

Bellarmino University

ScholarWorks@Bellarmino

Undergraduate Theses

Undergraduate Works

2023

Black Maternal and Infant Mortality Rates and Food Apartheid in Louisville

Maame Dei
deimaame@gmail.com

Follow this and additional works at: https://scholarworks.bellarmino.edu/ugrad_theses



Part of the [Maternal and Child Health Commons](#), and the [Women's Health Commons](#)

Recommended Citation

Dei, Maame, "Black Maternal and Infant Mortality Rates and Food Apartheid in Louisville" (2023).
Undergraduate Theses. 133.
https://scholarworks.bellarmino.edu/ugrad_theses/133

This Honors Thesis is brought to you for free and open access by the Undergraduate Works at ScholarWorks@Bellarmino. It has been accepted for inclusion in Undergraduate Theses by an authorized administrator of ScholarWorks@Bellarmino. For more information, please contact jstemmer@bellarmino.edu, kpeers@bellarmino.edu, jboyd@bellarmino.edu.

Black Maternal and Infant Mortality Rates and Food Apartheid in Louisville

Maame Dei

Bellarmino University

Honors Program Undergraduate Thesis

Advisor: Dr. Jessica Hume

Reader: Professor Erin Wiedmar

Department of Health and Aging Services Leadership

April 21st, 2023

Table of Contents

Abstract..... 3

Introduction.....4

Chapter One.....8

Chapter Two.....17

Chapter Three.....25

Chapter Four.....33

Chapter Five.....37

Implications.....47

Conclusion.....51

Bibliography.....53

ABSTRACT

The purpose of this thesis is to determine whether there is a correlation between the Black maternal and infant mortality rates and food apartheid or food deserts. This thesis will highlight that further research is needed in understanding how food insecurity may influence maternal and infant mortality. This thesis collected data from several midsize cities to assess accessibility to healthy food options and maternal and infant mortality rates. The cities were selected based on similarities in demographic and geographic makeup and having experienced a similar pattern of redlining. St. Louis, Memphis, Knoxville, and Pittsburgh were cities that were chosen for comparison to Louisville. Since Louisville is the main city of focus for this thesis, Louisville will be the benchmark used to compare the other chosen cities. Factors such as food insecurity, food deserts, grocery store areas, and maternal and infant mortality rates were collected. The data from each city was extensively analyzed and interpreted. The data shows there may be a correlation between redlining, food insecurity, and high rates of Black maternal mortality or Black infant mortality rates. The information from the different cities shows that neighborhoods that were colored red during the redlining policies were more likely to have high rates of food insecurity. These neighborhoods are more likely to have high rates of maternal and infant mortality for people of color, specifically Black women and children. Further research is needed to explore food apartheid as another factor that may exacerbate Black maternal and infant mortality rates.

INTRODUCTION

Dr Martin Luther King Jr once said, “Of all the forms of inequality, injustice in health is the most shocking and inhumane” (Galarneau, 2018). There have been several researchers who have tried to understand the causes of health disparities. Some have theorized that it is caused by economic disparities, lack of representation, implicit bias, lack of cultural competency in healthcare professionals among others. There is little available research that looks at nutrition and food deserts as factors that play a role in these disparities. Healthcare disparities among minority and vulnerable groups in the United States have been silently killing many members of such groups. Although health disparities have been documented for over two centuries, the causes are not fully understood (Baldwin, 2003). Healthcare disparities include the differences in mortality rates of Black women and infants in comparison to White women and infants. Black women have a higher maternal and infant mortality rate compared to White women. In the U.S., Black women are dying at three to four times the rate of non-Hispanic white mothers (Novoa & Taylor, 2018). Infants born to Black mothers are dying at twice the rate as infants born to non-Hispanic white mothers (Novoa & Taylor, 2018). Even with economic and education controlled, these rates remain notably high as Black women and infants have significantly higher rates of maternal and infant mortality.

These patterns are evident in different cities in the United States, but the city of Louisville will be examined extensively. Residential segregation is evident in Louisville and most residents are aware of the Ninth Street Divide, where the city is divided into Black and White neighborhoods (Mattingly, 2021). This history can be dated back to slavery and was reinforced due to redlining. West neighborhoods are made up of predominantly Black families while most areas in East Louisville are exclusively occupied by White families (Mattingly,

2021). According to the Louisville Health Equity Report, Black babies have a 1.95 times higher death rate than Metro Louisville as a whole and have a 2.3 times death rate higher than White babies and 2.9 times higher than Hispanic babies (Bailey & Bruggers, 2017).

Additionally, throughout this paper, the terms “food desert” and “food apartheid” will be used interchangeably. This is because the term desert implies that the inaccessibility to healthy foods is a natural phenomenon and not human created (Sevilla, 2021). This removes accountability as it ignores the human created policies and conditions that stems from systems of oppression that leads to food “deserts.” Food deserts are most prevalent in lower-income neighborhoods and communities. The use of the word “desert” also suggests that low-income communities and communities with people of color are vacant, abandoned, and valueless. The word “apartheid” is a more accurate term that describes inaccessibility to food as the result of intentional and systemic racial and economic oppression (Engel). The term “food apartheid” recognizes that issues surrounding food access are created by humans and require systemic solutions. Food Apartheid shifts the focus from economic and geographic access and focuses on root causes of the system of food injustice like zoning codes, unchanging wages, and racial bias in housing policies (Engel). However, the term “food apartheid” is a relatively new term to describe food access problems so for the purpose of data collection for this paper the term “food desert” will be used.

In the 2008 Farm Bill, a “food desert” was defined as an area with limited access to affordable and nutritious food (Food, Conservation, and Energy Act of 2008, p.2039). In these areas, healthy foods are available at relatively high prices or healthy foods are geographically far from the community (Bitler & Haider, 2010). Some researchers have argued that residential segregation has a negative impact on infant health among non-Hispanic Black people compared

to non-Hispanic white people. This could mean that another factor contributing to the high rates of poor health for Black infants is the prevalence of food deserts and lack of healthy food availability caused by residential segregation. Racial and socioeconomic segregation exposes minority groups to lower quality of education, poor housing quality, poor access to healthcare, lower employment opportunities, and restricted access to healthy and fresh food options (Sparks, Sparks, & Campbell, 2013).

The west side of Louisville has been designated as a food desert area. A report composed by the Mayor's Healthy Hometown Movement found that people living on both the west and east side of Louisville were experiencing inequities in gaining access to food. These residents have limited access to complete grocery stores and limited options for mode of transportation to stores in other neighborhoods with grocery stores (2017). In an attempt to understand the role of "food desert" areas, alcohol availability and pregnant women. Some researchers have studied whether pregnant women in these areas are more likely to use alcohol during gestation. Previous knowledge shows that the use of alcohol in the first three months of gestation has been shown to cause abnormal facial features (Alcohol use, 2021). Alcohol use during this time can cause growth and developmental abnormalities of the central nervous system such as low birth weight, impaired mental activities or disorders affecting the central nervous system (Goodlett & Horn). Tobacco has been linked to increase the risk of miscarriage and preterm birth and has been linked to sudden infant death syndrome (SIDS) (Rice, 2020). Food desert communities like the west side of Louisville have lots of convenience stores selling products such as tobacco and alcohol. Limited access to fresh foods can negatively impact the health of both mother and child. Exposure to an environment where people smoke can lead to secondhand smoking which can have a negative impact on the health of the mother and developing child. But there is no

substantial evidence that shows that pregnant women living in “food desert” areas are more likely to use alcohol during pregnancy. This paper will collect data from the chosen cities of interest to take a deeper look at accessibility to healthy food options and the rates of maternal and infant mortality rates. These cities were selected based on similarities of demographic and geographic makeup and having experienced a similar pattern of redlining. The selected cities for comparison are St. Louis, Memphis, Knoxville, and Pittsburgh. Each chapter will examine a variety of factors at play in all these cities looking at food insecurity, food deserts, grocery store areas, and maternal and infant mortality rates. The first chapter will look at the demographics of Louisville, the redlining history of Louisville, grocery store accessibility, rates of food insecurity, maternal mortality, preterm birth, infant mortality and low birthweight. The second chapter will look at the demographics of St. Louis, its redlining history, grocery store accessibility, rates of food insecurity, maternal mortality, preterm birth, infant mortality and low birthweight. The third chapter will contain data about the demographics of Memphis, its redlining history, food desert areas, grocery store accessibility, rates of food insecurity, maternal mortality, preterm birth, and infant mortality. There was no information on rates for low birth weight for Memphis. The fourth chapter will collect data on the demographics of Knoxville, its redlining history, food desert areas, rates of food insecurity, maternal mortality, preterm birth, and infant mortality. There was no information on rates for low birth weight and grocery store accessibility. The fifth chapter will collect data on the demographics of Pittsburgh, its redlining history, food desert areas, grocery store accessibility, rates of food insecurity, maternal mortality, low birthweight, preterm birth, and infant mortality. The subsequent chapter will compare the information from the various cities which will be followed by a concluding chapter.

CHAPTER ONE

Louisville

Louisville has a combined area of 397.68 square miles with 380.46 square miles consisting of land, and 17.23 square miles covered with water. Louisville is the largest city in Kentucky with a current population of 344, 794 (Louisville, Kentucky Population). Louisville is the sixth most populated city in the Southeast and the 28th most populated city in the United States. It is known as the home of boxer Muhammed Ali, the Kentucky Derby and Kentucky Fried Chicken. To better understand the current structure of Louisville, its history needs to be examined and understood.

In 1933, the Homeowners Loan Corporation was made to make home ownership available to Americans during the Great Depression, thus beginning the genesis of redlining. Redlining was a discriminatory practice of denying loans or financial services to people in certain neighborhoods; these policies were created to maintain already established racist practices. Financial services were based on racial makeup instead of the structure or physical characteristics of the neighborhoods. This system ranked and color-coded neighborhoods on a scale of A to D, with A signifying high quality and colored as green. While grade D indicated the lowest quality of neighborhoods and were colored as pinkish red. The lowest quality areas indicated as pinkish red were most predominantly African American neighborhoods or minority communities. Looking at the 1937 redlining map, the green and blue colors representing A and B were clustered in the east in places like St. Matthews, Indian Hills, and portions of Highlands (Marshall, 2021). These areas had good housing stock even with the high potential for flooding,

but they had a similar racial population makeup with no Black or Jewish populations. During this time, areas located in the west side of Louisville such as Shawnee Parke were colored blue as those areas were exclusively made up of White populations. The yellow-colored areas or C ranked areas were barriers separating the green/blue colored areas from the red colored areas (Marshall, 2021). The red colored areas included neighborhoods such as Smoketown, Shelby Park, Russell, and Portland (the last two neighborhoods are in the West-End). Majority of the White population lived in the West end of Louisville starting from the 1950's to 1960's. Nonetheless, due to urban renewal and other infrastructure projects most homes and businesses were demolished leading to the racial geographic as seen in Louisville now (Marshall, 2021). With the majority of the White population now living in the East end of Louisville and the majority of the Black population living in the West End of Louisville.

Grocery store access

The Community Farm Alliance (CFA) established that there is an average of 1 full-service grocery per 25,000 residents in West Louisville in comparison to 1 per every 12, 500 residents in Jefferson County (Platt, 2021). This data indicates that grocery stores in West Louisville are most likely to be overwhelmed because they serve a larger portion of the community. CFA also reported that East Downtown had access to little-to-no grocery stores and supermarkets. The historical background of redlining in Louisville may help explain the inaccessibility to grocery stores occurring in the city. Access to healthy food choices is beneficial to people in all age groups. But proper nutrition is arguably one of the most important factors in enabling a person to have a high quality of life while experiencing little to no dietary related illnesses. In 2010, Louisville ranked 10th among peer cities in households living in a food desert, the peer cities included Memphis, Knoxville, St. Louis, etcetera. This is a result of the

generational disinvestment of West Louisville, where resources in these areas have been diverted to East Louisville and other areas. It was estimated that 3.56 percent of households live in a food desert (Greater Louisville Project, 2020). A 2007 report on Louisville's food environment concluded that people in West Louisville had the worst access to mainstream groceries. Healthy dietary choices are dependent on the availability of fresh food and the proximity of grocery stores to neighborhoods and homes.

A study conducted in one of the poorest neighborhoods in New York City showed that obesity rates in children decreased due to access to supermarkets (Rummo et al., 2022). Another study found that the presence of convenience stores in a neighborhood was associated with higher incidence of obesity (Morland et al., 2006). This provides another way to determine the health of a community which is to compare the rates of obesity to the number of convenience stores to grocery stores in the area. According to the Department of Agriculture, in 2010 17.9 percent of the population in Louisville lived a mile or more away from a grocery store in urban areas and more than 10 miles away in rural areas (USAFacts, 2021). 44, 000 residents of Louisville live in food desert areas and 20,000 seniors live more than a mile away from the nearest supermarket (Greater Louisville Project, 2020). Historically areas that have been designated as food desert areas have less access to stores that sell fresh fruits and vegetables, but these areas were heavily populated with convenience stores that sell alcohol, tobacco products, and were crowded by fast-food restaurants.

Residents living in food deserts have to travel more than one mile to get to a grocery store and have no access to a vehicle (Mills, 2018). Residents in food desert areas are more likely to not have access to vehicles to get to the city to access other grocery stores in other parts of Louisville further exacerbating these disparities (State of Food, 2008). The additional barrier of

not accessing transportation makes it difficult for residents who don't own a vehicle to get the fresh foods they need. In 2014, it was determined that only 9% of the population in Louisville/Jefferson County had access to a grocery store within a five-minute walk (Johnson, 2014). Thus, illustrating that residents in Louisville will have to walk more than five minutes from their homes to access any food options.

The American College of Sports Medicine ranked Louisville as the fifth unhealthiest city in America (2013). In Louisville, the infrastructure of the city does not enable all residents to acquire the proper nutrition needed for them to be healthy. In 2019, it was estimated that 67.6 percent of Louisville residents have limited access to healthy foods compared to an average of 65.4 percent across the Dashboard's cities (*City Health dashboard*). Inaccessibility to healthy food options may cause residents to not meet the nutritional requirements needed to be healthy. When this occurs then the population will be more likely to experience high rates of obesity, heart diseases, and diabetes. Data also shows that low-income residents in Louisville residents are more likely to experience significantly higher rates of obesity and other diet related health problems than the population as a whole (The Food Trust, 2018).

Food insecurity

Food insecurity is defined as having unreliable access to affordable or nutritious food options. According to Feeding America (a hunger-relief organization), the rate of food insecurity in Jefferson County was 11.5 percent and the average meal cost was \$3.13 higher than the state's average of \$2.79 (Overall (all ages) hunger & poverty in Jefferson County, Kentucky). This means that people in Jefferson County have to pay more money per meal than people in the overall state of Kentucky. In 2015, Louisville was ranked fifth in food insecurity among similar cities like St. Louis, Oklahoma, Knoxville among others with about 16.1 percent of the residents

experiencing food insecurity (Greater Louisville Project, 2020). It was estimated that food insecurity affects 12, 100 residents of Louisville including 1 in 6 children. In 2020, the number of people in Jefferson County experiencing food insecurity were 88, 230 (Overall (all ages) hunger & poverty in Jefferson County, Kentucky). In addition to increasing the number of grocery stores that are accessible to those living in food desert areas, there needs to be an increased number of farmer's markets in close proximity to those communities. In 2009, there were 27 active farmer's markets in Louisville but only four of those markets were located in areas that lacked access to fresh food.

Maternal mortality

Maternal mortality is defined as the death of a woman between the ages 15-55 during pregnancy, within one year of the end of pregnancy or within 42 days of termination of pregnancy. CDC reported that some of the clinical causes of maternal mortality involved cardiovascular conditions such as blood clots, heart muscle disease, high blood pressure, stroke, infection, postpartum bleeding among others (Declercq & Zephyrin, 2020). The maternal mortality rate for Kentucky was 37.7 births per 100,000 live births, which is the highest rate in the history of the state (Ansari, 2021). According to the 2020 Kentucky Maternal Mortality Review Committee Annual Report, Black women in Louisville and Lexington had higher rates of maternal mortality even with available advanced maternal care in urban cores of the state (Kentucky Department for Public Health....., 2020). In 2018 it was estimated in Louisville that 42.8 Black women died per 100,00 live births in comparison to 17.2 white women per 100,000 live births (McKenna, 2022).

In Jefferson County, 10 percent of non-Hispanic Black mothers and 7.7 percent Hispanic mothers received little to no prenatal care during their pregnancy in comparison to 4.3 percent of

non-Hispanic white mothers (A Qualitative Assessment, 2022). The maternal mortality disparities in Louisville could be a result of the differences in prenatal care that is accessed by the different racial groups. Black women were less likely than White women to receive prenatal care, this may contribute to the high rates of mortality in the city. Black women have reported being disregarded by their providers because of their race, not having autonomy over the decisions during the pregnancy, labor, and delivery.

In addition to these causes, racism and bias can negatively impact the interaction that Black women have with the medical field during pregnancy. This negative experience in addition to concerns surrounding healthcare insurance may potentially decrease the quality of care that they receive (Declercq & Zephyrin, 2020). The negative experience faced by Black women may be another factor in understanding why Black women are less likely to utilize prenatal care during their pregnancy.

Food access is one of the factors that can determine the health outcome of a fetus in utero. Eating healthy foods, staying active, gaining the right amount of weight are factors that have a huge impact on the health of a child and mother. A study conducted on a group of pregnant Mexican women found that high quality diet during pregnancy may positively affect fetal development, decrease likelihood of low birth weight in infants, and may modify risk of developing chronic diseases later in life (Reyes et al., 2021). This shows that proper nutrition is very important during pregnancy and post pregnancy for both mothers and infants.

Preterm birth

Preterm birth is any birth or delivery occurring before 37 weeks of gestation (Quinn et al, 2016). According to the Louisville birth rates 2014-2018 report, “the Jefferson County preterm

birth (percentage of births delivered at less than 37 completed weeks of gestation) rate increased from 9 percent in 2017 to 10.9 percent in 2018. Notably, the percent of preterm birth increased substantially for Black women during that time, while it decreased for all other groups. Preterm or low birth weight are considered risk factors that increase the chances of the death of an infant. Between 2014 and 2018, the preterm births decreased for Hispanic mothers, and non-Hispanic White mothers yet these rates increased for non-Hispanic Black mothers (Birth and Death Trends, 2021). The overall percentage of preterm births in Louisville was estimated to be 13.4% in 2014 and 10.9% in 2018. For non-Hispanic White mothers, the preterm birth rate was 13% in 2014 and 10% in 2018. The same report estimated that the rate of preterm births for Hispanic mothers were 14.6% in 2014 and 9.2% in 2018. For non-Hispanic Black mothers, the rate was 13.2% in 2014 and 14.1% in 2018 (Birth and Death Trends, 2021). Despite the differences and fluctuations of the rates of preterm birth for the different groups, the report did not indicate the reasons behind the data. In 2020, 1 in 9 babies born in Louisville were preterm, 13.7% of black infants were preterm, 10.2% for Hispanics, 9.6% for Whites, and 8.1% for Asian/Pacific Islanders (MarchofDimes). The data clearly outlines that the preterm birth rates for Black infants were higher than any racial groups in Louisville. A factor that could account for the disparities in preterm birth rates is inadequate nutrition or poor maternal nutrition.

Infant mortality

The Center for Disease Control and Prevention (CDC) defines ‘infant mortality’ as the death of an infant before their first birthday. While infant mortality in Kentucky has slowly been falling, the death rate for Black babies from 2011 to 2015 was 1.95 times higher than for Louisville Metro; 2.31 times higher than for White babies; and 2.88 times higher than for Hispanic babies. As the infant mortality rate decreased in the overall city, the rates for Black

infants were high, and much higher among infants from other racial groups. In 2014, the infant mortality rate for non-Hispanic White mothers was 4.3 percent and the rate was 13.6 percent for non-Hispanic Black mothers. Infants born to non-Hispanic Black mothers experienced mortality rates that were about 3 times higher than infants born to non-Hispanic White mothers. Then in 2018, it was estimated that the infant mortality rate was 5.1 percent for non-Hispanic White mothers and 9.5 percent for non-Hispanic Black mothers (Birth and Death Trends, 2021). In 2018, the rates of infant mortality increased for non-Hispanic White mothers while the mortality rate decreased for non-Hispanic Black mothers. However, the infant mortality rate disparities between non-Hispanic White mothers and non-Hispanic Black mothers were still significant. Although the infant mortality rate increased for non-Hispanic White mothers and the rate decreased for non-Hispanic Black mothers, yet the infant mortality rate for Black infants was significantly higher than that of White infants. Maternal nutrition is a vital determinant of infant health and poor maternal nutrition can contribute to infant mortality directly or indirectly.

Low Birthweight

Low birthweight is defined as the percentage of infants that weigh less than 2,500 grams or 5.5 pounds at birth (Birth and Death Trends, 2021). In 2014, it was reported that the overall percentage of low birthweight was 12.3 percent, but these rates decreased to 9.3 percent in 2018. The rates of low birthweight decreased for non-Hispanic White mothers in 2018, however these rates increased for non-Hispanic Black mothers (Birth and Death Trends, 2021). However, the disparities between different racial groups of mothers were astonishing over the four-year period. In 2014, rates of low birthweight for non-Hispanic White mothers were 13.8 percent and 13.2 percent for both non-Hispanic Black mothers and Hispanic mothers. In 2018, these rates were 6.9 percent for non-Hispanic White mothers, 6.1 percent for Hispanic mothers, and 15 percent

for non-Hispanic Black mothers (Birth and Death Trends, 2021). The previous percentages show that there was a significant decrease in low birth weights for non-Hispanic White and Hispanic mothers. Yet these rates increased significantly for non-Hispanic Black mothers between 2014 to 2018. The report, however, could not fully explain why the disparities existed for the different groups. A factor that could explain the disparities could be the lack of healthy nutrition options available to predominantly Black women in Louisville. Black women are more likely to live in communities that have limited healthy food options thus making it hard for these pregnant women to meet the nutritional requirement needed for them and the baby to be healthy.

Relevance

The information collected about Louisville showed that food accessibility and availability is a growing problem. In an attempt to address and solve this issue, the leadership of the city increased the number of farmer's markets. However, the farmer's markets are located in areas that already have access to food thereby widening the gap of food inaccessibility for those living in food desert areas. The data collected on infant and maternal mortality rates show that Black mothers and infants are more likely to have higher mortality rates in comparison to their White and Hispanic peers. Several factors could contribute to this problem, such as lack of prenatal care, racism and bias when interacting with medical providers or inaccessibility to healthy food options. In Louisville, minority populations make up a substantial amount of the population that live in food desert areas and these groups are more likely to face high rates of food insecurity. The data shows that there could be a correlation between healthy food access and mortality rates, thus illustrating food inaccessibility as another factor that could exacerbate the mortality rates for Black women and infants. Food apartheid may be another vehicle that is fueling the high rates of mortality for Black women and infants.

CHAPTER TWO

St. Louis

According to the United States Census Bureau, the city has a total area of 66.2 square miles with 61.9 square miles of it consisting of land, and 4.2 square miles of it being water (U.S. Census Bureau quickfacts: St. Louis). The estimated population of St. Louis was 293, 310. The Delmar Divide as named by BBC represents the racial divide in St. Louis County. Delmar Boulevard is a dividing line that runs east to west of St. Louis County and city. In this divide 95 percent of Black residents live north of Delmar Boulevard and almost two thirds of white residents live south of Delmar Boulevard (Cooperman, 2004).

Residents in St. Louis voted on a reform in 1916, that prevented anyone from purchasing a home in a neighborhood with more than 75 percent occupied by another race (Cooperman, 2004). This means that white person couldn't purchase a home in a neighborhood if more than 75 percent of those living there were white. This was the first popular vote that imposed racial segregation on housing in the nation. When the Supreme Court made this law illegal the following year, some residents in St. Louis asked every family on a block or in a subdivision to sign a legal document pledging to never sell their home to an African American- this practice was made illegal in 1948. Outlawing the practice encouraged white flight as white families abandoned neighborhoods in North St. Louis for the suburbs (Collins, 2021). Beginning in the 1930s, mortgages and other home-based lines of credit were systematically denied to people in Black neighborhoods (Abello, 2019). White ownerships were more prominent in the southwest areas in St. Louis city (Collins, 2021). The Ville is a historically Black neighborhood north of St. Louis a previously segregated area (Ruff, 2021). Homes north of the Delmar line valued at

\$2000 are the same as homes south of the line but those houses are worth hundreds of thousands of dollars (Abello, 2019).

Grocery store access

18.2 percent of the population in the St. Louis area live a mile or more away from a grocery store in urban areas and more than 10 miles away in rural areas in 2010 (Bird, 2022). In 2014, about 54.9 percent of residents in St. Louis lived in food desert neighborhoods as classified by the U.S. Department of Agriculture (USDA) (2020). This means that the percentage of the population that lacked access to grocery stores increased by 36.7 percent in four years. The USDA ranked St. Louis as the 24th worst city in the country in the category of healthy food access (Obradovic, 2020). With St. Louis being part of the worst city in the country with healthy food access, this could negatively impact the health of the residents in the city. In 2015, the USDA reported that 33 percent of the people in St. Louis were living in food desert areas. But the proportion of the population that lives in St. Louis that live in food desert areas decreased from 2014 but the percentage was still higher in 2015 than in 2010.

13.9 percent of Black residents that live in the St. Louis Metro Area live in a low-income census tract and live at least one mile away from a grocery store while only 4.9 percent of the white residents face the factors listed above (Obradovic, 2020). This means that Black residents are more likely to live in low-income areas and live further away from a grocery store in comparison to white residents in the St. Louis metropolitan area. The USDA Food Access Research Atlas concluded that East St. Louis was a food desert area with low-income residents who live more than a mile from the nearest supermarket (Adhikari, 2021).

An article found that a resident in St. Louis had to travel to a more affluent neighborhood grocery to access better quality of foods even though the same store was located in the resident's neighborhood (Meko, 2021). It is very interesting that the same grocery stores have different quality of products, and the quality of the products depends on the neighborhood. More affluent neighborhoods were more likely to have stores that carry better quality of foods, with Black residents having a higher percentage of living in low-income areas. This means that Black residents are more likely to live in neighborhoods that do not carry high quality foods products.

Food insecurity

The national average percentage of residents in food insecure areas in 2014 was 15.8 percent but the average was 25 percent for those living in St. Louis. Residents in St. Louis are more likely to live in food insecure areas in comparison to the average residents in the U.S. 55 percent of residents in St. Louis were living in food desert areas while the national average was 23 percent according to the USDA (2020). The percentage of residents in food desert areas was about two times higher than the national average. In 2017, the national population who were food insecure was 12.7 percent while the population for St. Louis was 13.4 percent much higher than the national average (Bruton, 2020).

Food insecurity has also been linked to the increase in gun violence in certain areas. Although food insecurity has always been linked with decreased quality of health, there might be a correlation between food insecurity and gun violence. According to a Kansas City Star analysis of federal data and police report, about 70 percent of the city's 271 homicides took place in areas without access to groceries for at least half a mile (Meko, 2021). Some researchers have speculated that some of the factors that lead to high rates of gun violence include deficits in the social determinants of health such as income, education, food security among others. St. Louis

for the past decade has ranked No.1 for food insecurity while the city also leads in gun violence in the state (Meko 2021). This data could indicate that food insecurity may play a role in the rates of gun violence in St. Louis.

Maternal Mortality

According to the CDC, Black women are three times more likely than white women to die from pregnancy related causes in the U.S (Center for Disease Control and Prevention, 2022). In Missouri, Black women are four times more likely to die compared to white women (Coronel, 2022). Based on these statistics, the maternal mortality rates for Black women are much higher in Missouri than the rates in the U.S. The rate of maternal morbidity for Black women is 220 per 10, 000 live births, and 89 per 10,000 live births for White women. Maternal morbidity are the unexpected acute conditions that occur during labor or delivery. These include blood transfusion, hysterectomies among others as these could lead to maternal mortality. Black pregnant women in St. Louis are twice more likely to die from pregnancy related causes than white pregnant women (Infant & Maternal, 2022). The overall maternal mortality rate in St. Louis was determined to be 36.7 per 10, 000 per live births, and the rates for maternal mortality for Black women was 53.8 per 10,000 live births compared to 48.8 in the state of Missouri and 45.5 in the U.S. (Infant & Maternal, 2022). The maternal mortality rates for Black women were higher than the overall maternal mortality rates in the city, state, and nation. From 2017 to 2019, the pregnancy related mortality ratio was three times more for Black women in comparison to White women (Missouri Pregnancy, 2022). About 75 percent of pregnancy-related deaths among women in Missouri were preventable (Weinberg, 2022). Surprisingly, more than half of death due to pregnancy were preventable, meaning the maternal mortality rates for Black women are avoidable. Interestingly, researchers found that 53 percent of pregnancy related deaths were among those whose births

were covered by Medicaid (Weinberg, 2022). The ratio of pregnancy-associated deaths were eight times more likely to occur among women on Medicaid in comparison to those with private insurances (Missouri Pregnancy, 2022). Medicaid does not cover expenses for doulas and other at home visiting programs that support pregnant women and their babies. These services have been shown to improve the health of women and infants as they are able to create a personalized health plan. The negative stigma associated with Medicaid and the implicit bias among healthcare providers can cause these groups of women to receive low quality of healthcare. Healthcare providers serving Medicaid holders are less likely to take the time to provide these patients with the care that they need, or the concerns of these patients may not be taken seriously. This indicates that there is correlation between types of insurance and pregnancy associated deaths. Women on Medicaid were more likely to die from pregnancy associated causes in comparison to women with private insurances.

During 2017 and 2019, 28 percent of women in Missouri reported not receiving prenatal care during the first trimester. Between 2017 and 2019, Black women did not receive prenatal care during their first trimester, and the rate for receiving prenatal care was 57 percent (Missouri Pregnancy, 2022). These rates indicate that women were not receiving prenatal care especially Black women, the lack of prenatal care could negatively affect the health of both mother and infant.

Preterm Birth/Low Birth weight

Low birthweight or premature births were notably lower in rural counties than in urban counties. Women who live in urban counties are less likely to give birth to infants with low birth weight or give birth early. However, Black women in rural areas had a higher rate of low birthweight and preterm births than both White women in rural/urban areas and Black women in

urban areas from 2009-2019 (Missouri Pregnancy, 2022). Regardless of race from 2017 to 2019, women living in rural Missouri counties were two times more likely to smoke while pregnant. Smoking while pregnant can be a risk factor that could lead to infants having low birthweight. But it is quite fascinating that Black women in rural areas have a higher chance of having premature births or having infants under the birthweight in comparison to white women in rural or urban areas. Even with smoking being a risk factor for infants with low birthweight, however it does not thoroughly explain why white women in both rural and urban areas have better lower rates of low birth weight in comparison to Black women in rural areas. So, there could be another factor contributing to the disparities of low birth weights for Black women in rural areas.

Infant Mortality

The infant mortality rate in Missouri was 6.1 per 1,000 live births in 2019 (Maternal mortality rates). The infant mortality rates for Black infants are three times higher than for White infants (Ferguson, 2022). Infant mortality rate for St. Louis is above the national average while Black infant mortality rates are higher compared to the national rate. The overall infant mortality rate in St. Louis was estimated to be 7.1 per 1,000 live births and the rate for Black births was 11.1 per 1,000 live births. Data collected from 2009- 2019 found that the average infant mortality rate for St. Louis is decreasing significantly (*Infant Mortality Rate, 2021*). Infant mortality rates were higher in zip codes in the inner and outer north of St. Louis (Maternal and Child Health Profile, 2019). Potentially, the type of neighborhood that the mother of an infant lives in determines whether the infant will live or not. In 2018, the rate of fetal death was 7.1 per 10,000 live births and the rate for Black mothers was 12.9 per 10,000 live births in St. Louis County (Maternal and Child Health Profile, 2019).

The rates of fetal deaths for Black mothers have increased significantly between 2014 and 2018 from 6.4 per 1,000 births to 12.9 per 1,000 births. For the past four years from 2014 to 2018, the number of fetal deaths has increased for Black mothers. Fetal death is the spontaneous death of a developing fetus in the uterus and the causes include stillbirth, preeclampsia, issues with the placenta etc. Some of the risk factors for fetal death include smoking, older maternal age, inadequate prenatal care, malnutrition etc. (Maternal and Child Health Profile, 2019). Fetal death rates for mothers living in neighborhoods with lower poverty rates were remarkably lower than the rate for St. Louis County. Black mothers and mothers living in the Inner North had fetal death rates that were notably above the rate for St. Louis County (Maternal and Child Health Profile, 2019). This shows that the community that mothers and Black mothers live in determines the life outcome of their children.

Relevance

The information collected about St. Louis illustrated that there were more people in St. Louis that live in food desert areas than those in the U.S. In addition to food deserts being linked to health issues there seems to be a correlation between food insecurity and gun violence. For the past decade St. Louis has been ranked number in food insecurity and also leads in gun violence in the state. Black women in St. Louis were two times more likely to die from pregnancy related causes in comparison to white women. The maternal mortality rates for Black women were higher in the overall city, state, and nation. Interestingly, women with Medicaid were more likely to have higher rates of pregnancy related deaths compared to women with private insurances. Women who live in urban cities were likely to have premature births or low birth weights. Black women in rural areas were likely to have higher rates of premature births than Black women in urban areas and white women in both urban and rural areas. Black infants just like Black women

were more likely to have higher rates of mortality than white infants. Infant mortality rates were higher in zip codes in the inner and outer north of St. Louis. St. Louis illuminates that the type of a community a Black mother lives in affects the life outcome of both mother and child. In St. Louis, food apartheid may be a factor contributing to the disparities in mortality rates for Black women and infants. As Black mothers are more likely to live in food apartheid areas leading to a poor maternal nutrition and that could have adverse effects on the health of both the mother and infant.

CHAPTER THREE

Memphis

According to the United States Census Bureau, Memphis Tennessee has a total size of 324.0 square miles with 315.1 square miles consisting of land, and 9.0 square miles consisting of water. The estimated population of Memphis in 2021 was 628, 127 (U.S. Census Bureau quickfacts: Memphis City). Shelby County is the country seat for Memphis, Tennessee.

The fruits of the practice of redlining in the 1930s are still evident in minority communities and generational wealth gap in Tennessee. Redlining maps were used as guides to help federal and local governments working along with banks and insurance companies to create policies concentrating investments into greenlined communities. As a result, investment into redlined communities decreased thereby concentrating poverty in those communities (Bradley, 2019). Neighborhoods that were redlined in the 1930s include Orange Mound, Binghamton, North, and South Memphis. Due to redlining, the value of homes of residents in North and South Memphis plunged (Garriss, 2020). This led business owners, residents, and developers to move to areas with high home values in the greenlined communities.

Chickasaw Gardens is one of the city's upper-class neighborhoods and has some homes that are worth half a million dollars or more. Less than a mile away is Orange Mound, which is one of the nation's first neighborhoods that were created for and by African Americans. However, the property values of homes in Orange Mound over the past decade have decreased rapidly (Garriss, 2020). Redlining enabled white families to be able to build intergenerational wealth, ultimately leading to a decrease in investment in public transportation, public education, and public resources. People who primarily use cars are less likely to invest their money in

public transportation. Neighborhoods that were redlined currently experience high rates of poverty, vacancies, unbanked households, and shorter life expectancy rates. For decades these neighborhoods were blocked from receiving investment and resources that have shaped its current social environment (Garriss, 2020). Although, The Fair Housing Act of 1968 caused redlining to be illegal discriminatory housing practices are still used today. In 2016, BancorpSouth made a \$10.6 million settlement for denying and raising loan prices for minority borrowers, deliberately not building branches in minority neighborhoods in Memphis, and directing marketing towards predominantly white neighborhoods in Memphis (Bradley, 2019). However, \$10.6 million is a little over one percent of Bancorp South's annual revenue. In that same year, First Tennessee, settled for \$1.5 million after there were allegations that the bank denied loans to qualified Black and Latino applicants, and avoided putting branches in minority communities in Memphis, Nashville, Chattanooga, and Knoxville (Bradley, 2019). In 2021, Trustmark National Bank was accused of redlining predominantly Black and Latino neighborhoods in Memphis (Testino, 2021). A lawsuit was filed against the bank and the bank was accused of violating the Fair Housing Act and Equal Credit Opportunity Act from 2014 to 2018. During this time, 21 out of 25 of Trustmark's offices were found in predominantly white neighborhoods, and policies were instituted that ensured Black and Latino neighborhoods had limited access to the company's services (Testino, 2021). Black and Latino residents were not able to utilize the services offered by the company thereby limiting their ability to apply for loans and have the tools needed to buy or sell their homes.

Food desert

The Department of Agriculture estimated that 32% of residents in Memphis who were low-income also had little to no access to grocery stores (USAFacts, 2021). 12% of residents in

Memphis live in food desert areas, the highest population of people living in food desert areas among any other large metro areas (USAFacts, 2021). In North Memphis, as nearby grocery stores close, reducing the number of groceries creates a food desert for people in this area (Coleman, 2022).

Feeding America reported that in 2015 198, 610 residents in Shelby County were food insecure, approximately 21% of the population lacked access to healthy foods (Smith, 2018). In 2019, a report from Feeding America estimated that 115, 980 residents in Shelby County were in an area classified as food insecure which means that 12. 4% of the population lacked access to healthy foods (Jones). Memphis is a city in Shelby County and is on the Mississippi River. Memphis is the poorest city in the U.S. and African Americans make up about 64.4% of the city's population ("Memphis Tennessee population"). In 2018, two of Kroger's local stores in a predominantly African American neighborhood closed just two weeks after each other. Kroger stated that the reason for the two closures was because of a loss of about \$4.8 million over the past three years (Jones). Less than 5% of households in Memphis don't have access to a vehicle or own a car (Mutasa, 2020). Without being able to own or have access to a vehicle, these households are not able to utilize grocery stores at their convenience or availability. These households will have to solely rely on public transportation to be able to purchase necessary items from the grocery which would be an additional barrier for the households to overcome especially when the nearest grocery store is more than a mile away.

Grocery store access

A study by the Shelby County Health Department found that people who live in neighborhoods without supermarkets live shorter lives (Weathersbee, 2018). A national study comparing food accessibility in various cities in the U.S. ranked Memphis as 16th, indicating

that residents do not have easy access to healthy food options. 5.5 out of every household in Memphis wrestled with food security in comparison to 2.3 households in Omaha and Nebraska (Greater Louisville Project). Memphis is estimated to have 10 times more gas stations in comparison to Nashville which is bigger (“Many Memphis Residents”, 2021). An increased number of gas stations is indicative of an area that does not provide healthy food options for residents and gas stations sell processed and unhealthy foods. In low-income neighborhoods that lack grocery stores, gas stations and stores with foods available to the community, usually these are unhealthy foods.

Food insecurity

In 2010, Memphis ranked 16th in a national study analyzing food insecurity in different cities in the United States. 5.5 out of every 100,000 households in Memphis battled with food insecurity. According to a report by Feeding America, Shelby County’s food insecurity rate in 2018 was 15.0% and by 2020 the rate decreased to 13.7%. The food insecurity rate for the state was 14.0% in 2018 and 11.9% in 2020. This shows that the food insecurity rate for Shelby County was significantly higher than the rate for the state in 2020. According to Feeding America, 20.5% of the people serviced in the mid-south area were food insecure (*Overall (all ages)....Shelby County*). According to Feeding America, 20.5% of the people served in the mid-south area were food insecure during COVID-19 (*Feeding America*). In 2021, it was reported by Clean Memphis that Memphis has an estimated food insecurity rate of 19% compared to the national average of 11% (Sheldon, 2021). Dare to Care estimated that 10.3% of the population or about 4,890 individuals in Shelby County are food insecure. The food insecurity rate for children in Shelby County is 12.8% (*Shelby County, 2021*).

Maternal Mortality

The CDC reported between 2007 to 2016, Black women were three times more likely to die due to pregnancy-related deaths in comparison to white women in the U.S. (Connor, 2015). In 2020, Tennessee's maternal mortality rate was 58.5 deaths per 100,000 live births in comparison to the national average of 23.8 deaths per 100,000 live births (Guzman, 2022). This shows that the maternal mortality rate in Tennessee is much higher than the national average for maternal mortality. A 2021 Tennessee Maternal Mortality Annual Report found that the ratio of pregnancy related deaths was 135.4 deaths per 100,000 live births (Scalise, 2022). In comparison to the previous year, the ratio of maternal mortality was two times higher in 2021. Shelby County has the highest rate of maternal mortality in the state of Tennessee (Burgess, 2022). Although the maternal mortality rate in Tennessee is much higher than the mortality rate for the United, the county with the highest rate of maternal mortality in the state was Shelby County. However, there was no available data found that showed the maternal mortality rates for women in different racial groups. The lack of data on the mortality rates for women from different racial backgrounds does not provide us with insights with what is happening to those groups of women.

Preterm Birth

The preterm birth rate of babies in Shelby County is 12.5% which is about 1, 676 babies (Brantley, 2018). The low birth weight of babies in Shelby County is 11% which is 3% higher than the national average of 8% (Brantley, 2018). In 2019, the national average of preterm birth was 10.2% of live births, the preterm rate was 11% for Tennessee, and 12.4% for Shelby County. This shows that the preterm rate was higher than the national and state average (MarchofDimes, 2022). In 2019, the preterm birth rates were 9.6% for White infants, 9.1% for Hispanic infants, and 14.5% for Black infants. 1 in 8 babies in Shelby County (12.5% of live births) were born preterm in 2020. In Shelby County, 14.5% of black infants were born preterm with 9.4% were

white, 9.2% were Asian/Pacific Islanders, and 9.2% were Hispanics (“March of Dimes”, 2022). The rates of preterm birth were highest for Black infants. However, the preterm birth rates have decreased for White infants, but the rates have remained the same for Black infants between 2019 and 2020.

Infant Mortality

In Tennessee, Black infants are twice more likely to die before their first birthday than white infants (Johnson, 2022). It was reported that women in West Tennessee had a higher ratio of pregnancy related deaths in comparison to other women in other divisions. Cities in West Tennessee include Germantown, Whiteville, Millington, Memphis etc. Historically Shelby County had one of the highest infant mortality rates in the U.S. The county seat for the city of Memphis is Shelby County. In 2004, the infant mortality rate in Memphis was 12.8 overall and 17.4 for Black infants, ranking Memphis to be first nationally for its high rates of infant mortality. In 2006, Black infants were 2.5 times more likely to die than white infants (The BLUES Project, 2010). In 2006, Shelby County was ranked first in the state as the overall rate of infant mortality was 13.8 per 1,000 live births (The BLUES Project, 2010). In 2015, Infant mortality rate in Shelby County was 8.3 deaths per 1,000 births, the lowest rate recorded in the county (Shelby County Infant Rate, 2016). The rates of infant deaths in non-Hispanic Black infants have declined from 17.4 per 1,000 live births in 2004 to 10.6 in 2015. The infant mortality rates for non-Hispanic White infants decreased from 6.6 in 2004 to 4.4 in 2015. For Hispanic infants the rates decreased from 7.4 in 2004 to 4.1 in 2015. The rates of infant mortality have decreased significantly for Black, White, and Hispanics between 2004 to 2015. However, the rate of infant mortality is disproportionately higher for Black infants than for White and Hispanic infants. However, the Tennessee Department of Health reported that Shelby County’s

infant mortality rates increased by 13%. In 2016, the rate of infant mortality in the county was 9.3 per 1,000 live births from the 8.3 per 1,000 that was reported in the previous year (Charlier, 2017). The mortality rate for infants in Shelby County increased between 2015 and 2016. In 2019, the infant mortality rate in Shelby County was 9.6 per 1,000 live births with a total of 123 infants who died in that year (Infant mortality rates: Shelby). Based on the pattern of data from 2015, it could be concluded that the rate of infant mortality is disproportionately higher for Black infants than for White and Hispanic infants.

In 2020, it was reported that 495 children in Tennessee died before their first birthday and 89 of those deaths were reported in Shelby County which was the county with the highest infant mortality rate in the state (Johnson, 2022). Tennessee received a D rating while Memphis and Shelby County received an F rating; the grades are given based on the rates of preterm birth, infant mortality, and maternal mortality rate. With grades of A rating indicating good or the best and an F rating being worst. The grade indicates that the numbers of preterm birth, infant mortality, and maternal mortality are much higher than the national average (Thompson, 2021). A report from Doximity concluded that Memphis was the seventh most at risk city for having shortages in OBGYN (Weathersbee, 2022). A decreased number of OBGYNs could potentially lead to an increased maternal and infant mortality rate due to limited access to medical providers.

Relevance

12.4% of the population in Shelby County lacked access to healthy foods. Between 2018 and 2020, the rate of food insecurity decreased for both Shelby County and the state of Tennessee. However, the food insecurity rate in 2020 was notably higher in Shelby County than for the state. The average maternal mortality rate in 2020 was more than two times higher than the national average. Shelby County had the highest rate of maternal mortality in the state. The

low birthweight of infants in Tennessee was significantly higher than the national average. The rates of preterm births were highest for Black infants, however the preterm rates decreased for White infants between 2019 and 2020; these rates did not change for Black infants. Women in West Tennessee had a higher ratio of pregnancy related deaths compared to women in other divisions. Shelby county or Memphis is part of the cities located in West Tennessee. Even as infant mortality rates have decreased significantly for infants of other racial groups, Black infants have a higher disproportionate rate of infant mortality. The rate of food insecurity was higher in Shelby County than in the state. At the time, the average maternal mortality rate was higher for Shelby County than the average for the state. The low birthweight rate in Shelby County was 3 percent higher than the average low birthweight in the U.S. Food apartheid and barriers associated with accessing healthy food options may be an element contributing to the high rates of maternal mortality, low birthweight, and infant mortality in Shelby County.

CHAPTER FOUR

Knoxville

According to the United States Census Bureau, Knoxville has a total area of 104.3 square miles, 98.5 square miles is land, and 5.6 square miles is water. Knox County is the county seat of Knoxville and is included in the Knoxville metropolitan area. The population of Knoxville was estimated to be 192,648 in 2021 (U.S. Census Bureau quickfacts: Knoxville City).

During the redlining era, neighborhoods in East Knoxville were labeled as indicating that those neighborhoods were not worthy of receiving loans. People that lived in the red zones were not able to re-purchase or refinance their homes (Inman, 2020). Neighborhoods in East Knoxville were mostly occupied by low-income whites, immigrants, and Black people. West Knoxville that is close to the water were labeled as green and safe to loan were mostly occupied by White people (Inman, 2020). In the 1950s and 1960s, urban renewal projects in Downtown Knoxville moved several African American residents (Wuot, 2021). Urban Renewal also known as Urban Removal or Negro Removal which started under Title I of the Housing Act of 1949. The Urban Removal project was a program for land redevelopment with the federal government aiding and giving loans to local communities with the goal of eliminating slums or substandard housing (Urban renewal (removal) Before | After). This program targeted minority communities and displaced many families. According to the Beck Center, 107 African American businesses, 15 African American churches, and 2,500 families, about 70% of who were Black families, were removed by urban renewal policies in Knoxville (Brice, 2021). The urban renewal policies caused most of these residents to relocate to East Knoxville as banks only provided home loans for Black people to move into lower-value neighborhoods in the East neighborhoods (Salvemini, 2021).

Food desert

The Food Trust found that half a million people in Tennessee live in food deserts or have limited access to healthy food (“Nourish Knoxville”, 2021). According to the USDA, there are 20 areas in Knoxville that have been categorized as food desert neighborhoods (Alapo). The Sycamore institute reported that 24% of households with children in Tennessee are food insecure compared to the national average of 17.9% (Wuot, 2018). In the eastern part of Knoxville, there was one grocer that served an entire zip code of 37914 and there was no grocery store for 37915; these zip codes correlate with a majority African American communities in the city (Dennis, 2021).

Food insecurity

In 2018, Feeding America found that Knox County’s food insecurity rate was 11.7% with an estimated 53,150 people in Knox County who do not have access to healthy foods (Dennis, 2021). An additional study found that food insecurity increased since the beginning of the Covid-19 pandemic. The Second Harvest Food Bank of Tennessee estimated the food insecurity rate across east Tennessee to be 13.1% (Staff, 2021). An estimated 950,290 people in the state of Tennessee were food insecure. According to Feeding America, 12.3% of the population in Knox County were food insecure in 2019 (Food systems, 2022). Food insecurity increased by 31% for people with children in Tennessee. The food insecurity rates were much higher for Blacks and Hispanics people with children than for White individuals (Food systems, 2022).

Maternal Mortality

In Tennessee 79% of pregnancy-related deaths are preventable and for Black women 91% of maternal mortality is preventable (Massey et al., 2022). Prenatal care is limited for rural

counties, 45 out of the 95 counties in Tennessee lack an OBGYN (Young, 2020). Barriers associated with limited access to a healthcare facility or professional may account for the high percentage of preventable maternal mortality. Tennessee has been ranked 41st in high rates of maternal and infant mortality (Wadhvani, 2022). The ratio of pregnancy associated death in Knox County was 87.5 deaths per 100,000 live births between 2017- 2020 (Scalise, 2022). Factors that could describe the high rates of maternal mortality for women include limited access to healthcare and nutrition. If a woman has limited access to healthcare, then the woman may not be educated or may be unaware about the type of diet that is needed for her and the child. Thus, indicating that nutrition may be another important component in reducing rates of maternal and infant mortality.

Preterm Birth

Non-Hispanic black mothers had a higher rate of having low birthweight infants or premature infants in comparison to women of other races and ethnicities (Birth Outcomes, 2017). The percentage of low birthweight births decreased from 8.2 in 2004 to 7.9 in 2015 for non-Hispanic White mothers, and the rate decreased from 14.8 to 13.9 from 2004 and 2015 for non-Hispanic Black mothers. However, these rates increased for Hispanic mothers from 5.1 in 2004 to 9.7 in 2015 (Birth Outcomes, 2017). The rate of low birthweight decreased for both non-Hispanic White and non-Hispanic Black mothers from 2004 to 2015. These rates were significantly higher for Hispanic mothers from 2004 to 2015. However, the low birthweight rate was significantly higher for non-Hispanic Black infants than for both non-Hispanic White infants and Hispanic infants.

Infant Mortality

The rates of infant mortality as reported in 2015 shows that the overall rate in Knox County was 8 per 1,000 live births. The rate was 6.5 per 1,000 births for White infants, and 23.8 per 1,000 live births for Black infants (Number of Infant Death, 2017). Based on the previous data, the rate of infant mortality was significantly higher for Black infants than the white infants. The data also shows that the infant mortality rate for Knox County was much lower than the infant mortality rate for Black infants in the county. In 2018 the rate of infant mortality in Knox County was 8 per 1,000 births (Henderson, 2019), although the rate was the same as the rate in 2015; the infant mortality rate for the county was higher than rates for the state and the nation. In addition, the infant mortality rate in Knox County was two times higher for Black residents than for White residents.

Relevance

In Knox County, 12.3% of the population were food insecure in 2019. Food insecurity rates were higher for Black and Hispanic individuals than white individuals. Food insecurity also affects children as food insecurity increased by 31% for people with children. Although the maternal mortality rates in Knox County were high, there isn't any information available that looks at the racial breakdown of maternal mortality. Non-Hispanic Black mothers were more likely to have higher rates of having infants with low birth weights or premature births in comparison to White infants. The infant mortality rates were two times higher for Black infants than for White infants. The infant mortality rates for Knox County were higher than the state and national rates. A potential factor that could account for the mortality disparities seen in Knox County are food inaccessibility and food apartheid. As nutrition is a huge component of factors that determine the health of a person, poor nutrition may be a factor contributing to these high rates of maternal and infant mortality.

CHAPTER FIVE

Pittsburgh

According to the United States Census Bureau, Pittsburgh has a total area of 58.3 square miles, 55.6 square miles of the total area is land, and 2.8 square miles is water. In 2019, the population of Pittsburgh was 300, 286, with white residents making up 64.7% of the population (The Maternal Wellbeing, 2021). Followed by Black residents at 23%, Asian residents at 5.8%, and Hispanic or Latino residents at 3.2% (The Maternal Wellbeing, 2021). This data from 2019 shows that white residents make up a large proportion of the city's population followed by Black residents, Asian residents, and Hispanic or Latino residents. The population of the city was estimated to be 300, 431 in 2021 (U.S. Census Bureau quickfacts: Pittsburgh City).

Pittsburgh, Pennsylvania is the county seat of Allegheny County. Pittsburgh is one of the most segregated cities in the United States (Buchanan, 2021). Local realtors produced a residential map of the neighborhoods in Pittsburgh (Rutan, 2021). The map split the city into two groups of neighborhoods with the first group consisting of affluent and white neighborhoods such as Squirrel Hill or Brookline. The second group consisted of Jewish, Black communities, immigrants or poor communities that lived in areas such as Hill District, Manchester, or Hazelwood (Rutan, 2021). Lenders were encouraged to invest heavily in the first group while lenders were advised to avoid investing in communities in the second group. The Urban Redevelopment Authority forcibly removed 8,000 people, mostly Black residents, to different parts of the city, specifically East Liberty and Homewood (Rutan, 2021). In the process, numerous businesses in the district were destroyed and more than 1,000 homes were destroyed. During the mid-1930s, 70% of the Black population lived in three neighborhoods: East Liberty, Hill District, or Homewood (Rutan & Glass, 2017). Currently, poor and black communities are

centralized in areas that endured historic disinvestment. While affluent class and homeowners live in areas that have been supported by historic investment through several government policies (Rutan & Glass, 2017). The rates of Black home ownership have remained unchanged but the rates of White home ownership have increased in Pittsburgh (Obenza-Bridges, 2021). The historic and continuous disinvestment in poor and black communities can contribute to creating neighborhoods that lack access to healthy food options, which could have adverse effects to the health of individuals in those communities.

Food desert

Pittsburgh is also one of the most gentrified cities in the United States (Food insecurity and resource access, 2018). In 2013, Pittsburgh led the nation as having the largest percentage of people living in food desert areas among cities of its size. 22.3% of the population in Pittsburgh is estimated to live below the poverty line (U. S. Census Bureau, 2018). It was estimated that 47% of the residents of Pittsburgh had low access to healthy food options and 18% of residents in the metropolitan area resided in food deserts (Harvest, 2014). The rate of obesity among U.S. metro areas, Pittsburgh metro area, was the 4th highest rate of obesity (Harvest, 2014).

The city data found that in 2017, 1 in 5 residents of Pittsburgh were food insecure (Deppen et al., 2018). It was estimated that 63,000 residents in Pittsburgh were food insecure in 2019 (Gundersen et al., 2019). Approximately 11% of the U.S. population in 2018 were food insecure, it was also estimated that 19.4% of the population in Pittsburgh were food insecure (Gundersen et al., 2019). One third of the population in Allegheny County live in poverty. Despite education levels, Black women are five times more likely to live in poverty than white men (Maternal Health in Allegheny). A study found that 286 of the existing pantries in Allegheny County, 198 of those pantries were located in areas whose poverty rates were above

average, 31 were in food desert areas, and 96 were located in transit deserts (Food insecurity and resource access, 2018). Transit deserts are areas with limited transportation supply, poor sidewalk, or poor road infrastructure. 412 Food Rescue network has 337 partners, 243 of them are located in areas above the average poverty rate, 50 are located in food desert areas, and 98 are located in transit desert (Food insecurity and resource access, 2018). This data shows that locations of the 412 Food Rescue partners and food pantries limit the impact of distributions of food thereby making food inaccessible for people and communities who need it.

Grocery store access

According to Danko-Day, the Urban Agriculture and Food Policy specialist for the City of Pittsburgh, between the 1970s and 1980s grocery stores moved into affluent areas leaving the poorest areas at risk for experiencing hunger (Pennsylvania Legislative Service, 2019). In 2013, the Hill District Shop ‘n Save was the neighborhood’s first full- scale grocery store that was opened in almost 30 years (*Lease signed for new grocery store...*, 2022). A report by a local anti-hunger organization revealed that Pittsburgh had the highest percentage of people living in areas without access to supermarkets among similarly- sized cities (Rosenfeld, 2022). The Mayor of Pittsburgh stated that 47% of residents in Pittsburgh do not have consistent access to fresh food or grocery stores (Rayworth, 2022). Lacking access to stores that sell healthy food options can have negative impacts on the health of the community. These negative impacts include being more likely to develop diet related diseases such as type 2 diabetes, obesity, stroke, heart disease among others. Having access to healthy food options can drastically decrease rates of mortality for individuals.

Food insecurity

One out of five residents in Pittsburgh experience food insecurity (Food Access Programs). A report from Feeding America projected that in 2020 there would be a 42% increase in food insecurity rates in Greater Pittsburgh Community Food Bank's service area (Murray, 2020). In 2020, Pennsylvania had a child food insecurity rate of 13.1%. The child food insecurity rate in Allegheny County was 15.7% (Stacker, 2022). This shows that the child food insecurity rate in Allegheny County was higher than the rate for the state. The food insecurity rate in Allegheny County was 10.8% (Stacker, 2022). During the early days of the COVID-19 pandemic the food insecurity rates of residents in Hill District and Homewood was 37% (Troxel & Dubowitz, 2021). The food insecurity rate was reported to be 20.7% in 2018 but the rate increased to 36.9% in 2020. Food insecurity increased by almost 80% for residents in the two previously mentioned neighborhoods in the early weeks of the Covid-19 pandemic (Giammarise, 2021). Although food insecurity rates increased in these neighborhoods, participation in Supplemental Nutrition Assistance Program (SNAP) and the use of food banks remained the same. The data indicates that the addition of new food banks and resources could help meet the needs of residents (Troxel & Dubowitz, 2021). For the past decade, the rates of food insecurity in Hill District and Homewood have been twice the national rate (Troxel & Dubowitz, 2021).

Maternal Mortality

Pittsburg is the second largest city in Pennsylvania and is located in Allegheny County. Pittsburgh was considered the worst city for Black women to live in based on findings and generational experiences (Mock, 2019). In 2020, the Allegheny County Council declared that systemic racism was a public health issue (Maternal Health in Allegheny). Overall women in Pittsburgh have a smaller diagnosis of gestational diabetes and hypertension compared to 90% of women in similar cities. However Black women have slightly higher rates of gestational

hypertension and infection, but AMLON women have higher rates of gestational diabetes (Pittsburgh's Inequality, 2019). Although Black women had higher rates of gestational hypertension and infection and AMLON women had higher rates of gestational diabetes, yet the mortality rates were higher for Black women. Some of the risk factors for developing gestational diabetes and gestational hypertension include being overweight or obese in addition to being pregnant. The risk factors for developing gestational diabetes and hypertension are associated with nutrition and quality of maternal mortality. So, we can conclude that pregnant women who have poor maternal nutrition may be more likely to develop gestational diabetes and hypertension. Potentially Black women and AMLON women may live in neighborhoods with reduced or limited access to healthy food options. The rates of maternal mortality for Black women in Pittsburgh is 97% higher than for women in similar cities. The rate of maternal mortality for Black women in Allegheny County was 3.7 times higher than white women. The maternal mortality rates for Black women were 87.6 per 100,000 births in comparison to 23.9 per 100, 000 for white women (WHAMglobal Brief: Maternal Mortality, 2018).

Low Birthweight

The rates for low birthweight between 2017 to 2018 decreased for Black infants from 15.4% to 14.8% and the very low birthweight also decreased from 4% to 2% (Monaghan, 2021). However, Black infants had the highest percentage of low birthweight and very low birthweight. 87.4% of Asian/Pacific Islanders infants had a normal birthweight and this was the racial group with the highest proportion of normal birth weight (Monaghan, 2021). In 2019, Pittsburgh's inequality across Gender and Race (PIGR) reported that 14% of infants born to Black women have a low birthweight. This rate is twice the rate of low birthweight infants for White women and 1.5 times more than infants born to AMLON (Asian, Multicultural, Latinx, Other, and

Native American) women. Black women are three times more likely to give birth to extremely low birthweight infants compared to white women. These disparities are evident even when education and income levels are controlled.

Preterm Birth

Black mothers had the highest proportion of preterm births compared to all other races whilst white mothers had the smallest proportion of preterm births. The preterm birth rates for White mothers from 2017-2018 were unchanged (8.4%), while the preterm birth rates for Black mothers decreased from 15.1% in 2017 to 13.7% in 2018 (Monaghan, 2021). From 2017-2018, the preterm birth disparity decreased between Black and White mothers. In 2019, a report compiled by Pittsburgh's Inequality Across Gender and Race (PIGR) found that the rate of low birth weight for babies born to Black mothers was twice the rate of babies born to white women (The Maternal Wellbeing, 2021). In 2021, rates of preterm birth for Allegheny County were 10.1% for Hispanics, 8.9% for Whites, 8.1% for Asian/Pacific Islanders, and 14.4% (MarchofDimes.....Preterm..Allegheny..). The data shows that the preterm birth rate in Allegheny County was highest for Black infants.

Infant Mortality

The infant mortality rate in Pennsylvania was determined to be 5.9 per 1,000 live births in 2019 (Maternal mortality rates: Pennsylvania). In 2019, the Pittsburgh's inequality across Gender and Race (PIGR) reported that Black women experience 18 fetal deaths for every 1,000 pregnancies compared to 9 fetal deaths for every 1,000 pregnancies for white women and 2 out of every 1,000 pregnancies in Asian, Multicultural, Latinx, Other, and Native American women (AMLON) (Pittsburgh's Inequality, 2019). In 2017, the infant mortality rate in Allegheny

County was 5% higher than the national average with Black infants having a greater risk for mortality than white infants (The Maternal Wellbeing, 2021). The 2017 Equity Indicators Report found that the rate of infant mortality in 2016 was 3.3 per 1,000 births for white infants and 14.9 per 1,000 births for Black infants (Ross, 2022). 38 out of the 78 babies that died in Allegheny County were Black. Even though Black residents make up 13.4% of the county's population, the infant mortality rates were 49% (Ross, 2022).

Lack of prenatal care has not been associated with the high rates of fetal deaths as Pittsburgh women across race start prenatal care at 10 weeks gestation. Black women in Pittsburgh start prenatal care sooner than 92% of Black women in similar cities (Pittsburgh's Inequality, 2019). Black women are more likely to report communication barriers and bias with providers (What the Black Maternal Health Momnibus....., 2021). Black women are more likely to have lower rates of screening and follow up services. Healthcare providers are more likely to be less culturally responsive or competent in addressing the needs of their Black parents. The lack of cultural competency, communication barrier, and biases may be factors contributing to the high rates of fetal deaths for Black women even with an early prenatal care. 64 out of every 10,000 babies born to Black women had abnormal conditions such as seizures, admission to NICU, infection etc. This is more than two times higher than the rate for white women with 28 out of every 10,000 babies and over 1.5 times the rate for AMLON women with 39 out of every 10,000 babies born. (Pittsburgh's Inequality, 2019). Congenital anomalies such as down syndrome, heart disease, chromosomal disorder etc. affect 17% of Black babies which is 14% for AMLON babies and 12% for White babies (Pittsburgh's Inequality, 2019). The rates of congenital anomalies were 3 percent higher for Black babies than AMLON babies and 4 percent higher for Black babies than for White babies. Nutrition could be a factor fueling the high rates

of congenital anomalies for Black infants. One of the congenital anomalies listed was heart disease and is directly influenced by the quality of maternal nutrition. 13 out of every 1,000 Black babies regardless of assigned sex died before turning one compared to 2 out of every 1,000 White female babies. Only a small percentage of White babies at birth and no AMLON babies died before turning one compared to a larger percentage of Black babies (Pittsburgh's Inequality, 2019). Demographically similar cities were determined using cities with sufficient numbers of Black and White residents for subgroup calculations. Some of the cities that are often compared to Pittsburgh include Buffalo, Cleveland, Detroit, Louisville, Philadelphia etc.

Additionally, a 2011-2015 Linked Infant Mortality Report revealed that the infant mortality rate was two times higher for Black preterm infants than for white preterm infants (Kokenda, 2018). The report found that the infant mortality rate (IMR) for White infants in 2013, 2014, and 2015, were 5.1, 3.6, and 4.2 respectively (Kokenda, 2018). Between 2013-2015, the mortality rate for White infants decreased, and then increased in 2015 but the rate was much lower than the rate in 2014. The IMR for Black infants in 2013, 2014, and 2015 were 13.5, 13.8, 14.4 respectively (Kokenda, 2018). Between 2013-2015, the mortality rates for Black infants increased gradually and the rate in 2015 was much higher than the rate in 2013. The infant mortality rate for white infants was lowest in 2014 but increased slightly in 2015. For Black infants, the infant mortality rate was lowest in 2013 but has increased from 2013-2015. Although the (IMR) fluctuated for white infants, the mortality rate for Black infants has been significantly higher and the rates continued to increase compared to white infants from 2013-2015 (Kokenda, 2018). The report established that the mortality rate for term Black infants was 2.7 times greater than for term White infants (Kokenda, 2018). In Allegheny County between 2011 and 2015, the leading cause of infant mortality was disorders related to short gestation or low birthweight

(Kokenda, 20218). The second leading cause of death was Sudden Unexpected Infant Death (SUID) which included Sudden Infant Death Syndrome, Unknown sudden infant death, accidental suffocation, and strangulation in bed. The third leading cause of death was due to congenital malformations, deformations, and chromosomal abnormalities (Kokenda, 2018).

Furthermore, the 2017 Equity Indicators Report, compiled by Pittsburgh City Planning observed that the infant mortality rate for white infants was 3.3 per 1,000 births, however for Black infants the rates were 14.0 per 1,000 births in 2016 (Ross, 2022). This data shows that the infant mortality rate was more than four times higher for Black infants than for White infants. In 2017, the rate of infant mortality was five percent higher than the national average (The Maternal Wellbeing, 2021). Additionally, the risk of infant mortality was five times higher for Black infants than for White infants. This illustrates that the mortality rate for Black infants is significantly higher than White infants. Allegheny County's data from 2018 revealed that the infant mortality rate for Pittsburgh was much higher in comparison to the rate for the county and state. The rate of infant mortality for Pittsburgh was 8.8 deaths out of 1,000 births, 5.6 deaths out of 1,000 deaths for the county, and 5.9 deaths out of 1,000 births for the state (The Maternal Wellbeing, 2021). The mortality rate for Pittsburgh is significantly higher than the mortality rates for the county and the state with Black infants making up a substantial amount of the mortality rates in Pittsburgh.

Relevance

In 2013, Pittsburgh had the largest percentage of people living in food desert areas. One third of people in Allegheny County live in poverty. In 2018, the rate of food insecurity was higher in Pittsburgh than in the United States. The number of children that were food insecure was higher in Allegheny County than in the state. The food insecurity rates in neighborhoods that

were predominantly African American were twice the national rate. Interestingly, Black women were five times more likely to live in poverty than white men regardless of educational levels. The rate of low birthweight was two times higher for Black infants than for White infants. In 2017, the infant mortality rate was five percent higher for Allegheny County than the national average. Black residents make up 13.4% of the county's population, yet the infant mortality rates were 49%. Interestingly, Black women started prenatal care sooner than women in similar cities like Pittsburgh. Infant mortality was five times higher for Black infants than for White infants. There are so many factors influencing the high rates of maternal mortality for Black mothers and nutrition may be another component. Pittsburgh has the largest percentage of people living in food apartheid areas, so this could contribute to the high rates of maternal and infant mortality that is observed.

IMPLICATIONS

Food desert

There was no public data available for St. Louis so it's hard to make a comparison between St. Louis and the other cities. More research is needed to know the rates of food desert areas in St. Louis and how it's similar or different from other racial groups.

Food insecurity

In each of the cities that were studied, the neighborhoods that experienced the most food insecurity had a predominantly Black population or a predominantly minority population. In 2020, 11.5% of the population of people in Jefferson County were food insecure. In 2020, the food insecurity rate during COVID-19 for the population in Memphis Tennessee was 20.5%. Additionally, in 2021, it was reported that the food insecurity rate decreased to 19%. This shows that the food insecurity rate in Memphis was much higher than for Louisville (*Feeding America*). The rate of food insecurity was much higher for Memphis in comparison to Louisville in 2020. In 2015, the rate of food insecurity in Memphis was much higher than the rate for Louisville. The food insecurity rate in Louisville was 16.1% while the rate for Memphis was 21.6%. However, in Knoxville the food insecurity rate was 14.0% which is about 2% lower than the rate for Louisville. In 2020, the food insecurity rate for Allegheny County was 36.9% which is about 25% higher than the food insecurity rate for Louisville. This shows that Allegheny County had the highest rate of food insecurity than the other four cities that were studied. For neighborhoods that have a large proportion of minority groups like Hill District and Homewood had a significantly high rate of food insecurity during the early days of the Covid-19 pandemic. This pattern is also seen in Louisville with the West End of Louisville, a predominately minority

neighborhood, which has historically experienced significantly high rates of food insecurity. Nutrition is a vital component that affects the quality of health of a person. For that reason, it is absurd that a country like the United States with all the resources it has to have communities experiencing food insecurity at such high rates.

Maternal Mortality

Two key indicators of a community's health are the maternal and infant mortality rates. The rate for Tennessee was 58.5 deaths per 100,000 live births in 2020. In 2021, the rates of maternal mortality in Tennessee were 135.4 deaths per 100,000 live births while the rate of maternal mortality was 37.7 births per 100,000 live births for Kentucky in the same year. This shows that the maternal mortality rate for Tennessee was significantly higher than that of Kentucky. Shelby County was the county with the highest rate of maternal mortality in Tennessee. As noted in the previous section, the rate of food insecurity was much higher in Memphis Tennessee (Shelby County) than in Jefferson County. The ratio of pregnancy associated deaths in Knox County was 87.5 deaths per 100,000 live births. However, there was little information found about the maternal mortality rates in Knox County, so it is difficult to make any comparison without sufficient data. The maternal mortality rate in St. Louis was determined to be 36.7 per 10, 000 per live births, and the rates for maternal mortality for Black women was 53.8 per 10,000 live births. This pattern of Black women experiencing higher rates of maternal mortality can be found in Louisville just as in St. Louis and Pittsburgh. In 2018, the maternal mortality rate in Louisville for Black women was 42.8 deaths per 100,000 live births while the rate was 17.2 deaths per 100,000 live births for White mothers. The rate of maternal mortality for Black women was 3.7 times higher than for White women. The maternal mortality rates are 87.6 deaths per 100,000 births for Black women and 23.9 per 100,000 births for White

women. Across various cities like Louisville, St. Louis, and Pittsburgh, Black women are more likely to have higher rates of maternal mortality even when insurance or prenatal care is not a contributing factor. There seems to be a systemic issue that fuels this pattern across different cities in the nation.

The leading causes of maternal mortality in the U.S. were hemorrhage and cardiovascular conditions. For non-Hispanic Black women, the leading causes of mortality were cardiovascular conditions, cardiomyopathy, and hypertensive disorders such as preeclampsia. An analysis of 2016-2017 national death certificate data found that non-Hispanic Black women were five times more likely to die of preeclampsia, eclampsia, and postpartum cardiomyopathy and 2.3 times more likely to die of obstetric embolism and hemorrhage as compared to White women (Eggen et al., 2022)

Low Birthweight

There is an evident pattern pertaining to low birthweight in Louisville, Knoxville, St. Louis and Pittsburgh. Black women in these listed cities were more likely to have significantly higher rates of infants with low birth weights compared to infants of other races. The same conclusion cannot be made for Memphis as no data was available on low birth weights and the rates for different racial groups. Smoking during pregnancy was mentioned as a potential cause of the high rates of low birthweight for Black infants in St. Louis. In Louisville, between 2014 and 2018, the low-birth-weight rates were significantly higher for Black infants than for Non-Hispanic White infants. In Knoxville, non-Hispanic Black mothers had significantly higher rates of low birth weights than both non-Hispanic White mothers and Hispanic mothers between 2004 and 2015. For Pittsburgh, the rate of low birth weight for babies born to Black mothers was twice the rate of babies born to white women. And Black women are three times more likely to give

birth to extremely low birthweight infants compared to white women. These disparities are evident even when education and income levels are controlled. This data shows that there is an alarming problem that Black women and infants are facing, and immediate action is needed to solve this problem. More research is needed to determine whether Black women in similar cities and other cities have higher rates of low birth weight. There needs to be an efficient method to collect low birth weight rates among different racial groups in all cities across the United States. Maternal nutrition is an essential determinant of the health of an infant. Poor maternal nutrition can directly lead to low birth weights for infants and other diet related diseases that can show up during the lifetime of the infant. Efficient methods of collecting low birth weight rates will be a great measure in understanding the maternal nutritional quality of a community.

Infant Mortality

Infant Mortality is another indicator of the health of a community. Across all the five cities analyzed, there was an obvious pattern. The infant mortality rates for Black infants were significantly higher than any other racial group. In the Louisville metro area, the data shows that from 2011-2015 the infant mortality rate remained substantially higher for babies born to non-Hispanic Black mothers. It was recorded in 2018 that the infant mortality rate for non-Hispanic Black infants was almost twice that of non-Hispanic White infants. In St. Louis, the rates of infant mortality were notably higher for Black infants than for White infants during 2011 to 2018. The infant mortality rate for Black infants in Tennessee was twice the rates for White infants. In 2015 it was estimated that the infant mortality rate for Black infants in Shelby County was almost three times higher than the rate for White infants. The infant mortality rate for Black infants in Memphis was higher than the rate for Black infants in Louisville for the same year. Black infants are more likely to have higher rates of infant mortality. The mortality patterns that

are observed may be explained by many factors such as systemic issues and policy making. that. One factor that could account for the disparities that exist could be the inaccessibility to healthy food options or food apartheid. Food apartheid areas were created to work against people of color like Black people using different policies.

CONCLUSION

In conclusion, the maternal mortality rates for Black women are at an alarming rate. In the United States the average mortality rate for Black women is significantly higher than the rate for White women. The same pattern seems to be seen across different cities in the United States. The mortality rate of infants is also disproportionately higher for Black infants than for white infants. There are many factors that may contribute to the high rates of mortality for Black women and infants. However, nutrition has not been viewed as a potential component to the high rates of mortality. More research is needed to understand the role nutrition and food access plays in exacerbating the disparities rates that exist for Black women and infants. There are too many Black women and infants whose deaths are preventable. We should not view the high rates of mortality of Black women and infants as something natural, but it should be viewed as a pattern created by years of systemic policies that negatively affected the Black community. We as a country have the necessary resources and power needed to address and reduce the disparities that currently exist for Black women and children. As a nation, we need to do more to ensure that pregnancy is not a death sentence for Black women and babies in the Black community.

LIMITATIONS

This study attempted to analyze the rates of pre-eclampsia rates in the selected cities. However, the data for pre-eclampsia rates were hard to find and collect. So, this study did not

include those rates. Preeclampsia is caused by high blood pressure which causes proteins to leak from the kidneys to the urine. High blood pressure can also lead to liver damage. Some symptoms of pre-eclampsia include swelling or puffiness of feet, face or hands (oedema) (Gluck, 2018). During routine antenatal appointments, samples of urine are collected to test for the presence of proteins in urine. Preeclampsia is a major cause of complication of maternal and infant mortality. Preeclampsia increases a woman's risk for heart disease such as heart attack, stroke, heart failure, and women with preeclampsia are more likely to have high rates of preterm delivery or low birthweight. Children born to mothers with preeclampsia are at a higher risk of developing high blood pressure and heart disease. Some ways of reducing the risk of pre-eclampsia development include maintaining a plant-based diet with healthy fats, unprocessed foods, and foods high in fiber. But the addition of pre-eclampsia rates would have enhanced this paper as nutrition plays a huge role in the formation of pre-eclampsia. As preeclampsia is one of the causes for maternal, fetal, and infant mortality rates. Further studies should include and analyze the rates of preeclampsia in addition to other factors that affect food access and nutrition.

Bibliography

Abello, O. P. (2019, August 19). *Breaking through and breaking down the Delmar Divide in St. Louis*. Next City. Retrieved November 2, 2022, from <https://nextcity.org/features/breaking-through-and-breaking-down-the-delmar-divide-in-st.-louis>

Adhikari, T. (2021, November 1). *This east St. louis grocer tends an oasis of uplift in a food desert*. The Christian Science Monitor. Retrieved October 7, 2022, from <https://www.csmonitor.com/World/Making-a-difference/2021/1101/This-East-St.-Louis-grocer-tends-an-oasis-of-uplift-in-a-food-desert>

Alapo, L. (n.d.). *Knoxville Food Deserts*. Knoxville Academy of Nutrition and Dietetics. Retrieved October 10, 2022, from <https://www.eatrightknox.org/resources/articles-of-interest/knoxville-food-deserts/>

Alviola, P. A., Nayga, R. M., & Thomsen, M. (2013). Food Deserts and Childhood Obesity. *Applied Economic Perspectives and Policy*, 35(1), 106–124. <http://www.jstor.org/stable/23356424>

Alviola, P. A., Nayga, R. M., Thomsen, M. R., & Wang, Z. (2013). Determinants of Food Deserts. *American Journal of Agricultural Economics*, 95(5), 1259–1265. <http://www.jstor.org/stable/24476908>

Ansari, M. (2021, November 8). *Kentucky ranks low in National Women and Children's Health Report*. Wave3. Retrieved October 12, 2022, from

<https://www.wave3.com/2021/11/08/kentucky-ranks-low-national-women-childrens-health-report/>

A Qualitative Assessment of Prenatal Care and Prenatal Care Access in

Louisville/Jefferson County. (2022, February). Department of Public Health and Wellness.

Retrieved October 10, 2022, from [https://louisvilleky.gov/health-](https://louisvilleky.gov/health-wellness/document/qualitative-assessment-prenatal-care-and-prenatal-care-access-louisville)

[wellness/document/qualitative-assessment-prenatal-care-and-prenatal-care-access-louisville](https://louisvilleky.gov/health-wellness/document/qualitative-assessment-prenatal-care-and-prenatal-care-access-louisville)

Bailey, P., & Bruggers, J. (2017, December 4). *Louisville's 2017 Health Report shows staggering gaps along lines of race and ZIP code.* Journal. Retrieved November 15, 2021, from <https://www.courier-journal.com/story/news/politics/metro-government/2017/11/30/louisville-health-equity-report-2017-takeaways/909220001/>.

Baldwin, D. (2003, January 31). *Disparities in Health and Health Care: Focusing Efforts to Eliminate Unequal Burdens.* OJIN. Retrieved November 5, 2021, from

<https://ojin.nursingworld.org/MainMenuCategories/ANAMarketplace/ANAPeriodicals/OJIN/TableofContents/Volume82003/No1Jan2003/DisparitiesinHealthandHealthCare.html>.

Bird, J. L. (2022, March 14). *18 percent of the St. Louis–area population lives in a food desert. Food Outreach has a new approach for how to help some of them.* St. Louis

Magazine. Retrieved October 8, 2022, from <https://www.stlmag.com/news/food-outreach-food-insecurity-food-deserts-outreach/>

Birth and Death Trends 2014-2018. LouisvilleKy. gov. (2021, January 28). Retrieved October 17, 2022, from <https://louisvilleky.gov/health-wellness/document/birth-and-death-trends2014-2018>

Birth Outcomes in Knox County, Tennessee: 2004-2015. (2017, December). Knox County Health Department Epidemiology Program. Retrieved October 7, 2022, from https://www.knoxcounty.org/health/epidemiology/reports_data/community_surveys/Community%20Surveys%20Reports/Birth%20Outcomes%20in%20Knox%20County%202005-2015.pdf

Bitler, M., & Haider, S. J. (2010). AN ECONOMIC VIEW OF FOOD DESERTS IN THE UNITED STATES. *Journal of Policy Analysis and Management*, 30(1), 153–176. <http://www.jstor.org/stable/40961588>

Bradley, C. (2019, March 31). *Seeing red I: Mapping 90 years of redlining in Memphis*. High Ground. Retrieved November 21, 2022, from <https://www.highgroundnews.com/features/SeeingRedlining.aspx>

Brantley, A. (2018, October 19). *Health brief: Memphis & Shelby County*. Better Tennessee. Retrieved November 21, 2022, from <https://bettertennessee.com/memphis-shelby-county-health-brief/>

Brice, L. (2021, May 3). *Knoxville Urban Removal*. ArcGIS StoryMaps. Retrieved December 1, 2022, from <https://storymaps.arcgis.com/stories/65afcbd084684b19ade54155145dbcd8>

Bruton, G. (2020, January 15). *Missouri Coalition for the Environment Saint Louis Regional Food Study 2019*. Missouri Coalition for the Environment. Retrieved October 9, 2022, from <https://moenvironment.org/wp-content/uploads/sites/370/2022/01/St.-Louis-Regional-Food-Study-2019.pdf>

Buchanan, C. (2021, June 29). *Health and food deserts in Pittsburgh*. ArcGIS StoryMaps. Retrieved October 10, 2022, from <https://storymaps.arcgis.com/stories/909e567bc6f141c2bac555aeb034b50>

Burgess, K. (2022, September 27). *Choices gets funding from Shelby County for two midwife fellows*. The Commercial Appeal. Retrieved December 1, 2022, from <https://www.commercialappeal.com/story/news/local/2022/09/26/shelby-county-choices-gets-funding-for-two-midwife-fellows/69521035007/>

CDC on Infant and Maternal Mortality in the United States: 1900-99. (1999). *Population and Development Review*, 25(4), 821–826. <http://www.jstor.org/stable/172510>

Centers for Disease Control and Prevention. (2021, December 14). *Alcohol use during pregnancy*. Centers for Disease Control and Prevention. Retrieved October 30, 2022, from <https://www.cdc.gov/ncbddd/fasd/alcohol-use.html#:~:text=Alcohol%20use%20in%20the%20first,alcohol%20use%20anytime%20during%20pregnancy.>

Centers for Disease Control and Prevention. (2013, October 25). *NCCDPHP: Community Health*. Centers for Disease Control and Prevention. Retrieved October 4, 2022, from

https://www.cdc.gov/nccdphp/dch/programs/communitiesputtingpreventiontowork/communities/profiles/obesity-ky_louisville.htm

Centers for Disease Control and Prevention. (2021, November 1). *Preterm birth*. Centers for Disease Control and Prevention. Retrieved October 17, 2022, from <https://www.cdc.gov/reproductivehealth/maternalinfanthealth/pretermbirth.htm#:~:text=Preterm%20birth%20is%20when%20a,2019%20to%2010.1%25%20in%202020>.

Centers for Disease Control and Prevention. (2022, April 6). *Working together to reduce Black Maternal Mortality*. Centers for Disease Control and Prevention. Retrieved February 2, 2023, from <https://www.cdc.gov/healthequity/features/maternal-mortality/index.html>

Center for Health Equity. (2017). *Louisville Metro Health Equity Report 2017*. LouisvilleKY.gov. Retrieved November 25, 2021, from <https://louisvilleky.gov/government/center-health-equity/louisville-metro-health-equity-report-2017>.

Charlier, T. (2017, November 16). *Shelby County's Infant Mortality Rate Rose in 2016, State figures show*. The Commercial Appeal. Retrieved October 17, 2022, from <https://www.commercialappeal.com/story/news/2017/11/16/shelby-countys-infant-mortality-rate-rose-2016-state-figures-show/870546001/>

City Health dashboard. City Health Dashboard. (n.d.). Retrieved October 4, 2022, from <https://www.cityhealthdashboard.com/ky/louisville/metric-detail?metric=19&dataRange=city&metricYearRange=2019>

Coleman, A. (2022, July 12). *Grocery store planned in North Memphis Food Desert*. WREG.com. Retrieved October 9, 2022, from <https://wreg.com/news/local/grocery-store-planned-in-north-memphis-food-desert/#:~:text=In%20North%20Memphis%2C%20many%20people,leave%20behind%20boarded%20Dup%20buildings.&text=The%20USDA%20classifies%20a%20%E2%80%9Cfood,selling%20healthy%20and%20affordable%20foods>.

Collins, J. (2021, May 28). *#Redlined: A St. Louis Story*. ArcGIS StoryMaps. Retrieved October 2, 2022, from <https://storymaps.arcgis.com/stories/366759e8b76c46efbf6ff9e8fff3ac0b>

Connor, C. (2020, June 15). *Data shows pregnancy-related deaths more likely among black women*. Action news5 Retrieved October 17, 2022, from <https://www.actionnews5.com/2020/06/15/pregnancy-related-deaths-more-likely-among-black-women/>

Cooperman, J. (2014, October 17). *The story of segregation in St. Louis*. St. Louis Magazine. Retrieved October 11, 2022, from <https://www.stlmag.com/news/the-color-line-race-in-st.-louis/>

Coronel, J. (2022, June 29). *Roe v. Wade reaction: St. Louis Doulas Worry About Maternal mortality rates increasing in minority communities*. ksdk.com. Retrieved October 17, 2022, from <https://www.ksdk.com/article/news/health/roe-v-wade-st-louis-douglas-maternal-mortality-rates/63-06dbb1ff-983a-48be-882a->

b3c5f42ac511#:~:text=Black%20pregnant%20moms%20are%20four,89%20per%2010%20C000%20live%20births).

Declercq, E., & Zephyrin, L. (2020, December 16). *Maternal mortality in the United States: A Primer*. Commonwealth Fund. Retrieved October 12, 2022, from https://www.commonwealthfund.org/publications/issue-brief-report/2020/dec/maternal-mortality-united-states-primer?utm_medium=email&utm_source=govdelivery

Dennis, A. (2021, May 12). *Battlefield Farm's mission: Alleviate food deserts that are 'slowly killing' so many*. Knoxville News Sentinel. Retrieved October 10, 2022, from <https://www.knoxnews.com/story/news/local/2021/05/12/battlefield-farm-knoxville-food-deserts-insecurity/4860653001/>

Deppen, C., MJ Slaby, M. J., & Culgan, R. (2018, November 8). *A fresh divide: Inside Pittsburgh's food deserts*. 100 Days in Appalachia. Retrieved October 10, 2022, from <https://www.100daysinappalachia.com/2018/11/a-fresh-divide-inside-pittsburghs-food-deserts/>

Eggen, M., Stanev, N., & Creel, L. (2022, February). Issue brief: Maternal mortality in Kentucky. University of Louisville School of Public Health and Information Sciences. Retrieved March 12, 2023, from <https://louisville.edu/sphis/departments/cik/docs-and-pdfs-1/Maternal%20Mortality%20in%20KY%20Issue%20Brief%20CIK>

Engel, T. (n.d.). *Food desert (food apartheid)*. Beyond the Buzzwords. Retrieved December 19, 2022, from <https://www.beyond-buzzwords.com/food-desert-food->

apartheid#:~:text=%E2%80%9CFood%20desert%E2%80%9D%20is%20a%20commonly, that%20create%20inequitable%20food%20environments.

Feeding America: Our Impact. Mid-South Food Bank. (n.d.). Retrieved December 10, 2022, from <https://www.midsouthfoodbank.org/>

Food Access Programs. The City of Pittsburgh. (n.d.). Retrieved December 4, 2022, from <https://pittsburghpa.gov/dcp/food-access-programs>

Food insecurity. Greater Louisville Project. (2020, October 29). Retrieved October 4, 2022, from <https://greaterlouisvilleproject.org/factors/food-insecurity/>

Food insecurity and resource access in Allegheny, Pennsylvania. (2018). 412 Food Rescue. Retrieved October 2, 2022, from <https://412foodrescue.org/wp-content/uploads/2018/04/412-Food-Rescue-GIS-Study-.pdf>

Food insecurity incarnate word foundation. Incarnate Word Foundation. (2020, November 23). Retrieved October 9, 2022, from <https://incarnatewordstl.org/news/food-insecurity/>

Food systems. United Way of Greater Knoxville. (2022, August 19). Retrieved December 1, 2022, from <https://www.uwgk.org/food-security/>

Forward Through Ferguson. (2022, April 21). *Equity: Racial disparity in health.*

FLOURISH St. Louis. Retrieved January 6, 2023, from <https://www.flourishstlouis.org/problem/equity/>

Garriss, K. (2020, November 24). *Fox13 gets real: The complex history and legacy of redlining in Memphis*. FOX13 News Memphis. Retrieved December 1, 2022, from <https://www.fox13memphis.com/getsreal/fox13-gets-real-complex-history-legacy-redlining-memphis/KW4AKP7JKRBPRBYOLOGJYKP2LQ/>

Galarneau, C. (2018, February). *Getting Martin Luther KING'S words right*. Retrieved April 14, 2021, from <http://pnhp.org/news/getting-martin-luther-kings-words-right/>

Gebregiorgis, S. (2021, May 18). *City Leaders Select Developer for New Community Grocery Store in West Louisville*. whas11.com. Retrieved October 9, 2021, from <https://www.whas11.com/article/news/local/west-louisville-grocery-community-developer/417-9fd06b61-cdef-4625-97ac-2e38c8833fb5>

Giammarise, K. (2021, June 3). *Pandemic drove large food insecurity increases in Hill District, Homewood*. 90.5 WESA. Retrieved November 5, 2022, from <https://www.wesa.fm/economy-business/2021-01-22/pandemic-drove-large-food-insecurity-increases-in-hill-district-homewood>

Gillespie, L. (2017, March 4). *New Data Show Stark Health Disparities in east, West Louisville*. 89.3 WFPL News Louisville. Retrieved October 8, 2021, from <https://wfpl.org/new-data-show-stark-health-disparities-east-west-louisville/>

Gluck, M. (2018, January 5). *Pre-eclampsia in pregnancy: How to reduce your risk*. The Marion Gluck Clinic. Retrieved December 21, 2022, from <https://www.mariongluckclinic.com/blog/pre-eclampsia-pregnancy-reduce->

risk.html#:~:text=Research%20shows%20that%20diets%20high,salty%20snacks%20and%20fizzy%20drinks.

Goodlett, C. R., & Horn, K. H. (n.d.). *Mechanisms of alcohol-induced damage to the developing*. National Institute on Alcohol Abuse and Alcoholism. Retrieved October 30, 2022, from [https://pubs.niaaa.nih.gov/publications/arh25-3/175-](https://pubs.niaaa.nih.gov/publications/arh25-3/175-184.htm#:~:text=Maternal%20drinking%20during%20pregnancy%20can,CNS)%20disorders%2C%20and%20a%20pattern)

184.htm#:~:text=Maternal%20drinking%20during%20pregnancy%20can,CNS)%20disorders%2C%20and%20a%20pattern

Gundersen, C., Dewey, A., Kato, M., Crumbaugh, A. S., & Strayer, M. (2019, May). *Map The Meal Gap 2019*. Feeding America. Retrieved October 12, 2022, from https://www.feedingamerica.org/sites/default/files/2019-05/2017-map-the-meal-gap-all-modules_0.pdf

Gundersen, C., Kreider, B., & Pepper, J. (2011). The Economics of Food Insecurity in the United States. *Applied Economic Perspectives and Policy*, 33(3), 281–303.
<http://www.jstor.org/stable/41237221>

Guzman, D. T. (2022, September 27). Shelby County Commission funds midwife program. Tennessee Lookout. Retrieved January 6, 2023, from <https://tennesseelookout.com/2022/09/27/shelby-county-commission-funds-midwife-program/>

Harvest, J. (2014, June 24). *Hunger awareness month: Pittsburgh leads the nation in food deserts*. Just Harvest. Retrieved October 10, 2022, from <https://justharvest.org/hunger-awareness-month-pittsburgh-leads-the-nation-in-food->

Infant Mortality Among Black Americans. (1987). *Morbidity and Mortality Weekly Report*, 36(1), 1–10. <http://www.jstor.org/stable/45195838>

Infant Mortality Rate. Think Health St. Louis. (2021, April). Retrieved December 6, 2022, from <https://www.thinkhealthstl.org/indicators/index/view?indicatorId=289&localeId=1649>

Inman, K. (2020, November 10). *Ut sociologist: Neighborhood inequities span a century in Knoxville*. wbir.com. Retrieved November 28, 2022, from <https://www.wbir.com/article/news/local/ut-sociologist-neighborhood-inequities-span-a-century-in-knoxville/51-a24573e0-759a-4df0-bb10-4dc0fcef2809>

Johnson, K. (2022, September 13). *Shelby County infant mortality rate decreases; still higher than average*. MemphisFlyer. Retrieved October 17, 2022, from <https://www.memphisflyer.com/shelby-county-infant-mortality-rate-decreases-still-higher-than-average>

Johnson, N. (2014, March 27). *America's Worst Food Deserts: Map-lovers edition*. Grist. Retrieved October 4, 2022, from <https://grist.org/food/americas-worst-food-deserts-map-lovers-edition/>

Jones, R. (n.d.). *The Roots of Food Deserts*. ML14 Food Deserts Feature - School of Law - The University of Memphis. Retrieved October 9, 2022, from https://www.memphis.edu/law/about/ml14_rootsoffooddeserts.php

Kentucky Department for Public Health Division of Maternal and Child Health. (2020, November). *Maternal mortality review 2020 Annual Report*. UK College of Medicine. Retrieved March 14, 2023, from <https://medicine.uky.edu/sites/default/files/inline-files/mmrannualreport.pdf>

Knox County Tennessee Health Department. Healthy Moms - Maternal and Infant Health - Health Department - Knox County Tennessee Government. (n.d.). Retrieved December 6, 2022, from https://www.knoxcounty.org/health/maternal_infant_health/healthy_moms.php

Kokenda, J. (2018, February 26). *2011-2015-Infant-Mortality-Report*. Allegheny County. Retrieved January 1, 2023, from https://www.alleghenycounty.us/uploadedFiles/Allegheny_Home/Health_Department/Resources/Data_and_Reporting/Chronic_Disease_Epidemiology/2011-2015-Infant-Mortality-Report.pdf

Lease signed for new grocery store at former Shop 'n save in Pittsburgh's Hill District. WTAE. (2022, January 26). Retrieved December 2, 2022, from <https://www.wtae.com/article/hill-district-grocery-store-salems-market-shop-n-save/38902537>

Louisville, Kentucky Population 2022 (Demographics, Maps, Graphs). (n.d.). Retrieved October 17, 2022, from <https://worldpopulationreview.com/us-cities/louisville-ky-population>

Many Memphis residents do not have access to fresh food. but they have gas stations galore, with convenience stores rather than grocery stores. The Counter. (2021, November

4). Retrieved October 9, 2022, from <https://thecounter.org/memphis-residents-no-access-fresh-food-access-gas-stations-convenience-stores/>

MarchofDimes. (n.d.). *Distribution of gestational age categories: Louisville, 2020*. March of Dimes | PeriStats. Retrieved October 17, 2022, from <https://www.marchofdimes.org/peristats/state-summaries/kentucky?top=3&lev=1&stop=55@=99&sreg=21&creg=2148000&obj=3&slev=5>

MarchofDimes. (n.d.). *Infant mortality rates: Shelby, 2009-2019*. March of Dimes | PeriStats. Retrieved October 17, 2022, from <https://www.marchofdimes.org/peristats/data?top=6&lev=1&stop=91@=99&p;sreg=47&creg=47157&obj=1&slev=6>

MarchofDimes. (n.d.). *Maternal mortality rates: Missouri, 2018-2020 average*. March of Dimes | PeriStats. Retrieved October 17, 2022, from <https://www.marchofdimes.org/peristats/data?top=6&lev=1&stop=370@=99&am p;sreg=29&obj=35&slev=4>

MarchofDimes. (n.d.). *Maternal mortality rates: Pennsylvania, 2018-2020 average*. March of Dimes | PeriStats. Retrieved October 17, 2022, from <https://www.marchofdimes.org/peristats/data?top=6&lev=1&stop=370@=99&a mp;sreg=42&obj=35&slev=4>

MarchofDimes. (n.d.). *Preterm birth rate: Allegheny, 2015-2021*. March of Dimes | PeriStats. Retrieved January 1, 2023, from

<https://www.marchofdimes.org/peristats/data?reg=99&top=3&stop=63&lev=1&slev=6&obj=1&sreg=42&creg=42003&ftop=60>

MarchofDimes. (2022, January). *Preterm birth rate: Shelby and Tennessee, 2014-2020*.

March of Dimes | PeriStats. Retrieved November 25, 2022, from

<https://www.marchofdimes.org/peristats/data?reg=99&top=3&stop=60&lev=1&slev=6&obj=1&cmp=47&sreg=47&creg=47157>

Marshall, A. (2021, March 4). *Dividing lines: Redlining in Louisville*. Louisville. Retrieved October 30, 2022, from <https://www.louisville.com/redlining-louisville-dividing-lines>

Massey, S. M., Ferguson-Young, D., & Brady, S. J. (2022, April 21). *'we need a revolution'*: Too many black Tennessee mothers are dying from pregnancy-related deaths, Opinion. The Tennessean. Retrieved October 17, 2022, from <https://www.tennessean.com/story/opinion/2022/04/21/tennessee-has-reached-turning-point-maternal-mortality-crisis/7396052001/>

Maternal and Child Health Profile. Think Health St. Louis. (2019, October 28). Retrieved October 17, 2022, from https://www.thinkhealthstl.org/content/sites/stlouisco/MCH/FINAL_2019_MCH_Report.pdf

Maternal Health in Allegheny County. (n.d.). Women's Health Activist Movement. Retrieved October 2, 2022, from <https://www.jhf.org/docman/resources/research-papers/417-what-the-black-maternal-health-momnibus-means-for-allegheny-county/file>

Mattingly, J. (2021, October 1). *How racism is built into Louisville's infrastructure.*

Louisville Political Review. Retrieved October 30, 2022, from

<https://loupolitical.org/2021/10/01/how-racism-is-built-into-louisvilles-infrastructure/>

McKenna, G. (2022, June 21). *Council seeks solutions to staggering black maternal death rate.* whas11.com. Retrieved October 14, 2022, from

<https://www.whas11.com/article/life/family/metro-council-womens-caucus-solutions-black-maternal-death-rate-black-birth-justice-louisville-kentucky/417-e0c2ad23-e005-4da9-a95a-eac605e64da0>

Meko, H. (2021, June 27). *Food insecurity linked to gun violence. Urban Farms in St.*

Louis work on a solution • Missouri Independent. Missouri Independent. Retrieved

October 9, 2022, from <https://missouriindependent.com/2021/06/27/food-insecurity-linked-to-gun-violence-urban-farms-in-st-louis-work-on-a-solution/>

Memphis, Tennessee population 2022. Memphis, Tennessee Population 2022

(Demographics, Maps, Graphs). (n.d.). Retrieved October 9, 2022, from

<https://worldpopulationreview.com/us-cities/memphis-tn-population>

Mills, A. (2018, December 2). *New study shows food deserts persist in Louisville.*

Thousands of Louisvillians live in food deserts, according to new study. Retrieved October

3, 2022, from <https://spectrumnews1.com/ky/louisville/news/2018/12/02/food-deserts>

Missouri Pregnancy Associated Mortality Review 2017-2019 Annual Report. (2022, June).

Missouri Department of Health and Senior Services. Retrieved October 10, 2022, from

<https://health.mo.gov/data/pamr/pdf/2019-annual-report.pdf>

Mock, B. (2019, September 20). *How Pittsburgh fails black women in 6 charts*. Bloomberg.com. Retrieved October 17, 2022, from <https://www.bloomberg.com/news/articles/2019-09-20/how-pittsburgh-fails-black-women-in-6-charts>

Morland, K., Diez Roux, A. V., & Wing, S. (2006). *Supermarkets, other food stores, and obesity: the atherosclerosis risk in communities study*. *American journal of preventive medicine*, 30(4), 333–339. <https://doi.org/10.1016/j.amepre.2005.11.003>

Murray, M. (2020, October 27). *Food insecurity rates increase significantly due to COVID-19 pandemic*. Pittsburgh Food Bank. Retrieved December 1, 2022, from <https://www.pittsburghfoodbank.org/wp-content/uploads/2021/08/PRESS-RELEASE-New-Food-Insecurity-Data-Shows-Significant-Increase-in-Southwest-PA.pdf>

Mutasa, N. (2020, September 10). *Food deserts in Memphis, TN*. Medium. Retrieved October 9, 2022, from <https://medium.com/@namatsaimutasa/food-deserts-in-memphis-tn-da51328f967a>

National Center for Health Statistics (US). (2016). *Health, United States, 2015: With Special Feature on Racial and Ethnic Health Disparities*. National Center for Health Statistics (US).

Nourish Knoxville. Trinity Health Foundation of East Tennessee. (2021, April 15). Retrieved October 10, 2022, from <https://trinityfound.org/services/nourish-knoxville-2/>

Number of Infant Deaths with Rates per 1,000 Births, by Race of Mother, For Counties of Tennessee. Tennessee State Government. (2017, April 4). Retrieved October 11, 2022, from https://www.tn.gov/content/dam/tn/health/documents/TN_Infant_Mortality_Rates_-_2015.pdf

Norment, L. (2023, March 1). *Women's History Month: Pregnancy and childbirth should not endanger the lives of mothers.* The Commercial Appeal. Retrieved March 3, 2023, from <https://www.commercialappeal.com/story/opinion/columnists/2023/03/01/norment-this-womens-history-month-lets-protect-and-uplift-mothers/69954498007/>

Novoa, C., & Taylor, J. (2018, February 1). *Exploring African Americans' high maternal and infant death rates.* Retrieved April 15, 2021, from <https://www.americanprogress.org/issues/early-childhood/reports/2018/02/01/445576/exploring-african-americans-high-maternal-infant-death-rates/>

Obenza-Bridges, Z. (2021, March 2). *Looking into Pittsburgh's segregated communities.* The Foreword. Retrieved December 1, 2022, from <https://theforeword.org/1298/local-news/looking-into-pittsburghs-segregated-communities/>

Obradovic, M. (2020, July 24). *Opinion: St. Louis-area food deserts clearly demonstrate systemic racism.* Webster Journal. Retrieved October 7, 2022, from <https://websterjournal.com/2020/07/23/opinion-st-louis-area-food-deserts-clearly-demonstrate-environmental->

racism/#:~:text=According%20to%20the%20U.S.%20Department,to%20the%20nearest%20grocery%20store.

Overall (all ages) hunger & poverty in Jefferson County, Kentucky: Map the meal gap.

Feeding America. (n.d.). Retrieved October 9, 2022, from

<https://map.feedingamerica.org/county/2020/overall/kentucky/county/jefferson>

Overall (all ages) hunger & poverty in Shelby County, Tennessee: Map the meal gap.

Feeding America. (n.d.). Retrieved December 6, 2022, from

<https://map.feedingamerica.org/county/2018/overall/tennessee/county/shelby>

Paula Dutko. (2012). Food Deserts Suffer Persistent Socioeconomic Disadvantage.

Choices, 27(3), 1–4. <http://www.jstor.org/stable/choices.27.3.02>

Pennsylvania Legislative Service. (2019, April 23). *Pittsburgh grapples with food*

insecurity. AFT Pennsylvania. Retrieved December 1, 2022, from

<http://pa.aft.org/publications-and-reports/pittsburgh-grapples-food-insecurity>

Pittsburgh's Inequality Across Gender and Race. (2019). City of Pittsburgh's Gender

Equity Commission. Retrieved October 11, 2022, from

https://apps.pittsburghpa.gov/redtail/images/7109_Pittsburgh's_Inequality_Across_Gender_and_Race_09_18_19.pdf

Platt, R. (2021, March 10). How the frazier history museum is "Bridging the divide" in its

City. American Alliance of Museums. Retrieved October 17, 2022, from [https://www.aam-](https://www.aam-us.org/2021/03/10/how-the-frazier-history-museum-is-bridging-the-divide-in-its-city/)

[us.org/2021/03/10/how-the-frazier-history-museum-is-bridging-the-divide-in-its-city/](https://www.aam-us.org/2021/03/10/how-the-frazier-history-museum-is-bridging-the-divide-in-its-city/)

Quinn, J. A., Munoz, F. M., Gonik, B., Frau, L., Cutland, C., Mallett-Moore, T., Kissou, A., Wittke, F., Das, M., Nunes, T., Pye, S., Watson, W., Ramos, A. A., Cordero, J. F., Huang, W. T., Kochhar, S., Buttery, J., & Brighton Collaboration Preterm Birth Working Group (2016). Preterm birth: Case definition & guidelines for data collection, analysis, and presentation of immunisation safety data. *Vaccine*, 34(49), 6047–6056.

<https://doi.org/10.1016/j.vaccine.2016.03.045>

Rayworth, M. (2022, August 31). *To help feed families in Pittsburgh's food deserts, Lyft Launches Grocery Access Program*. NEXTpittsburgh. Retrieved December 31, 2022, from <https://nextpittsburgh.com/latest-news/to-help-feed-families-in-pittsburghs-food-deserts-lyft-launches-grocery-access-program/>

Reyes-López, M. A., González-Leyva, C. P., Rodríguez-Cano, A. M., Rodríguez-Hernández, C., Colin-Ramírez, E., Estrada-Gutierrez, G., Muñoz-Manrique, C. G., & Perichart-Perera, O. (2021). Diet Quality Is Associated with a High Newborn Size and Reduction in the Risk of Low Birth Weight and Small for Gestational Age in a Group of Mexican Pregnant Women: *An Observational Study*. *Nutrients*, 13(6), 1853.

<https://doi.org/10.3390/nu13061853>

Rosenfeld, J. (2022, February 16). *Giant Eagle dispatches mobile market to improve food access in underserved neighborhoods*. Just Harvest. Retrieved November 31, 2022, from https://justharvest.org/jh_news_item/giant-eagle-dispatches-mobile-market-to-improve-food-access-in-underserved-neighborhoods/

Ross, A. (2022, February 28). *How can we fight high black infant mortality rates in Pittsburgh?* Pittsburgh Magazine. Retrieved October 17, 2022, from <https://www.pittsburghmagazine.com/how-can-we-fight-high-black-infant-mortality-rates-in-pittsburgh/>

Ruff, C. (2021, November 18). *Racial covenants segregated St. Louis. They still exist.* STLPR. Retrieved November 10, 2022, from <https://news.stlpublicradio.org/culture-history/2021-11-18/30-000-st-louis-properties-have-racial-covenants-in-their-deeds-your-home-could-be-one>

Rummo, P. E., Elbel, B. D., & Jeremy Sze. (2022, May 9). *'New & improved' Supermarkets Trim Childhood Obesity in New York City.* NYU Langone News. Retrieved October 3, 2022, from <https://nyulangone.org/news/new-improved-supermarkets-trim-childhood-obesity-new-york-city#:~:text=Led%20by%20researchers%20at%20NYU,mile%20of%208%20such%20stories.>

Rutan, D. (2021, November 5). *How housing policy over the last century has made Pittsburgh what it is today.* PublicSource. Retrieved November 29, 2022, from <https://www.publicsource.org/how-housing-policy-over-the-last-century-has-made-pittsburgh-what-it-is-today/>

Rutan, D. Q., & Glass, M. R. (2017). The lingering effects of neighborhood appraisal: Evaluating redlining's legacy in Pittsburgh. *The Professional Geographer*, 70(3), 339–349. <https://doi.org/10.1080/00330124.2017.1371610>

Salvemini, C. (2021, May 24). *A legacy of community: The history of East Knoxville*.

wbir.com. Retrieved November 29, 2022, from

<https://www.wbir.com/article/news/history/the-history-of-east-knoxville/51-a9b93a2c-8e47-4d2e-9012-9f50372f6435>

Scalise, B. (2022). *Maternal Mortality in Tennessee 2017-2020*. Tennessee Department of

Health. Retrieved December 10, 2022, from

<https://www.tn.gov/content/dam/tn/health/documents/MMR-2022-Annual-Report.pdf>

Sevilla, N. (2021, April 2). *Food apartheid: Racialized access to Healthy Affordable Food*.

NRDC. Retrieved December 2, 2022, from [https://www.nrdc.org/experts/nina-sevilla/food-](https://www.nrdc.org/experts/nina-sevilla/food-apartheid-racialized-access-healthy-affordable-food)

[apartheid-racialized-access-healthy-affordable-food](https://www.nrdc.org/experts/nina-sevilla/food-apartheid-racialized-access-healthy-affordable-food)

Shelby County. Dare To Care. (2021, September 13). Retrieved December 2, 2022, from

<https://daretocare.org/county/shelby->

[county/#:~:text=The%20food%20insecurity%20rate%20in,food%20insecurity%20rate%20is%2012.8%25.](https://daretocare.org/county/shelby-county/#:~:text=The%20food%20insecurity%20rate%20in,food%20insecurity%20rate%20is%2012.8%25.)

Shelby County Infant Mortality Rate Reaches Historic Milestone. (2016, November 21).

Shelby County Health Department. Retrieved October 9, 2022, from

<https://shelbycountyttn.gov/DocumentCenter/View/27841/NEWS-RELEASE--INFANT-MORTALITY-RATE-112116doc?bidId=>

Sheldon, M. (2021, May 10). *Memphis Food Waste Project aims to halve food waste by*

2030. NYC Food Policy Center (Hunter College). Retrieved November 28, 2022, from

<https://www.nycfoodpolicy.org/food-policy-snapshot-memphis-food-waste-project/>

Smith, M. (2018, June 28). *Food fight: The battle to eliminate Memphis' food deserts*. MemphisFlyer. Retrieved October 9, 2022, from <https://www.memphisflyer.com/food-fight-the-battle-to-eliminate-memphis-food-deserts>

Sparks, P. J., Sparks, C. S., & Campbell, J. J. A. (2013). *An application of Bayesian spatial statistical methods to the study of racial and poverty segregation and infant mortality rates in the US*. *GeoJournal*, 78(2), 389–405. <http://www.jstor.org/stable/42006326>

Stacker. (2022, September 13). *Counties with the highest rate of food insecure children in Pennsylvania*. Stacker. Retrieved December 1, 2022, from <https://stacker.com/pennsylvania/counties-highest-rate-food-insecure-children-pennsylvania>

Staff, & Rice, A. (2020, October 7). *Tobacco, alcohol, and drugs during pregnancy*. familydoctor.org. Retrieved October 30, 2022, from <https://familydoctor.org/tobacco-alcohol-drugs-pregnancy/>

Staff, W. B. I. R. (2021, January 21). *Feeding America reports 11.7% food insecurity rate in Knox County*. wbir.com. Retrieved December 1, 2022, from <https://www.wbir.com/article/life/food/feeding-america-reports-117-food-insecurity-rate-in-knox-county/51-919d3672-43d0-48b9-b920-7457ebdee56c>

Testino, L. (2021, October 22). *Trustmark National Bank accused of redlining black and Hispanic neighborhoods in Memphis*. The Commercial Appeal. Retrieved December 2, 2022, from

<https://www.commercialappeal.com/story/money/business/development/2021/10/22/trustmark-national-bank-accused-redlining-black-hispanic-memphis-neighborhoods/6139583001/>

The BLUES Project: Targeting Social Determinants of Health to Address the City's High Infant Death Rate. University of Tennessee Health Science Center. (2010, May 19).

Retrieved October 17, 2022, from <https://www.uthsc.edu/cheer/documents/blues-project.pdf>

The Food Trust. (2018, April 26). *The need for more healthy food retail in Louisville. Food for Every Child.* Retrieved November 21, 2022, from <https://thefoodtrust.org/wp-content/uploads/2022/07/louisville-bifold-final-lowres.original.pdf>

The Maternal Wellbeing City Dashboard. Case Study Analysis: Pittsburgh, PA. (2021).

Ariadne Labs. Retrieved October 5, 2022, from https://www.ariadnelabs.org/wp-content/uploads/2021/07/PITTSBURGH_CaseStudyAnalysis.pdf

Thompson, A. (2021, June 24). *Infant mortality remains critical issue in Memphis; local organizations raise funds for Research.* WREG.com. Retrieved October 17, 2022, from <https://wreg.com/news/infant-mortality-remains-critical-issue-in-memphis-local-organizations-raise-funds-for-research/>

Troxel, W. M., & Dubowitz, T. (2021, February 9). *Striking rates of food insecurity in two Pittsburgh neighborhoods.* RAND Corporation. Retrieved November 30, 2022, from <https://www.rand.org/blog/2021/02/other-voices-striking-rates-of-food-insecurity-in-the.html>

Urban renewal (removal) Before / After. Beck Cultural Exchange Center. (n.d.). Retrieved December 3, 2022, from <https://www.beckcenter.net/urban-renewal>

USAFacts. (2021, June 23). *Which cities have the most people living in food deserts?*

USAFacts. Retrieved October 9, 2022, from <https://usafacts.org/articles/which-cities-have-the-most-people-living-in-food-deserts/>

U.S. Census Bureau. (2018). *Community Facts—Poverty.* Retrieved October 2, 2022, from <https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=CF>

U.S. Census Bureau quickfacts: Knoxville City, Tennessee. (n.d.). United States Census Bureau. Retrieved October 11, 2022, from <https://www.census.gov/quickfacts/fact/table/knoxvillecitytennessee/PST045221>

U.S. Census Bureau quickfacts: Memphis City, Tennessee. (n.d.). United States Census Bureau. Retrieved October 1, 2022, from <https://www.census.gov/quickfacts/fact/table/memphiscitytennessee/PST045221>

U.S. Census Bureau quickfacts: Pittsburgh City, Pennsylvania. (n.d.). United States Census Bureau. Retrieved October 10, 2022, from <https://www.census.gov/quickfacts/fact/table/pittsburghcitypennsylvania/PST045221>

U.S. Census Bureau quickfacts: St. Louis City, Missouri. (n.d.). United States Census Bureau. Retrieved October 10, 2022, from <https://www.census.gov/quickfacts/stlouiscitymissouri>

Wadhvani, A. (2022, June 27). *With Tennessee abortion ban imminent, out-of-state travel could be next battleground*. Tennessee Lookout. Retrieved October 10, 2022, from <https://tennesseelookout.com/2022/06/27/in-tennessee-near-total-ban-on-abortion-to-take-effect-within-weeks/>

Weathersbee, T. (2018, March 16). *Places don't thrive without fresh food. Orange Mound doesn't plan to be one of them*. The Commercial Appeal. Retrieved October 9, 2022, from <http://www.commercialappeal.com/story/news/2018/03/16/weathersbee-places-dont-thrive-without-fresh-food-orange-mound-doesnt-plan-one-them/422637002/>.

Weathersbee, T. (2022, June 25). *Without roe, Memphis' OBGYN shortage will worsen. that means more women will die: Weathersbee*. The Commercial Appeal. Retrieved October 17, 2022, from <https://www.commercialappeal.com/story/news/columnists/tonyaa-weathersbee/2022/06/25/end-roe-add-memphis-maternal-mortality-body-count/7723475001/>

Weinberg, T. (2022, August 2). *Stark disparities persist in Missouri's maternal mortality rate, State Board finds*. Missouri Independent. Retrieved October 17, 2022, from <https://missouriindependent.com/2022/08/02/stark-disparities-persist-in-missouris-maternal-mortality-rate-state-board-finds/>

WHAMglobal Brief: Maternal Mortality. (2018). Women's Health Activist Movement. Retrieved October 1, 2022, from <https://www.whamglobal.org/images/blog/mmoverviewfinal4418.pdf>

What the Black Maternal Health Omnibus means for Allegheny County. JHF. (2021, April 1). Retrieved November 21, 2022, from <https://www.jhf.org/publications-videos/pub-and-vids/research-papers>

Wuot. (2018, November 15). *Fighting Food Deserts in East Tennessee.* 91.9 FM WUOT, Your Public Radio Station. Retrieved October 10, 2022, from <https://www.wuot.org/2018-11-15/fighting-food-deserts-in-east-tennessee>

Wuot. (2021, May 13). *Losing home: When urban renewal came to Knoxville.* 91.9 FM WUOT, Your Public Radio Station. Retrieved December 9, 2022, from <https://www.wuot.org/news/2021-05-13/losing-home-when-urban-renewal-came-to-knoxville>

Young, K. (2020, February 12). *Policy solutions to prevent infant and maternal mortality in Tennessee.* Tennessee Justice Center. Retrieved October 17, 2022, from <https://www.tnjustice.org/infant-maternal-mortality-policy-solutions/#:~:text=Tennessee%20lags%20behind%20other%20states,of%20maternal%20and%20infant%20mortality.>