motivated by personal traumatic experiences or wanting to avoid "unnecessary intervention" by doctors.[40] The danger with women fearing or avoiding medical intervention is that a woman could find herself in a dangerous labor and not be able to get the medical

[39] Dannaway, Jasan, and Hans Peter Dietz. "Unassisted Childbirth: Why Mothers Are Leaving the System." Journal of Medical Ethics 40, no. 12 (2014): 817-20. www.jstor.org/stable/43283198.
[40] "Unassisted Childbirth: Why Mothers Are Leaving the System."

attention she needs when it is necessary. Better education of pregnant women is necessary to make sure they can make the best decisions for their health.[41] On the side of the medical profession, greater education and understanding of women's fears are needed, along with outreach to help improve women's relationships with doctors and hospitals.

Women's need for more personalized care has been recognized by the United Kingdom's National Health Service. The NHS determined that women need to be offered more personalized pregnancies and concluded that in low risk pregnancies the best qualified professional to provide that personalized care was a midwife.[42] Additionally, the United Kingdom has in place the Patients Charter, which emphasizes the rights of patients and establishes a clear standard of care.[43] Ultimately, the patient centered care offered by midwives has become increasingly interesting to American patients who are used to the physician centered care offered by western hospitals.[44]

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[41] "Unassisted Childbirth: Why Mothers Are Leaving the System."
[42] Mejia, A., R. Shirazi, R. Beech, and D. Balmer. "Planning Midwifery Services to Deliver Continuity of Care." The Journal of the Operational Research Society 49, no. 1 (1998): 33-41. doi:10.2307/3010651.
[43] "Planning Midwifery Services to Deliver Continuity of Care."
[44] KANG-WANG, JANET F. "The Midwife in Taiwan: An Alternative Model for Maternity Care." Human Organization 39, no. 1 (1980): 70-79. www.jstor.org/stable/44125571.

Figure 12, Gateshead Health Midwives, (NHS, Gateshead Health)

Midwives

Midwives are defined as "a person who assists women in childbirth".[45] Midwives focus on vaginal childbirth and typically have formal medical training. Births lead or attended to by midwives can occur in a hospital, clinical setting/birthing center, or at the home. Midwifery is regulated on a state by state basis across the US. There are organizations, however, that operate internationally like the International Confederation of Midwives or at the national level like the United States Midwifery Education, Regulation Association that try to create standards of care, conduct and ethics for midwives.[46]

[45] "Midwife." Merriam-Webster. Merriam-Webster. Accessed December 13, 2019. https://www.merriam-webster.com/dictionary/midwife.

[46] Kennedy, Holly Powell, Jo Anne Myers-Ciecko, Katherine Camacho Carr, Ginger Breedlove, Tanya Bailey, Marinah V. Farrell, Mary Lawlor, and Ida Darragh. "United States Model Midwifery Legislation and Regulation: Development of a Consensus Document." Wiley Online Library. John

Figure 13, Midwife and new Mom, (NHS, University Hospitals Birmingham, NHS Foundation Trust Midwifery Awards)

Modern midwifery is an extension of ancient practice and time-honored tradition; however, formal medical training is now essential to the profession. Formal medical training, in tandem with the personalized relationship and patient centered care provided by midwifes are being recognized for the quality of care and support midwives can provide to women with low risk pregnancies. The benefits of trained midwifes, both to patients and healthcare systems, have been recognized in places like the United Kingdom. It is important to note, however, that adopting and enforcing clear standards of education and care is key to making midwifes a safe and reliable option for women.

Doulas

Doulas are generally defined as "a person trained to provide advice, information, emotional support, and physical comfort to a mother before, during, and

Wiley & Sons, Ltd (10.1111), February 20, 2018. https://onlinelibrary.wiley.com/doi/abs/10.1111/jmwh.12727.

just after childbirth".[47] A doula's main role is in providing emotional, physical, and educational support to a mother.

Figure 14, Doulas offer support through the end of pregnancy, in the delivery room, and beyond. May is National Doula Month, (www.sheknows.com)

Doulas are not required to have formal medical training and are therefore prohibited from giving medical advice to the women they help.[48] In the case of doulas particularly, the need to establish standards of communication between doulas, midwives, doctors and nurses is key to providing the best emotional and physical care for a mother.

Sanhujori

While midwives and doulas are becoming more mainstream in western culture the physician centered paradigm of western medicine is gradually moving toward a more holistic and patient centered approach. Other places around the world, however,

[47] "Doula." Merriam-Webster. Merriam-Webster. Accessed December 13, 2019. https://www.merriam-webster.com/dictionary/doula.
[48] "PDF," March 29, 2017.

have their own ways of approaching wholistic maternal health. The Korean practice of Sanhujori (literally referring to postnatal care) is a cultural tradition that takes place after a woman has been discharged from the hospital and before her first postnatal doctors' appointment up to six weeks later.[49]

Following delivery women can feel overwhelmed by the experience of birth, motherhood, and the changes their body has gone through (as well as the recovery it must go through now). Sanhujori practices provide a cultural framework to attend to a mother's needs. Sanhujori focuses on fostering good mental, emotional, and physical health through treating the body with heat (and avoiding cold), resting, eating well, avoiding any potentially harmful strain, keeping clean, and being provided with support and attention.[50] These ideals and practices reflect the Korean culture/mindset of Korean women as well as some objectively beneficial health practices. For example, while avoiding cold and keeping the body warm is good for preventing blood clots, increasing circulation, as well as soothing muscle pain that a woman might be experiencing postpartum, there is a cultural element to the belief in warming the body as well.

[49] Yoo Eunkwang. "Reflections on Sanhujori: A Korean Postnatal Care Paradigm for Women's Health." Asian Journal of Women's Studies 4, no. 4 (1998): 110-28.
[50] "Reflections on Sanhujori: A Korean Postnatal Care Paradigm for Women's Health."

Figure 15, Cultural ideas of balance and comfort can impact a women's health and healing process, (Author)

The theory of yin and yang, simplified the belief that opposite entities create or maintain balance and harmony, is an overarching belief that also applies to health. In Sanhujori, the belief is that yin which represents cold and yang which represents heat must be in balance for a woman to heal and that the experience of birth throws off the balance in the body.[51] Therefore, recovering mothers must overcompensate with warmth in order to recover and achieve harmony in their own bodies. As such, the practice of warming the body is beneficial to a woman's health as well as relates to cultural ideal of balance and comfort. While there are many ways to recover from childbirth that would be medically appropriate (or at the very least not damaging to a

[51] "Reflections on Sanhujori: A Korean Postnatal Care Paradigm for Women's Health."

woman's physical recovery) for Korean women, Sanhujori is necessary to give themselves peace of mind and help them through their unique recovery experience.[52]

Figure 16, 11/21/2018 – Masterful handling of babies (and delicious steamed Korean sweet potato snack), (Joy Lee)

Sanhujori can take place in a special facility, in home with family, or in the home with a hired caregiver.[53] The goal of Sanhujori is to restore women to their full

[52] "Reflections on Sanhujori: A Korean Postnatal Care Paradigm for Women's Health."
[53] "Reflections on Sanhujori : A Korean Postnatal Care Paradigm for Women's Health."

physical, mental, and emotional health after childbirth and ensure healthy future pregnancies and a long life. Continued support after birth and cultural acceptance of the importance of helping a woman heal and recover (mentally and physically) after birth gives peace of mind to the women who practice Sanhujori.[54] Sanhujori provides an interesting cultural counterpoint to the prenatal care focused on in the west, as well as the fact that many women in the US do not have this framework of support and understanding to help them through their postpartum recovery.

Chapter 4: Postpartum Depression

What is Postpartum Depression?

Figure 17, Depressed Mother, (Photo by napatcha/ Adobe Stock)

[54] "Reflections on Sanhujori: A Korean Postnatal Care Paradigm for Women's Health."

Postpartum depression, also known as PPD, consists of the development of a depressive disorder or similar symptoms within the first year after giving birth. Including the typical symptoms associated with depression, PPD includes irrational fears for the baby and the baby's health along with the potential to have both suicidal and infanticidal thoughts.[55] As such, PPD is a condition that must be taken seriously for the sake of both mother and child.

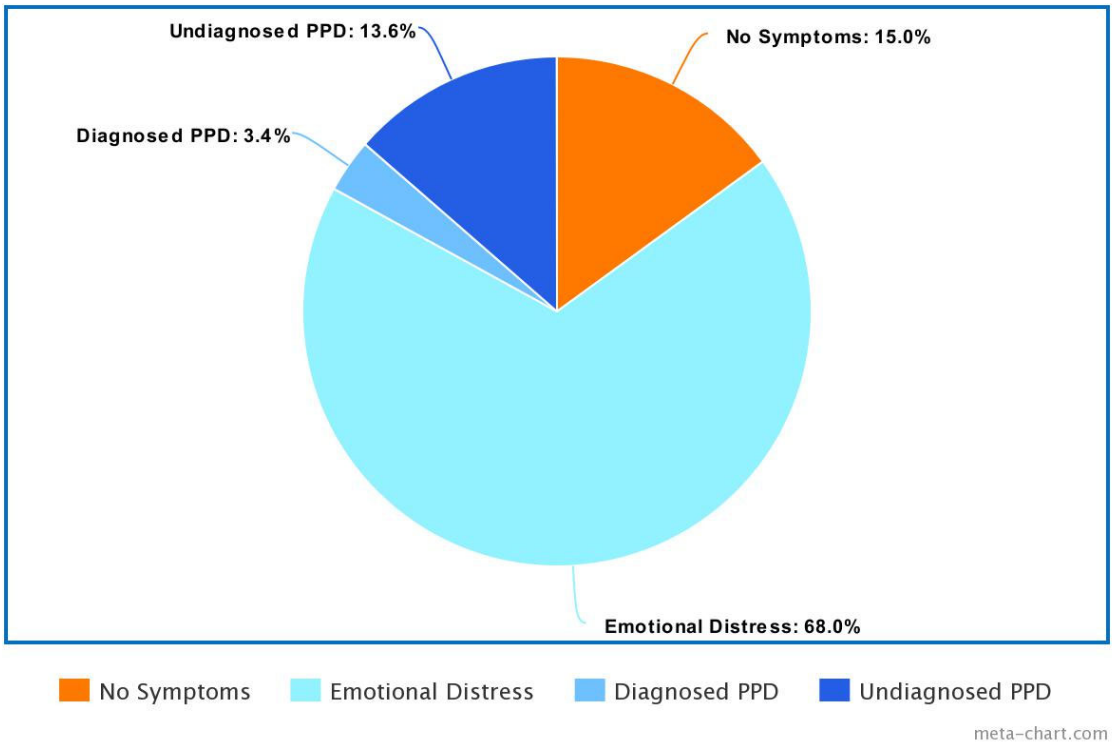

Figure 18, Emotional Distress and Postpartum Depression in Women, (Author with use of Meta-Chart)

While up to 85% of women will experience some sort of emotional distress after birth, 10-20% of those women will experience postpartum depression. Its

[55] Evagorou, Olympia, Aikaterini Arvaniti, and Maria Samakouri. "Cross-Cultural Approach of Postpartum Depression: Manifestation, Practices Applied, Risk Factors and Therapeutic Interventions." Psychiatric Quarterly 87, no. 1 (2016): 129-54. doi:10.1007/s11126-015-9367-1.

estimated that 80% of cases of PPD will go undiagnosed and untreated.[56] Leaving PPD undiagnosed and untreated not only puts mother and child at risk but also puts a huge strain on the family. A mother's mental health and the support structure surrounding her are also two factors that affect how sensitive a mother will be toward the needs of the baby. Maternal Sensitivity describes the ability of a mother to correctly interpret her baby's communication signals and respond to them appropriately.[57] This ability to understand and respond to a child's needs directly influences the ability for the mother and child to bond appropriately with one another.[58] In other words, the mental health of the mother has a direct impact on a woman's ability to correctly interpret her child's needs.[59]

Figure 19, Mother and baby, (NeuroscienceNews.com, image is adapted from the Harvard press release.)

[56] "Cross-Cultural Approach of Postpartum Depression: Manifestation, Practices Applied, Risk Factors and Therapeutic Interventions."
[57] Shin, Hyunjeong, Young-Joo Park, and Mi Ja Kim. "Predictors of Maternal Sensitivity during the Early Postpartum Period." Journal of Advanced Nursing 55, no. 4 (2006): 425-34. doi:10.1111/j.1365-2648.2006.03943.x.
[58] "Predictors of Maternal Sensitivity during the Early Postpartum Period."
[59] "Predictors of Maternal Sensitivity during the Early Postpartum Period."

The causes of PPD, however, are hard to pin down. Studies are able to point to some risk factors that increase a woman's likelihood to be affected by postpartum depression such as a family or personal history of depression before pregnancy, lack of social support systems, stress when caring for the new child, having an unwanted or unplanned pregnancy, stressful life events, being from a lower income bracket, and poor relationships with one's family.[60] In the case of poor familial relationships, lack of a support system, and being low income, the potential causes of postpartum depression also stand as obstacles to getting the help necessary to deal with PPD. It is also important to note that being apart of a lower socio-economic class both makes a woman more likely to experience PPD as well as being affected by maternal mortality. This overlapping risk factor identifies that women of a lower socio-economic class are a particularly vulnerable classification of women who should be in heavily considered in the design processes of a women's health facility.

Understanding Culture and PPD

As discussed with Sanhujori practices, cultural ideas of comfort and pain, right and wrong, normal and abnormal effect how an individual interprets their world and experiences as well as how they express those feelings to others. For example, the symptoms of postpartum depression and how they are described by women vary from country to country and culture to culture. While some women experience or describe

[60] "Cross-Cultural Approach of Postpartum Depression: Manifestation, Practices Applied, Risk Factors and Therapeutic Interventions."

more physical fatigue, others describe numbness in the head, or think that they hear their baby crying when it is not. This is echoed in the difference in cultural beliefs and practices surrounding childbirth and postpartum care. For example, the belief in whether or not a mother should stay home for a certain amount of time, eating a specific diet, or avoiding certain activities postpartum all differ greatly depending on where you are. In the United States women tend to describe physical symptoms of PPD, like fatigue, rather than admit to feelings associated with depression and mental illness (for fear of being stigmatized). Additionally, women in the US tend to go back to work as soon as possible after birth both because paid maternity leave is rare, hard to get, and/or that women are socially pressured to get back on their feet as soon as possible.

Despite all the different symptoms and beliefs across cultures the unifying factor is that women should have access to support and mental health care in a way that makes them feel comfortable being honest about their experience. That women should be able to seek help without being stigmatized.

While every woman would not be comfortable with or get piece of mind from Sanhujori practices or the special Sanhujori diets, every woman should be able to get the mental health support that they personally need in order to successfully recover from childbirth, and especially from postpartum depression.

Chapter 5: Architectural Precedents

Understanding Process

Inspiration vs Analysis

In order to set a framework for designing a building which takes the functionality of a hospital and softens it to create something more evocative of a community center, both hospitals and community centers needed to be studied. Some architectural precedents were used as a basis to establish program while others are inspirational precedents that are more important visually and thematically. Below is outlined which architectural precedents aided in developing program understanding while others act as a source of inspiration.

Reverse Engineering Program

The process of reverse engineering a program begins with identifying a building or buildings that are programmatically similar to the proposed project. Then with the use of project documentation like building plans, the spaces of the building can then be categorized by their program type and the square footages can be determined for each program element. Analyzing the plans of an applicable precedent can not only determine what kind of program elements are necessary but also what square footages are necessary to support those program elements. For this thesis the maternity floors of Sibley Memorial Hospital in DC, by Wilmot Sanz were analyzed for hospital programing while Breal-Sous Vitre Public Center in France, by Atelier 56S was studied to determine the program elements of a public library and community center.

Sibley Memorial Hospital is a Leed Gold certified building of 486,000 square feet and 200 beds total. This hospital serves not only mothers but also cancer and other patient groups. As such, it is only necessary to look at the maternity ward and related program areas. This focused the program analysis on only two floors of Sibley Memorial.

Figure 20, Sibley Memorial Labor and Delivery Floor, (Wilmot Sanz)

Figure 21, Sibley Memorial Post-Partum Floor, (Wilmot Sanz)

The analysis of the two floors identified the program types, the total square footages and in the case of a program that was split between similar rooms the total square footages were divided by the number of rooms to give the square footage necessary for one room. For example, postpartum rooms took up 13,997 square feet divided among 46 rooms of roughly equal size which illustrates that in order to accommodate equipment, furniture, and staff in a typical postpartum room roughly 304 square feet is necessary. This information can then be used to scale a maternity ward based on the number of certain room types needed so that program can be adjusted and expanded later in the design process to accommodate a certain number of patients.

	SF	#	PER
Post-Partum	13997	46	304
Post-Partum Iso	1803	4	450
Staff and Service	19693		
Circulation	25643		
Labor and Delivery	7202	16	450
Labor and Delivery Iso	1196	2	598
C-Section	2734	3	911
Triage Recovery	2545	8	318
Special care Nursery	3050	18	169
Sleep Rooms	967	8	120
Total Building	78830		
Net	53187		
Grossing Factor :1.48			

Figure 22, Sibley Memorial Maternity Program, (Author)

Breal-Sous Vitre Public Center is a 7,534 square foot facility that includes a public center, library, recreational center, after-school activities center as well as outdoor spaces. Since analysis of program began before a final site was determined a smaller facility was used to establish base line program elements and square footages.

Figure 23, Breal-Sous Vitre Public Center, (Arch Daily from Atelier 56S)

Community	-	-	5000
Community Administration	-	-	410
Community Service	-	-	1110
Community Restrooms	-	-	610
Community Circulation	-	-	2000
Outdoor Community Space	-	-	1430
Family Support	-	-	1000
Research Residency Apartment	2	600	1200
Temporary Housing for Women	4	800	3200
Cafe	1	-	1000-1500
Cafeteria	1	-	1000-1500
Child Care	1	-	2000
Counseling	-	-	1000
Legal Aid	-	-	1000
Total Community			**23000**
Total Building			**53000**

Figure 24, Breal-Sous Vitre Public Center Program, (Author)

Program Conclusions

Based on the analysis of Sibley Memorial Hospital and Breal-Sous Vitre Public Center a list of minimum program elements and square footages was developed. The resulting information was then translated and labeled graphically to aid in preliminary design.

	# Units	Per	Total SF
Postpartum	16	300	4800
Postpartum Iso	2	450	900
Labor and Delivery	6	450	2700
Labor and Delivery Iso	1	600	600
C-Section	1	950	950
Triage Recovery	3	320	960
Special Care Nursery	6	170	1020
Sleep Rooms	3	120	360
Health Staff and Service	-	-	6600
Pharmacy	1	800	800
Health Circulation	-	-	8550
Exam	10	100	1000
Total Health			**30000**
Community	-	-	5000
Community Administration	-	-	410
Community Service	-	-	1110
Community Restrooms	-	-	610
Community Circulation	-	-	2000
Outdoor Community Space	-	-	1430
Family Support	-	-	1000
Research Residency Apartment	2	600	1200
Temporary Housing for Women	4	800	3200
Cafe	1	-	1000-1500
Cafeteria	1	-	1000-1500
Child Care	1	-	2000
Counseling	-	-	1000
Legal Aid	-	-	1000
Total Community			**23000**
Total Building			**53000**

Figure 25, Minimum Proposed Program, (Author)

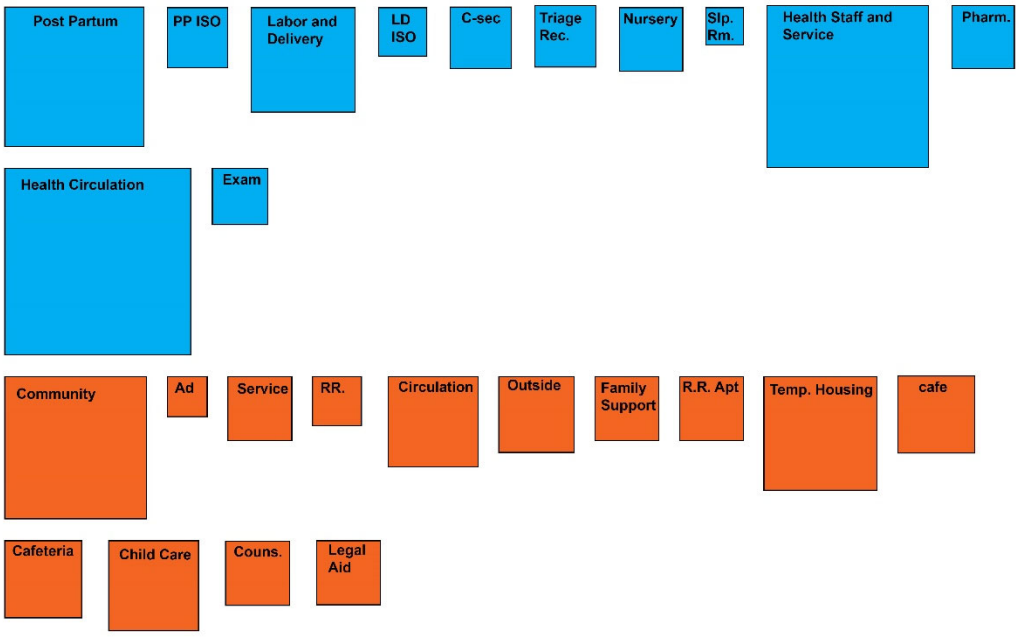

Figure 26, Minimum Proposed Program Graphic, (Author)

Hospitals and Healthcare

In addition to Sibley memorial hospital, other hospitals were found that serve as aesthetic or thematic precedents and architectural inspiration. Wuxi Women's and Children's Hospital in Wuxi China, Inova Women's Hospital in Falls Church Virginia, as well as VCU Medical Center, Virginia Treatment Center for Children, Replacement Facility in Richmond Virginia were all precedents that were visually and thematically of interest.

Figure 27, Wuxi Women's and Children's Hospital, (Perkins Eastman)

The natural campus and green roofs of the Wuxi Women's and Children's Hospital by Perkins and Eastman is thematically interesting for its use of green space. Views of nature and green space are shown to promote health and wellbeing for hospital patients.[61] This hospital design seeks to provide all patients with a natural landscape view. The scale of the project, however, is too large to be a programmatic precedent for a women's health and wellness center in Newark, NJ.

[61] United States. Forest Service. Urban Nature for Human Health and Well-Being : A Research Summary for Communicating the Health Benefits of Urban Trees and Green Space. Washington, D.C.: United States Department of Agriculture, Forest Service, 2018. 2018. Accessed December 14, 2019. INSERT-MISSING-URL.

Figure 28, Inova Women's Hospital, (Wilmot Sanz)

The warm and spacious patient rooms of Inova Women's Hospital by Wilmot Sanz represent an attitude toward patient experience where the goal is not only to provide a functional facility but a facility that also makes the patients feel at home. Warm colors and homey interior design details helps take away from the clinical feeling of the typical hospital room. In a building that seeks change the patient's impression of hospitals, creating comfortable and beautify interior spaces is key.

Figure 29, VCU Medical Center, Virginia Treatment Center for Children, (Cannon Design)

Figure 30, VCU Medical Center, Virginia Treatment Center for Children, (Cannon Design)

Finally, the VCU Treatment Center for Children does an excellent job of making the facility approachable and inviting. The broken-up massing of the building makes the facility more approachable; this impression is aided by the landscaped approach and the warm wood used in both the exterior and interior. Natural light makes the lobby bright, inviting, and visually interesting. A health facility that is also a community center must be approachable and inviting for both patients and community members.

Community Buildings and Spaces

In addition to Breal-Sous Vitre Public Center, other community buildings and spaces were found that serve as aesthetic or thematic precedents and architectural inspiration. The Asia Culture Center in Gwangju, South Korea as well as the LocHal library in Tilburg, Netherlands were both precedents that were visually and thematically of interest for the community center portion of this thesis.

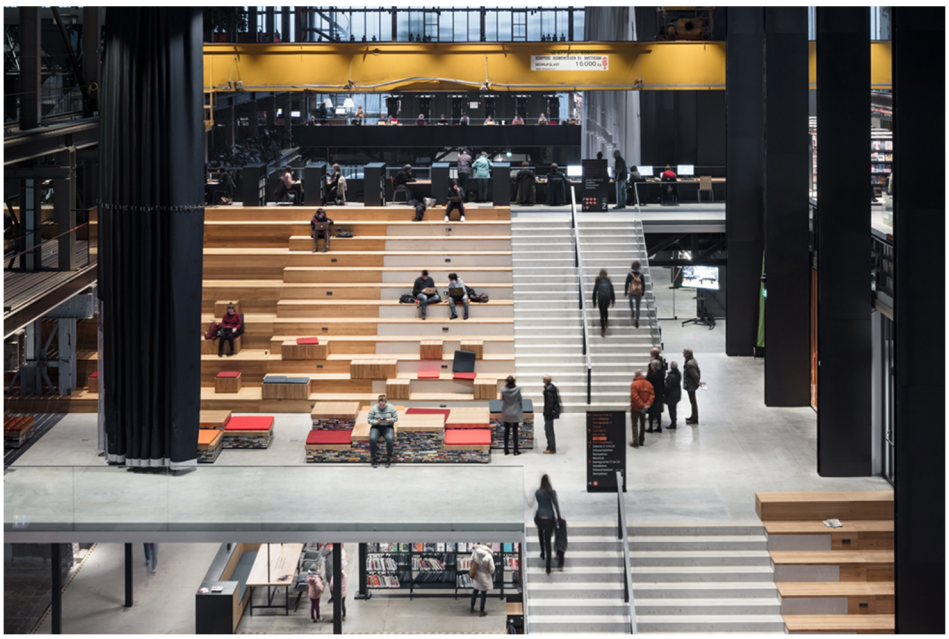

Figure 31, LocHal Library, (Civic Architecture)

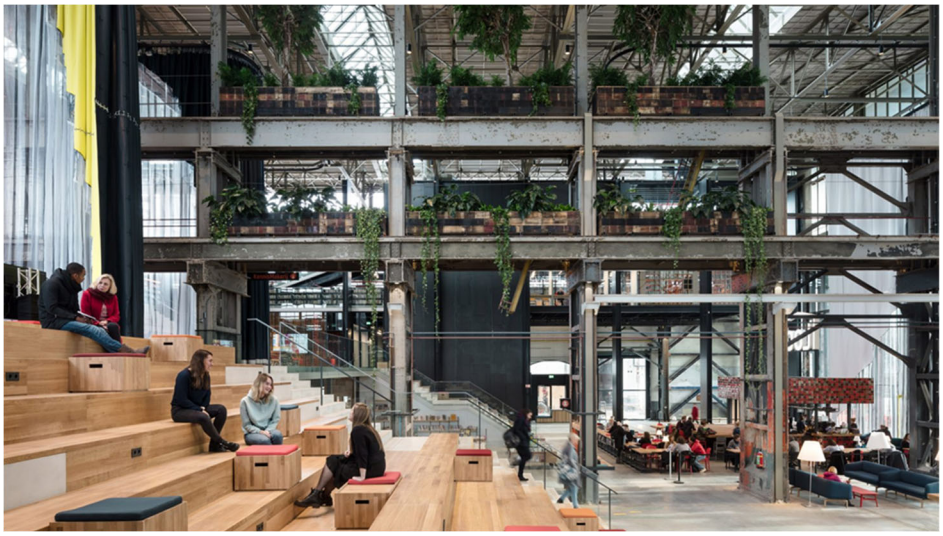

Figure 32, LocHal Library, (Civic Architecture)

The LocHal Library by Civic Architecture was particularly interesting for its central multistory space. This central community space provides vertical circulation, flexible seating for individuals or groups, as well as the potential to use as a gathering space with stadium seating. This multistory space largely lit by natural light contrasts industrial structure with warm wood and green hanging plants. The result is a space that gives priority to community space while also providing the opportunity for multiple space uses. Creating a double height or multistory space for important community spaces within the combined health and community center would help to promote interesting architecture and reinforce the importance of community. Flexibility of the community space is also key so that the community that uses the space can get the most use out of it as possible.

Figure 33, The Asia Culture Center in Gwangju, South Korea, (Kyu Sung Woo Architects)

Figure 34, The Asia Culture Center in Gwangju, South Korea, (Kyu Sung Woo Architects)

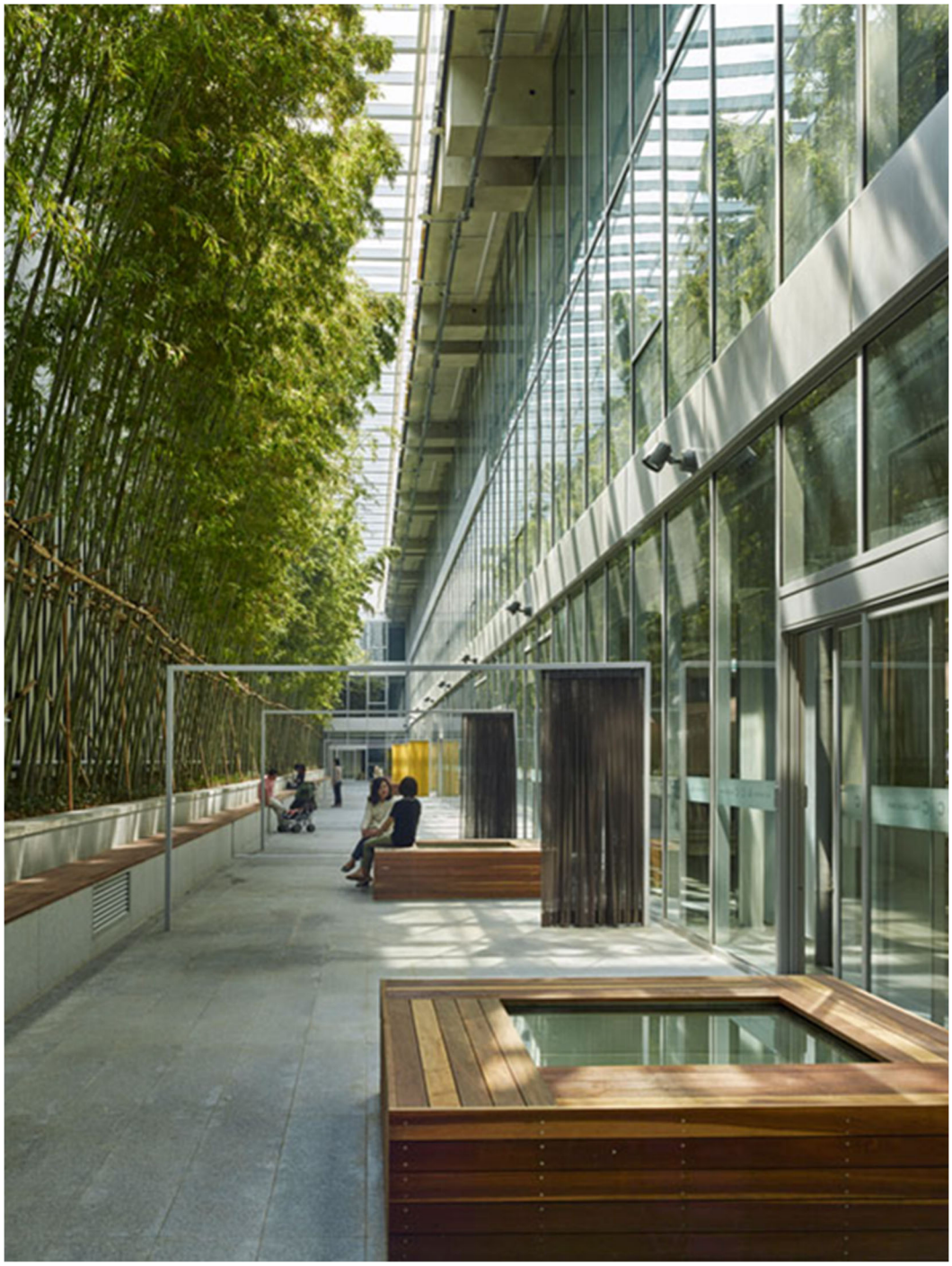

Figure 35, The Asia Culture Center in Gwangju, South Korea, (Kyu Sung Woo Architects)

Finally, the Asia Culture Center in Gwangju, South Korea by Kyu Sung Woo Architects is a great example of harnessing nature in flexible outdoor community spaces. The pockets of green space help break up the huge campus of buildings while

providing spaces where people can sit and enjoy nature alone or in groups. Here landscaping is used to create space alongside architecture so that both the architecture and landscaping interact. Additionally, the green space provides a beautiful backdrop that can be framed by the architecture on the inside, creating beautiful views for users. Creating a variety of flexible green space will help to make the health and community center approachable as well as providing extra amenities for the community.

Chapter 6: Understanding Newark, NJ

Newark's History

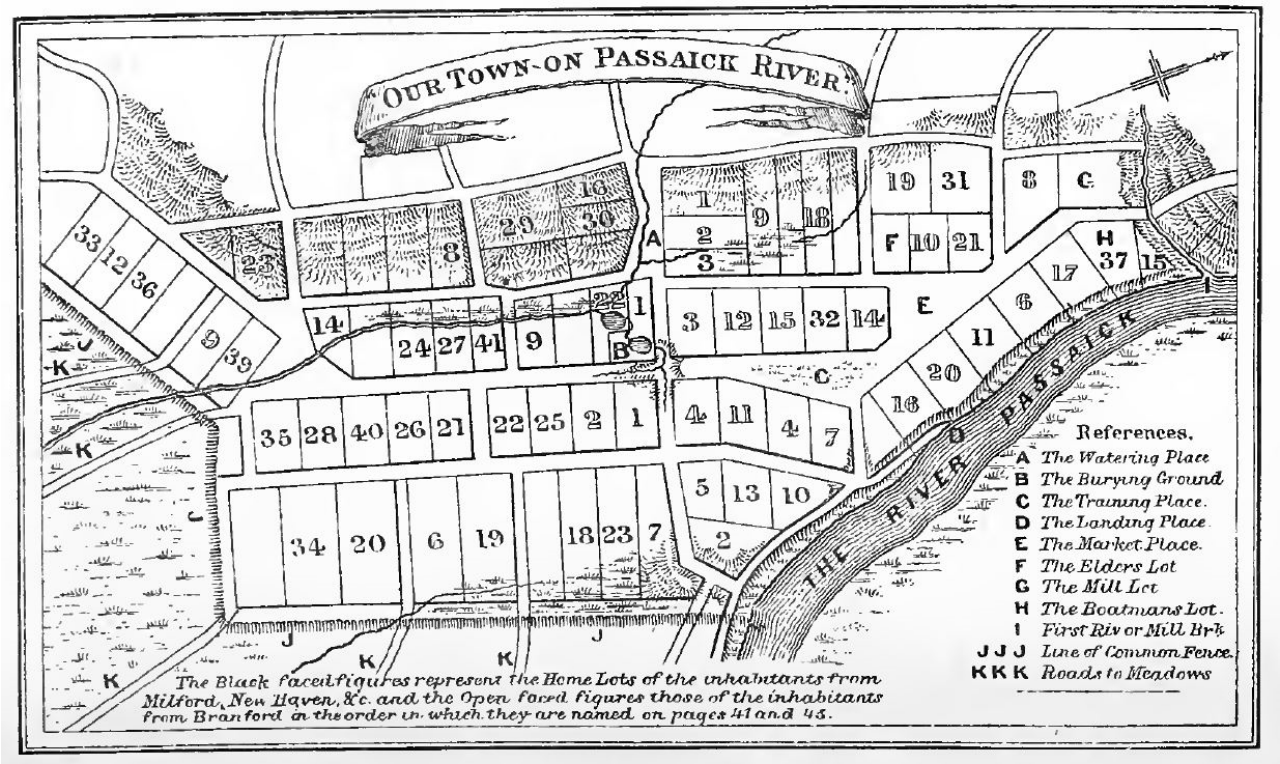

Figure 36, Our Town on Passaick River, ("The History of Newark, New Jersey : Being a Narrative of Its Rise and Progress, from the Settlement in May, 1666, by Emigrants from Connecticut, to the Present Time, Including a Sketch of the Press of Newark, from 1791 to 1878")

Newark, New Jersey was first settled in May of 1666 by Puritan along the Passaic River.[62] These conservative puritans came primarily from the Connecticut settlements of Branford, Guilford, and Milford of the New Haven Colony, where

[62] Atkinson, Joseph, and Thomas Moran. The History of Newark, New Jersey : Being a Narrative of Its Rise and Progress, from the Settlement in May, 1666, by Emigrants from Connecticut, to the Present Time, Including a Sketch of the Press of Newark, from 1791 to 1878. Newark, NJ: William B Guild, 1878.

religious tolerance was increasing. The increased tolerance, especially of Quakerism, drove the desire of these conservatives and intolerant puritans to seek out a new home untainted by beliefs they were against. The establishment of the settlement by Captain Robert Treat, while approved of by the local Governor, was disputed be the native Hackensack tribe. Early Newark was a theocracy in which church rule was law and only church members could hold office, inherit land, or have any other civil liberties.[63] After the American revolution the key industries in Newark were leather tanning, as well as shoe and jewelry manufacturing.[64] Its proximity to New York and location on the Passaic River made it a great location for industry, which can still be seen along the river's edge today.

[63] "1666 – The Founding of Newark." Descendants of Founders of New Jersey. Descendants of Founders of New Jersey. Accessed November 16, 2019. http://www.njfounders.org/history/1666-founding-newark.
[64] The Editors of Encyclopaedia Britannica. "Newark." Encyclopædia Britannica. Encyclopædia Britannica, inc., May 15, 2019. https://www.britannica.com/place/Newark-New-Jersey.

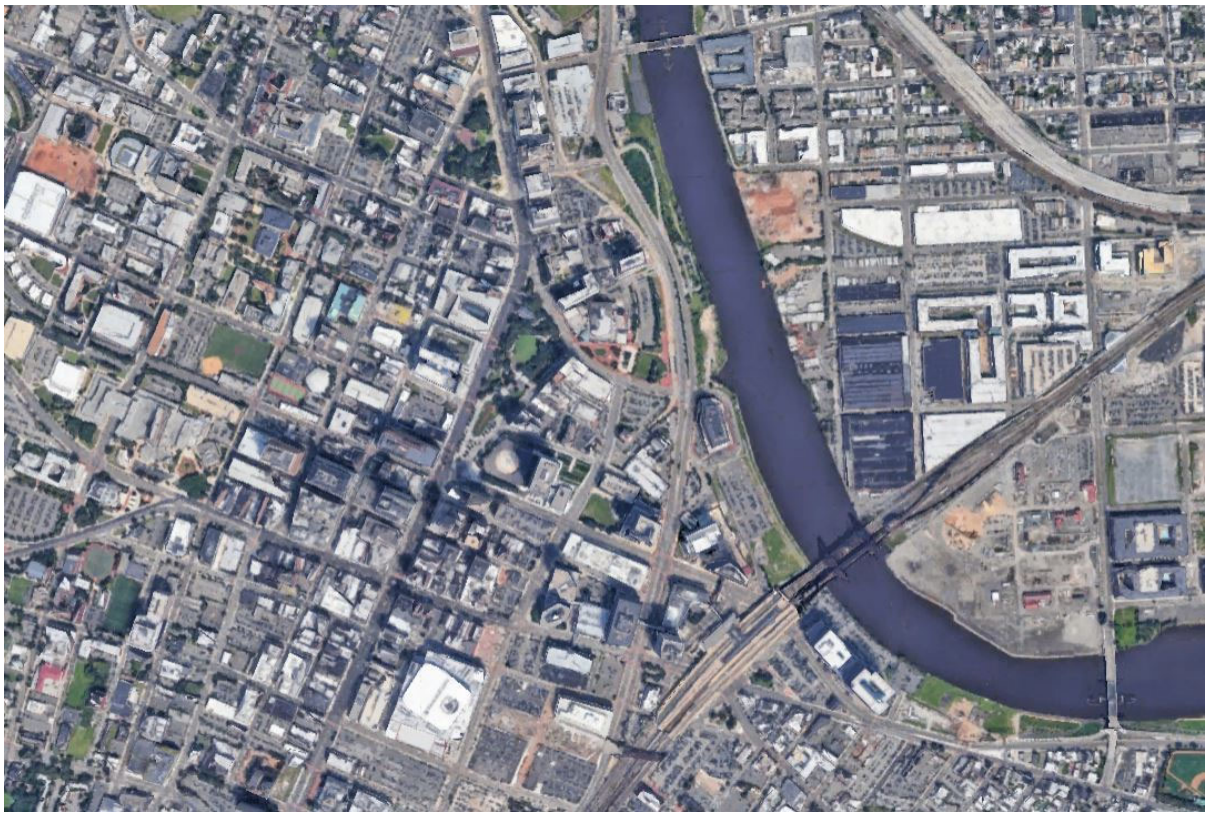

Figure 37, Newark, NJ, (Author with use of Google Earth)

From the 1950's to the 1970's the white middle class which occupied Newark moved further out into the suburbs, a trend happing across the United States. Eventually, the proportions of African Americans in Newark rose from one fifth to three fifths of the population in 1990.[65] In 1967 riots took over Newark but progress was made in 1970 when Newark elected its first African American mayor.

[65] "Newark."

Figure 38, The National Guard on Springfield Avenue in Newark on July 14, 1967, (Don Hogan Charles/The New York Times)

Figure 39, An injured rioter with the police, (Hulton Archive, via Getty Images)

The events of the riots are remembered to this day, and it's important to note that Newark still has significant poverty and health problems.[6667] Newark of today is the

[66] "Newark."
[67] Rojas, Rick, and Khorri Atkinson. "Five Days of Unrest That Shaped, and Haunted, Newark." The New York Times. The New York Times, July 11, 2017. https://www.nytimes.com/2017/07/11/nyregion/newark-riots-50-years.html.

largest city in New Jersey, a highly industrial city with a diverse group of industries, Newark benefits from its proximity to New York City.

The Demographics of Newark

Newark, NJ has a population around 277,000 people. Currently around 58 percent of the population are between the ages of 18 and 65.[68] With 7.5 percent of the population under the age of five and 24.8 percent under the age of 18.[69] Only 9.7 percent of the population 65 or older.[70] The gender split is almost 50/50 with 50.6 percent of the population being women.[71] This suggests that a good amount of the population of Newark are women in their childbearing years. As such it is reasonable to say that women health services are needed in the area. Additionally, the vast majority of the population of Newark are minorities. Currently, 50.1 percent of the population is Black or African American, 36.4 percent of the population are Hispanic or Latino.[72] Other minorities include mixed race people at 2.7 percent, Asian people at 1.7 percent, and native American at .6 percent.[73] Only about 36 percent of Newark's population is white. [74]

[68] "U.S. Census Bureau QuickFacts." Census Bureau QuickFacts. United States Census Bureau . Accessed November 16, 2019. https://www.census.gov/quickfacts/fact/table/newarkcitynewjersey,US/PST045218.
[69] "U.S. Census Bureau QuickFacts."
[70] "U.S. Census Bureau QuickFacts."
[71] "U.S. Census Bureau QuickFacts."
[72] "U.S. Census Bureau QuickFacts."
[73] "U.S. Census Bureau QuickFacts."
[74] "U.S. Census Bureau QuickFacts."

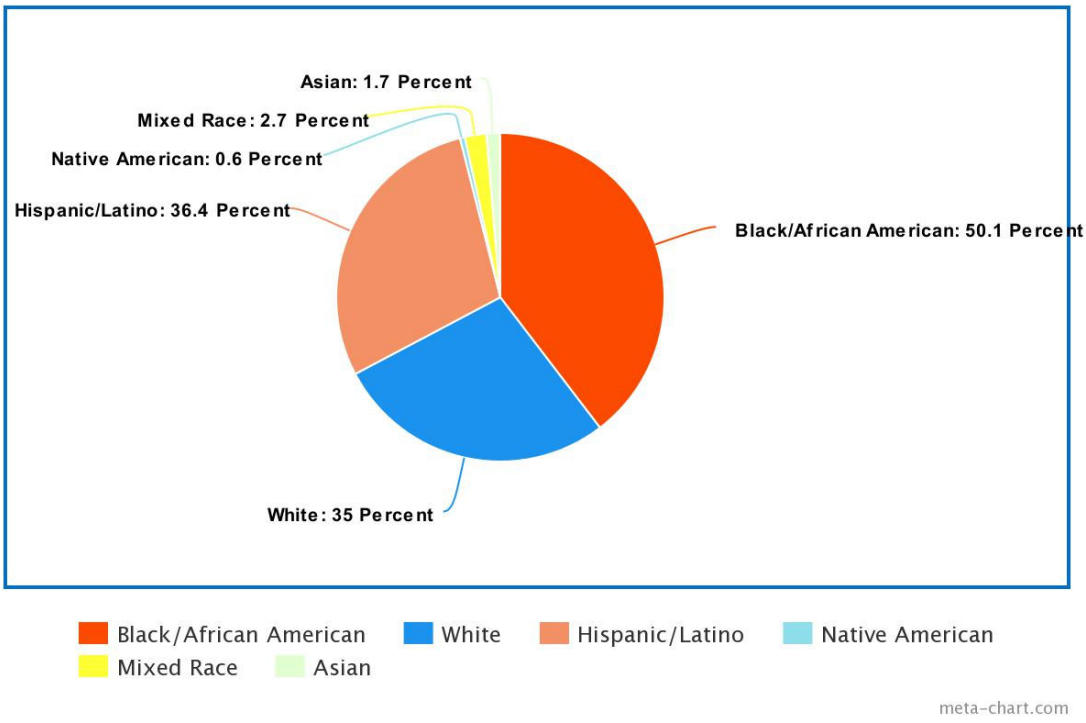

Figure 40, Race Distribution of Newark, NJ, (Author with use of Meta-Chart)

As established earlier, Maternal mortality tends to be worse for women of color and minorities, further establishing that Newark is home to a vulnerable population of women. Additionally, about 28.3 percent of Newark's population lives in poverty (compared to the national average of 11.8).[75] Compounding that fact, while 74 percent of Newark's population has at least a high school degree (the national average being 87.3) only 14.4 percent of the population have a bachelor's degree or higher (compared to 30.9 percent at the national average).[76] Since women of a lower socio-economic status are also at a greater risk of maternal death Newark is the perfect storm of poor Maternal mortality, compounded by a having a sizable population of women in their childbearing years, a high representation of minorities, as well as high

[75] "U.S. Census Bureau QuickFacts."
[76] "U.S. Census Bureau QuickFacts."

poverty and lower education rates. Finally, around 23.3 percent of the population is without health insurance, whereas the national average is less than half that at 10 percent.[77] The demographics of Newark suggest a population that is highly vulnerable to the problem of Maternal Mortality in the state of New Jersey.

Chapter 7: Site Analysis

Site Selection and Existing Conditions

Site Selection

Between the high maternal mortality rate of New Jersey, and the high-risk demographic population of Newark, supported by a public transit system and proximity to education and large-scale health institutions, as well as an apparent need for community building and social architecture, Newark New Jersey would be an ideal location for a women's health and wellness center. Initially, vacant or largely vacant, and underused lots at different scales were selected and then ranked by the sites in three weighted tiers. The most heavily weighted tier calculated by giving the site a score one through ten, ten being the best and then multiplied the score by three. The highest tier selection criteria were the sites proximity to transit, the walkability of the surrounding area, whether the site had any access to green space, and the sites proximity to additional amenities. The second tier, which took the scores out of ten and multiplied them by two consisted of how large the site was (larger being better

[77] "U.S. Census Bureau QuickFacts."

for program scaling and flexibility), how active or urban the surrounding area is, and whether the site was close to medical and educational facilities that would help support the programing of a women's health center. The baseline criteria, for any site selection was based on the maternal mortality rate of the area (higher equating to greater need), whether or not the demographics of the area reflected the demographics of a population that was particularly vulnerable to maternal mortality, as well as on how well the area dealt with the health of its population (worse health outcomes demonstrating greater need for intervention).

Site Matrix	Prudential Dr and Broad St	N 5 St. and Park Ave	Orange and Nesbitt	Central Ave and Market St.
Proximity to Transit	27	30	27	15
Walkability	30	27	15	27
Access to Green Space	29	30	12	21
Proximity to Amenities	24	21	9	15
Site Size	18	4	20	14
Activity	20	8	2	15
Access to Care	10	2	20	10
Maternal Mortality	8	8	8	8
Demographics	8	8	8	8
General Health Data	8	8	8	8
Score	**182**	**146**	**129**	**141**

Figure 41, Initial Site Evaluations and Scoring (Author)

The potential sites consisted of blocks located at Prudential Dr and Broad St (site #1), North 5th St and Park Ave (site #2), Orange and Nesbitt (site #3), and Central Ave and Market St (site #4).

Figure 42, All Potential sites in Newark, NJ, (Author with use of Google Earth)

Once the design process began, however, the programmatic decision to exclude C-section rooms from the design (as a way to de-incentivize medically unnecessary c-sections) made the necessity for quick access to emergency care from the site the most significant driver for determining site location. As a result, the immediate area surrounding Rutgers University Hospital became the focus of the search.

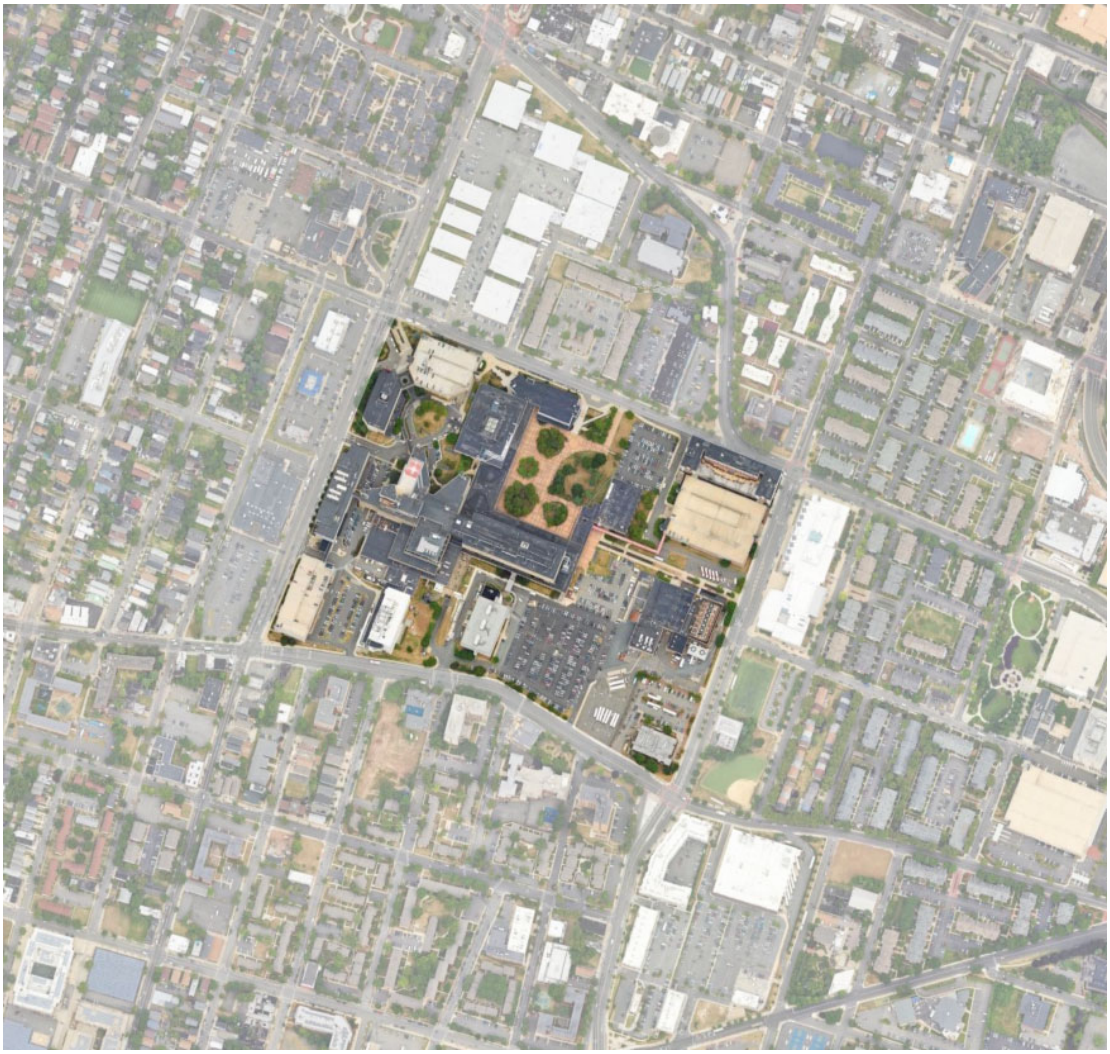

Figure 43, Rutgers University Hospital, (Author with use of Google Earth)

Immediately, a site directly across the street from the hospital entry (on Bergen St.) became the clear choice. Bounded by Bergen Street, 13th Ave, Camden St, and 12th Ave the site is currently only home to a Rite Aid, a KFC, and an IHop. This site creates immediate access too, and an association with Rutgers University Hospital. Additionally, because of the hospital's connection to higher medical

education through Rutgers University, the site of the women's health and wellness center can also be an educational testing ground for new practices.

Figure 44, Final Site, (Author with use of Google Earth)

Preliminary Analysis and Documentation

As can be seen in the figure below, in addition to the Hospital and related buildings (shown in blue) the Bergen St and 12th Ave stie is surrounded by primarily residential buildings (in dark orange) with some commercial buildings (light orange) and civic/public buildings (yellow).

Figure 45, Zoning Diagram, (Author with use of Google Earth)

The busiest street that borders the site is Bergen St (indicated below in the darkest blue), followed by 12 Ave, then Camden St., and finally 13th Ave.

Figure 46, Street Hierarchy, (Author with use of Google Earth)

Chapter 8: Research Conclusions

Maternal mortality is a serious problem in the united states. There is no clear-cut reason why maternal mortality has been rising and congress had taken action recently to try and figure out this complex problem. Overly high rates of c-sections (which increase the risk of complications), medical bias against women and minorities, difficulty of accessing care, fear or distrust of medical professionals are all things that contribute to this problem. Additionally, the current physician healthcare system leaves women feeling left behind, and more and more women are seeking out more personalized and compassionate care. Providing personalized care is not only makes women feel better about their care but can also help provide a framework for better taking care of women, before, during, and after childbirth. Ultimately,

personalized care and better support networks (particularly postpartum) would help to identify and address not only the physical needs of women, but also their mental and emotional needs as well.

Newark, NJ is an ideal location to explore these systematic problems and how architecture can foster better and more holistic care, while also providing women with a space that does not isolate them but rather provides them with a place in which they can find support and community. Integrating these two program types, health and community, will get to the root of this exploration.

The history of women and childbirth is a rollercoaster, and while medical technology has drastically and quickly improved in recent memory, inhumane birthing practices were the standard in the US from 1920-1960. When made aware of this history, its unsurprising that there still seems to be a pervasive disconnect between healthcare practitioners and patients. Therefore, it is a key part of the program for the proposed building type that education of staff and patients, as well as advocacy services be provided within the same building as the community spaces and healthcare spaces. Thus, this thesis seeks to explore what happens and what is possible when health, community, and educational programs are brought together in one accessible space.

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