

What's Partisanship Got to Do With It? Racial Disparities of Maternal and Infant Mortality in

North Carolina

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Abstract

This research aims to examine whether there are common conditions such as, race, poverty level, rural or urban location, and partisanship that lead to higher rates of infant and maternal mortality among African-American women in North Carolina. The findings suggest that regardless of rural or urban location, partisanship, or percentage of individuals below poverty Black women still display higher rates of infant and maternal mortality. However, White infant mortality displayed a statistical difference and stronger correlation to percentage below poverty than Black infant mortality. Among the tested variables, only race yielded a statistically significant P-value for African-American women. Though, rates of infant and maternal mortality are considerably higher for African-American women in comparison to White women, none of the tested variables besides race were revealed to have a strong correlation nor statistical difference. However, the averages and variability of the rates for Black women were higher than White women for every test. For Black women, race may be the only explanation for infant mortality. Overall, partisanship exhibited no impact on rates of infant mortality. When it comes to maternal mortality, race remains as a consistent explanatory factor for Black women. For White women, maternal mortality is impacted by poverty level. Furthermore, the North Carolina Pregnancy Medical Home stands as a non-partisan partnership, and establishes the value of healthcare solutions without partisan battles.

Keywords: North Carolina, infant mortality, maternal mortality, birth complications, partisanship

Importance of the Topic

The United States has the worst rates of infant and maternal deaths among any developed nation and this has persisted since the 1980s (Thakrar, et al. 2018). In 2017, The United States reported a maternal mortality rate of 26.4 deaths per 100,000 births, with the next highest rate from the United Kingdom at 9.2 deaths per 100,000 births (Martin and Montagne 2017). The Centers for Disease Control define maternal mortality as death that occurs at the start of pregnancy to one year after delivery or termination (CDC Foundation 2018). Currently, “American women are more than three times as likely as Canadian women to die in the maternal period, and six times as likely to die as Scandinavians” (CDC Foundation 2018). The CDC reports that 60 percent of these deaths are preventable (CDC Foundation 2018). By 2018, Black women in the U.S. had a maternal mortality rate of 47.2 deaths per 100,000 births and White women had a rate of 18.1 deaths per 100,000 births (America's Health Rankings United Health Foundation 2017).

Moreover, African-American women nationwide have disproportionately higher rates of infant mortality than their Caucasian counterparts. Concerning infant mortality, in 2016, the Centers for Disease Control reported over 23,000 infant deaths nationwide, with the top five leading causes being: birth defects, preterm birth and low birth weight, sudden infant death syndrome, maternal pregnancy complications, and injuries (i.e. suffocation) (CDC 2017). Compared to countries with similar GDPs, the United States has an average infant mortality rate that is nearly twice as high than comparable countries (Gonzales and Sawyer 2017). Infant Mortality is defined as death that occurs within the first year of life. Currently, Non-Hispanic Black infants account for 11.4 percent of these deaths and Non-Hispanic White infants account for 4.9 percent. These rates illustrate the Infant Mortality Gap, that include the disparity ratios between

Black and White infant populations. Between these disparity ratios exists a gap of which Black infants die a disproportionately higher rates (J. S. Speights, et al. 2017).

The spotlight on these alarming rates resurfaced in the public sphere when tennis star Serena Williams shared her C-section scare in 2018. Williams revealed the difficulty she had communicating with hospital personnel and nurses about critical treatment needed to address her long history of life-threatening blood clots. In an essay published by CNN, Williams cites the CDC in stating, "...Black women in the United States are over three times more likely to die from pregnancy or childbirth-related causes" (Williams 2018). Williams' life-threatening experience with childbirth prompted her to think about the maternal health of Black women in America and in other countries.

Framing the Issue

On September 2, 2017, tennis star Serena Williams gave birth to her daughter. Following the cesarean section birth, Williams expressed to a nurse that she felt the onset of a pulmonary embolism and requested a CT scan and a blood thinner. A pulmonary embolism, which results in a blood clot that usually begins in the legs and then travels to suddenly block an artery in the lungs. This request was based on her previous medical history of suffering from blood clots, one of which proved nearly fatal in 2011. The nurse promptly dismissed Williams' request as confusion from pain medication, and instead allowed for a doctor to perform an ultrasound of her legs. As the ultrasound did not reveal any abnormalities, she underwent a CT scan that showed several small blood clots in her lungs. Williams was then ushered into emergency surgery which resulted in her being bed-ridden for six weeks after giving birth. Due to being dismissed initially by health care providers, Serena Williams nearly died from a preventable post-pregnancy complication. This is especially true for Black and Hispanic women. The narrative following negative birth outcomes of Black women is attributed to factors such as low income, low education, urban location, and physical fitness/health. However, Serena Williams does not adhere to this narrative. Williams holds 23 Grand Slam titles, four Olympic gold medals, and has a net worth of \$180 million. This shines a light on a discovery researchers have made in recent years in New York City:

“Even when accounting for risk factors like low educational attainment, obesity and neighborhood poverty level, the city’s black mothers still face significantly higher rates of harm, the agency found. Of note, black mothers who are college-educated fare worse than women of all other races who never finished high school. Obese women of all races do better than black women who are of normal weight. And black women in the wealthiest neighborhoods do worse than white, Hispanic and Asian mothers in the poorest ones. The health department has even mapped where

the most maternal harm occurs, dividing the city into community districts. The highest rates of complications are concentrated in a swath of land in Central Brooklyn, in an area largely untouched by the wave of gentrification that has swept other parts of the borough. Here, mothers face up to four times the complication rates of neighborhoods just a few subway stops away.”

(Anglely, et al. 2016)

This anecdote of the complications that Serena Williams faced is a microcosm of a population of Black women that suffer from negative birth outcomes regardless of socioeconomic status, educational achievement, and physical health. This project aims to utilize data from the North Carolina Health Department, census data, and other primary data sources to possibly identify causal factors and statistically significant correlations to black infant and maternal mortality rates. Furthermore, it emphasizes a question that has been asked for more than a decade: Why are African-American women and infants struggling to achieve positive health outcomes in America?

Why North Carolina?

From 2016 to 2018, North Carolina has remained among the top 10 states with the highest infant mortality rates in America. This is also true for infant mortality rates of for Non-Hispanic Black women with North Carolina ranked 9th with 12.9 deaths per 1,000 live births (Kaiser Family Foundation 2016). Between 2016 and 2018, North Carolina has maintained a rate of 7.0-7.3 deaths per 1,000 live births (NCHS; United Health Foundation 2018).

Conversely, North Carolina has fared better in combatting maternal mortality in the state. From 2012-2016 North Carolina is ranked 30th out of 46 states with available data (Ungar and Simon 2018). The majority of states that reflect similar data are Midwestern and Southern states; all of which have infant mortality rates higher than the national average. As early as the late 90s, North Carolina state officials and health care providers alike have delved into this issue for a sustainable solution. In recent years, 2016-2017, the state has begun to work towards closing the infant mortality gap. The infant mortality rate for the general population dropped 1.4 percent in 2016 to 7.2 deaths per 1,000 births compared to the 7.3 deaths per 1,000 births reported in 2015 (NCDHHS 2017). The infant mortality death rate plateaued in 2017. However, the rate has returned to 7.3 deaths per 1,000 births in 2018. However, Black infants die at more than twice the rate of white infants in North Carolina (America's Health Rankings United Health Foundation 2017). The infant mortality gap is tangible, yet the causes are “complex, systemic and rooted in social structures from past generations” (The Observer Editorial Board 2019). The director of the Jordan Institute for Families at the UNC School of social work, Sarah Verbiest, suggested a combination of influencing factors. Verbiest mentions the impact of an economic gap, the lack of providers as “there are zero practicing OB/GYNs in about a third of North Carolina’s counties” (The Observer Editorial Board 2019). Verbiest also asserts that implicit and explicit racism in North Carolina

significantly contributes to negative birth outcomes. Nonetheless, experts attribute a combination of “social determinants” that make the infant mortality gap possible.

Conversely, North Carolina legislators have more difficulty confronting the issue of maternal mortality. From 1999-2013, 35.6% of all maternal deaths were pregnancy related (NC DHHS State Center for Health Statistics 2016). In 2018, the maternal mortality rate among the general population increased by 3.7 percent from 12.1 deaths per 100,000 births to 15.8 deaths per 100,000 births (America's Health Rankings United Health Foundation 2018). Maternal mortality rates for Black women in North Carolina in 2018 was nearly 3 times higher at 29.9 deaths per 100,000 live births than White women at 11.9 deaths per 100,000 live births (America's Health Rankings United Health Foundation 2017).

Though North Carolina lawmakers have drafted bi-partisan bills to combat these issues, giving birth in North Carolina has become increasingly risky business. Lawmakers have attempted to create community care programs such as, the North Carolina Pregnancy Medical Home (NCPMH), which will be discussed later, that explicitly targets and serves low-income women. Which in this case, according to the North Carolina Poverty report: “communities of color, women, and children are more likely to face economic hardships than white people, men, and older adults” (Kennedy 2017). Also, the importance of Medicaid expansion and revision of public policy decisions can lead to the success of the NCPMH and future programs alike.

In 2013, North Carolina’s General Assembly passed SB 4 which prohibited the expansion of Medicaid. By 2015, 28 states had accepted Medicaid expansion, 18 of which had Democratic governors and 10 had Republican governors. Medicaid has persisted as a largely partisan issue. As of today, North Carolina has yet to expand Medicaid as GOP lawmakers continue to block expansion. There are currently 17 states that have not expanded Medicaid, in which all except three

states have infant mortalities higher than the national average (5.9) (North Carolina: 7.3); and all except six states have maternal mortalities higher than the national average (20.7) (North Carolina: 15.8).

Major Research Question

My research question is: Does race, location, poverty level, and partisanship impact the rate of infant mortality in North Carolina?

Regarding, maternal mortality: Does race, poverty level, and Medicaid expansion impact the rate of maternal mortality in North Carolina?

In this research, I introduce the variable of partisanship to examine its relevancy to my research question.

Thesis

Studies and statistical data have shown that African-American women experience higher rates of infant and maternal mortality than white and Hispanic women in America. This has also been a supported narrative in North Carolina. African-American women are likely to have higher rates of negative birth outcomes despite having similar socioeconomic statuses to white and Hispanic women. Among the tested variables, African-American and White women demonstrated statistical significance regarding income/percent below poverty. This leads me to assert that regardless of poverty level, rural or urban location, and partisanship Black women experience higher rates of infant mortality than White Women. However, Black Maternal mortality was slightly influenced by poverty levels. Overall, negative birth outcomes for African- American women are not influenced by either partisanship of county, rural or urban location, nor poverty level. Therefore, the use of non-partisan programs such as the North Carolina Pregnancy home better serves the

states' goal of combating infant and maternal mortality disparities. This research also supports the efficacy of a strong social pact and establishment of a reliable welfare state. In short, infant and maternal mortality can be approached with a non-partisan strategy that promotes positive community led care and health initiatives.

Literature Review

Studies reviewed introduce several factors that contribute to negative birth outcomes for Black women. Each study either cites income, race, location, and partisan disputes as roadblocks to striving for positive health outcomes for African American women. In 2003, Leslie, et al, carried out a study titled: Infant mortality, low birth weight, and prematurity among Hispanic, white, and African American women in North Carolina. The study aimed to compare birth outcomes of Hispanics with white and African American women in North Carolina and observe variables that results in adverse birth outcomes among Hispanic women. The study utilized birth/infant death certificates in North Carolina between 1993-1997. It was found that infant mortality rates were lowest among Hispanic women, and low birth weight and prematurity were analogous to white women and lower than African American women. Researchers found that the healthy birth outcomes among Hispanic women were spurred by higher education, prenatal care, marriage, and no tobacco use. It was concluded that birth outcomes for Hispanics in North Carolina were better than those of African American women and similar to those of white women. This was regardless of utilization of prenatal care and socioeconomic characteristics mirroring African American women (Leslie, et al. 2003). This study is similar to my research, but instead it focuses on the birth outcomes of Hispanic women. Also, my research aims to compare the following independent

variables: race, partisanship, and income. Furthermore, I am focusing on how these variables affect the rates of infant and maternal mortality.

Another study, endeavored to compare their data with the “weathering hypothesis” which states that: the health of African American women begins to worsen in early adulthood, with negative effects on birth outcomes. The study utilized live birth and infant death records from 1999-2003 in North Carolina. The birth outcomes observed were low birth weight, very low birth weight, infant mortality, and neonatal mortality. Women’s health outcomes observed were obesity, high blood pressure, high cholesterol, and smoking. The rates of these outcomes were compared for white women and African American women among three different age groups. The maternal age groups observed were 15-19, 20-34, and 35 years and older. Researchers found that their data was consistent with the “weathering hypothesis”, and that “racial disparities in birth outcomes increase with increasing maternal age” (Buescher and Mittal, Racial Disparities in Birth Outcomes Increase with Maternal Age: Recent Data from North Carolina 2006). It was also concluded that health problems among older African American women may contribute significantly to racial disparities in birth outcomes. The researchers suggested that improving the health of older African American women might reduce the overall racial disparity gap in birth outcomes.

Overall, disparities in birth outcomes were negative for African American women among all age groups and was only similar to white women when considering post neonatal death rates among teen African American and white women. However, these rates differed for mothers 20 and older, with the rate for African American women being more than two times the rates for white women. The term post neonatal deaths signify the number of deaths of live born babies weighing 500 grams or more between 28 and 364 days (1 year) per 1,000 live births (Heaman, et al. 2012).

Neonatal deaths refer to infant deaths prior to reaching 28 days of age (Centers for Disease Control and Prevention 2009).

From 1999 to 2013, North Carolina has reduced the Black infant mortality rate by 20.9 percent. However, the reduction in infant mortality disparities (Black-White Ratios) was 7.8 percent, and among the top ten states with the lowest reduction rate of Black-white disparity ratios. Researchers projected that North Carolina would achieve infant mortality rate equality by the year 2130 (J. S. Speights, et al. 2017). This was concluded from a study published in 2017, the main points of their findings were that states progressed in decreasing black infant mortality, yet continued to struggle with eliminating the Black-White disparities/disparity ratios.

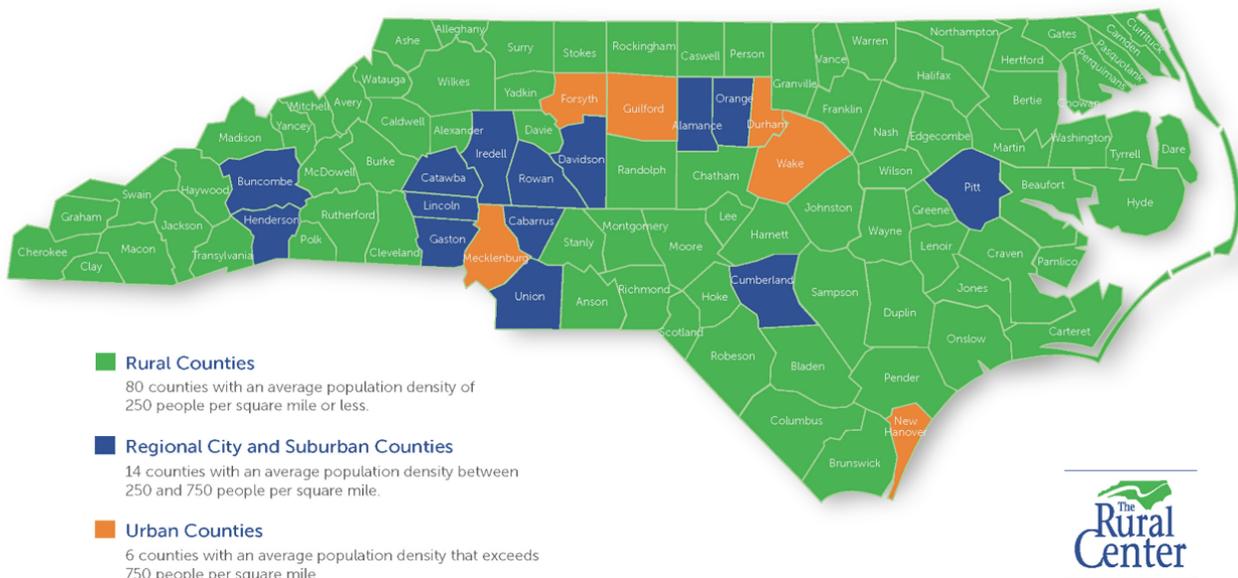
Furthermore, other studies have undertaken case studies of North Carolina counties to find a causal factor these disparities. Considering the preceding study, there is an allusion towards the role of race in negative birth outcomes. This is in regard to the difficulties seen in reducing the Black- White disparity ratios. However, there is speculation as to whether race is the defining factor in which these disparities exist. Early studies conducted in North Carolina, highlighted the impact of a comprehensive prenatal care program. Researchers wanted to assess the impact such programs had on the birth weights of infants born to low income women. This assessment began comparing women receiving care from a prenatal program of a large county public health department to pregnant Medicaid-eligible women in the same county who received care from private physicians. The results showed that low birth weights were higher among Medicaid women with a percentage of 19.3, while health department women displayed an 8.3 rate of low birth weights (Buescher, Smith, et al. 1987). The study controlled for race, marital status, WIC participation, quantity of prenatal care, and other risk factors and found that chances of Medicaid women having low birth weight infants was more than twice as great. The study concluded that a

case-management approach is most ideal to produce positive birth outcomes (Buescher, Smith, et al. 1987)

In 2016, the North Carolina Health News reported on the stubbornly high infant mortality rates within the state. It was reported that in Eastern North Carolina, a largely rural region, the infant mortality rate for African-American women was 16.6 deaths per 1,00 live births (Hoban 2016). This rate is nearly three times higher than the national average. When considering low levels of educational attainment, life expectancy, and high poverty rates, this region stood out among others. Also, it was highlighted that there were similar disparities in birth outcomes in counties with large populations of low-income African American women. Furthermore, it was observed that there are higher rates of pregnant women utilizing Medicaid and being served by fewer necessary healthcare professionals. Overall, women in Eastern North Carolina were more likely to be obese or overweight, deliver by C-section, and live in poverty.

Eastern North Carolina is comprised of 26 counties, most of which are rural counties. North Carolina has 100 counties, of the 100 counties, 80 are considered rural, 14 are suburban, and 6 are urban counties. Rural counties are defined as counties with an average population density of 250 people per square mile or less (Hash 2017). North Carolina is among the ten most populous states, and North Carolina's rural population is larger than any other state except for Texas (Hash 2017). Concisely, rural counties account for nearly 80% of all counties in North Carolina. Below is a map that shows the 2015 Census data estimates for population density in North Carolina:

North Carolina Counties



(Hash 2017)

Another study in 1993, found that Prenatal WIC participation and reduce low birth weight and newborn medical costs. This study was conducted under the premise of several previous studies confirming that prenatal participation in WIC improves birth outcomes. However, this study differed in providing a cost-benefit analysis of individuals utilizing Medicaid benefits. Previous studies had found that women who received “Medicaid benefits and prenatal WIC services had substantially lower rates of low and very low birth weight than women that received Medicaid but no prenatal WIC services” (Buescher, Larson, et al. 1993). For black women, low birth weight was 31% lower and very low birth weight was 57% lower for WIC participants. Researchers concluded that better birth outcomes and lower costs were associated with higher level of WIC participation. This study touches upon the importance of nutrition in resulting in positive

birth outcomes. To be eligible for WIC an individual, must meet income guidelines, a state residency requirement, and determined to be at “nutritional risk” by a health professional. Pregnant, postpartum, breastfeeding women, infants, and children up to age five are also included in eligibility. To garner eligibility based on income the applicants’ gross income must fall at or below 185 percent of the U.S. poverty income guidelines. However, some States may set lower income limit standards. Below is a table of income eligibility guidelines broken down from annual, monthly, and weekly income for family size, as reported by the United States Department of Agriculture:

Table 1. Poverty income eligibility guidelines in North Carolina

	Annually	Monthly	Weekly
Family of 1	\$22,311	\$1,860	\$430
Family of 2	30,044	2,504	578
Family of 3	37,777	3,149	727
Family of 4	45,510	3,793	876
Family of 5	53,243	4,437	1,024
Family of 6	60,976	5,082	1,173
Family of 7	68,709	5,726	1,322
Family of 8	76,442	6,371	1,471
For each additional family member, add	+\$7,733	+645	+149

(USDA 2017)

North Carolina currently follows the requirement of applicants’ having a family income less than 185% of the U.S. Poverty Income Guidelines. However, a person receiving Medicaid,

TANF, or assistance from the NC Food and Nutrition Services automatically meets the income eligibility requirement (NCDHHS 2019).

As of 2016, there are a total of 120,765 live births to mothers that received prenatal WIC services in North Carolina. Black Non-Hispanic women account for 34.6% of those births while White Non-Hispanic women make up 37.7%. Conversely, 68.8% of White Non-Hispanic live births involved no prenatal WIC services, while only 15% of Black Non-Hispanic live births involved no prenatal WIC services (State Center for Health Statistics NC Department of Health and Human Services 2016). There are several assumptions as to how these rates illustrate a deeper racial disparity in North Carolina, and this is concerning the access to healthcare.

The North Carolina Pregnancy Medical Home

Though North Carolina has encountered roadblocks in the expansion of Medicaid, organizations and Networks have partnered together to incite serious change in Maternal and infant health. Research has shown that mothers who have access to prenatal care are less likely to experience infant mortality and that providing health care is a major factor in decreasing the rate of negative birth outcomes. In North Carolina, 1 in 5 women of reproductive age does not have health insurance and Medicaid covers 54 percent of all births in North Carolina (Billman 2018). Though this coverage is critical for pregnant women it is lacking in providing sufficient resources for prenatal and postnatal care.

In April 2011, the North Carolina Community Care Networks (NCCCN), Division of Medical Assistance, and the North Carolina Division of Public Health partnered together to launch the North Carolina Pregnancy Home program. As of 2017, there are 380 pregnancy medical homes in 94 of 100 counties. Health care providers screen pregnant women to assess whether they are at

risk for preterm birth. At-risk pregnancies are identified by a plethora of negative medical, mental, or social factors that might adversely affect the health of the mother or child. The program operates under the philosophy that there is a combination of factors that lead to negative birth outcomes, such as unemployment, poor housing, neighborhood violence, etc. If the woman is deemed to be at risk, she is referred to a pregnancy care manager from their respective local public health department. A pregnancy care manager creates an individualized care plan and manages care throughout the pregnancy. Furthermore, doctors receive financial rewards to participate in the program where incentives can total upwards of \$200 and receive enhanced reimbursements for vaginal deliveries. The program primarily focuses on reducing incidences of low birth weight, preterm birth, and cesarean delivery. On the other hand, it also has the overall focus of improving the quality of maternity care, improving maternal and infant outcomes, and reducing health care costs. Through this program North Carolina hopes to save upwards of \$9 million dollars in following years (Zero to Three 2016).. In 2016, “more than 20 percent of all women of reproductive age in North Carolina earn too little (less than 100% of the Federal Poverty Line) to access subsidized coverage in the Marketplace, and only a small percentage qualify for Medicaid” (Thompson 2016). However, the expansion of Medicaid would allow for the flow of increased resources that could help to catapult the program further. Kate Menard, the director of the North Carolina Pregnancy Medical Home, encourages other states to not wait for the passage of federal laws before beginning their own programs. Considering the philosophy of the North Carolina Pregnancy Medical Home, the findings and data support the notion that community care programs and networks should be instituted regardless of partisan healthcare battles.

Methods

For this research project, I carried out several statistical analyses by utilizing Minitab. The analyses of Infant mortality were carried out by conducting two sample t-tests to determine whether there is a significant difference between the mean values of the two assessed groups. Other analyses were executed using two proportion tests and linear regressions. Following, the p-values are compared to discern whether the null hypothesis can be accepted or rejected. The null hypothesis states that there is no significant difference between tested samples. After conducting two sample t-tests, I utilized dot-plots and scatterplots to further aid in illustrating my findings. Findings of the two-proportion tests are displayed in tables.

My independent variables are as follows: race, income, rural/urban, and partisanship. The two racial groups studied were Non-Hispanic Black and Non-Hispanic White populations in North Carolina. Income was assessed in terms of the percentage of individuals below poverty for each county in North Carolina. The federal poverty level defines those in poverty as a family of four that earns \$24,860 annually (Center for American Progress 2018). Rural counties are defined as counties with an average population density of 250 people per square mile or less (Hash 2017). Urban counties are defined as counties with an average population density that exceeds 750 people per square miles (Hash 2017). Partisanship is measured in terms of how each county voted in the 2016 Presidential election. My dependent variables are as follows: Infant Mortality and Maternal Mortality. In the subsequent section, I will display the data and findings accompanied by descriptions of their significance and whether or not they support my hypothesis.

Below are my hypotheses:

Race

H₁: Black women will have higher rates of infant and maternal mortality.

Rural or Urban location

H_2 : Black women will have a higher rate of infant mortality There will be higher rates of infant mortality for Black women in rural areas.

Partisanship

H_3 : Black women will have higher rates of infant mortality in North Carolina counties that voted Republican in the 2016 presidential election.

Poverty level

H_4 : Black women will have higher rates of infant and maternal mortality when there are higher rates of individuals below the poverty line.

Medicaid expansion

H_5 : There will be higher rates of maternal mortality in states that did not expand Medicaid coverage.

Findings

I hypothesized that poor African American women in rural counties that had voted Republican in the 2016 Presidential election would demonstrate higher rates of negative birth outcomes. The data tested was gathered from the North Carolina State Health Department, American Fact Finder, Census data, and an online statistics portal called Statista.

This section will consist of various tables and graphs to illustrate my findings. Each table or graph will be accompanied by a summary and descriptive statistics. Prior to evaluating the data in this section, it is important to acknowledge that any data that reported less than 10 deaths was removed as unreliable. Furthermore, there was an outlier of 69 deaths per 1,000 births within the Black Infant Mortality data that was removed to prevent the skewing of data.

Firstly, to illustrate the existing infant mortality gap among Black and White infants, Table 2 shows the results of the two-proportion tests. These test, are testing if there is a significant difference in long-term infant mortality rates for African-American and White individuals. A total of six tests were conducted by grouping each county into their identifiable PCR regions. PCR regions are Perinatal Care Regions, that are divided into six regions: Western, Northwestern, Southwestern, Northeastern, Southeastern, and Eastern.

Table 2. Two Proportion Test of North Carolina PCR Regions 2013-2017

	P-Value
PCR I	0.001
PCR II	0.000
PCR III	0.000
PCR IV	0.000
PCR V	0.000
PCR VI	0.000

Each recorded p-value is less than 0.05. In this case, the null hypothesis can be rejected which means in each PCR region there is a significant difference in the long-term mortality rates of Black and White infants. At the county level, as shown in Figure 1, the dot plot shows that the variability is much higher among Black infant mortality rates than White infant mortality rates, this is also evident in Table 3. Figure 1, shows that the White Infant Mortality data, skews to the left as the mean is smaller than the median. Table 3 also, shows the p-value exhibited for these samples when a two-sample t-test is conducted. The p-value is 0.000 which further supports that there is a significant difference between long-term rates of Black and White Infant Mortality rates.

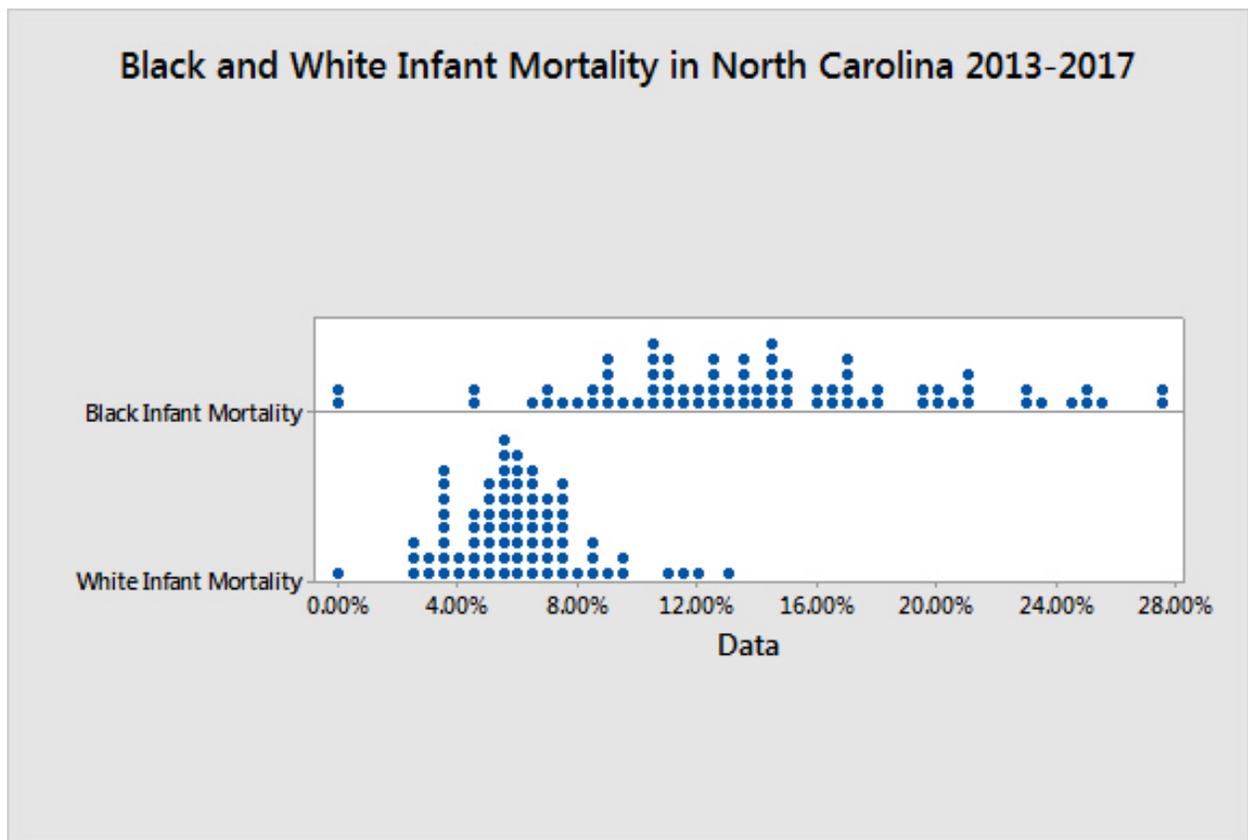


Figure 1. Dot plot of Black Infant Mortality vs. White Infant Mortality by county in North Carolina from 2013-2017

These findings mirror the

conclusions of studies conducted by Leslie et. al and Buescher. These conclusions stated that the instances of infant mortality among Black women in North Carolina differ significantly from white and other minority women. This further shown in Figure 2, through the utilization of a subject profile. A subject profile allows for a visualization of an equivalence test. Markers to the left represents Black maternal mortality and each marker to the right represents White maternal mortality. Each marker for Black maternal mortality is connected to the corresponding marker of White maternal mortality from the same year. All of the connecting lines trend downwards to connect to the White maternal mortality rates. Therefore, in almost every year from 1999-2013 Black maternal mortality was recorded at a higher rate.

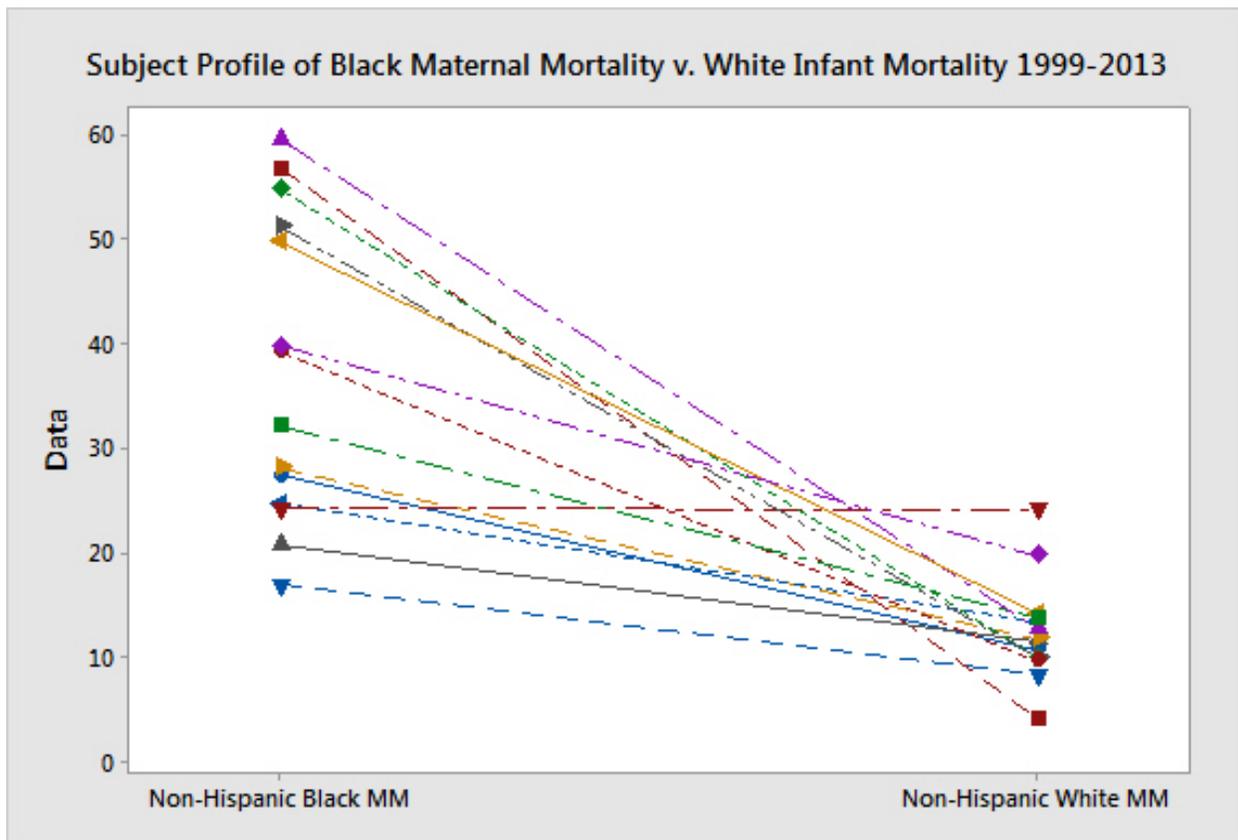


Figure 2. Subject Profile of Black Maternal Mortality and White Maternal Mortality 1999-2013

Table 3. P-values yielded from two-sample t-tests and regression analyses for each assessed population

	P-Value	Test
Black Infant Mortality v. White Infant Mortality	0.000	Two-Sample T-test
Black Infant Mortality v. Partisanship	0.548	Two-Sample T-test
Black Infant Mortality v. Rural or Urban	0.152	Two-Sample T-test
White Infant Mortality v. Partisanship	0.825	Two-Sample T-test
White Infant Mortality v. Rural or Urban	0.200	Two-Sample T-test

Table 4. Table of Regression Analyses for Infant Mortality

	R-Value	Test
Black Infant Mortality v. % Below Poverty Rate	0.4%	Regression Analysis
White Infant Mortality v. % Below Poverty Rate	5.0%	Regression Analysis

The next variable tested was partisanship, the party each county voted for in 2016 was recorded and then used to create dot plots of infant mortality rates by partisanship by county. Figure 3 is a dot plot of Black Infant Mortality by Partisanship. Through observation it is shown that the data is clustered differently. In counties that voted Republican in the 2016 Presidential election there is more variability in Black infant mortality rates than in counties that voted Democrat. In addition, the p-value is 0.548 (Table 3) which means that we cannot reject the null

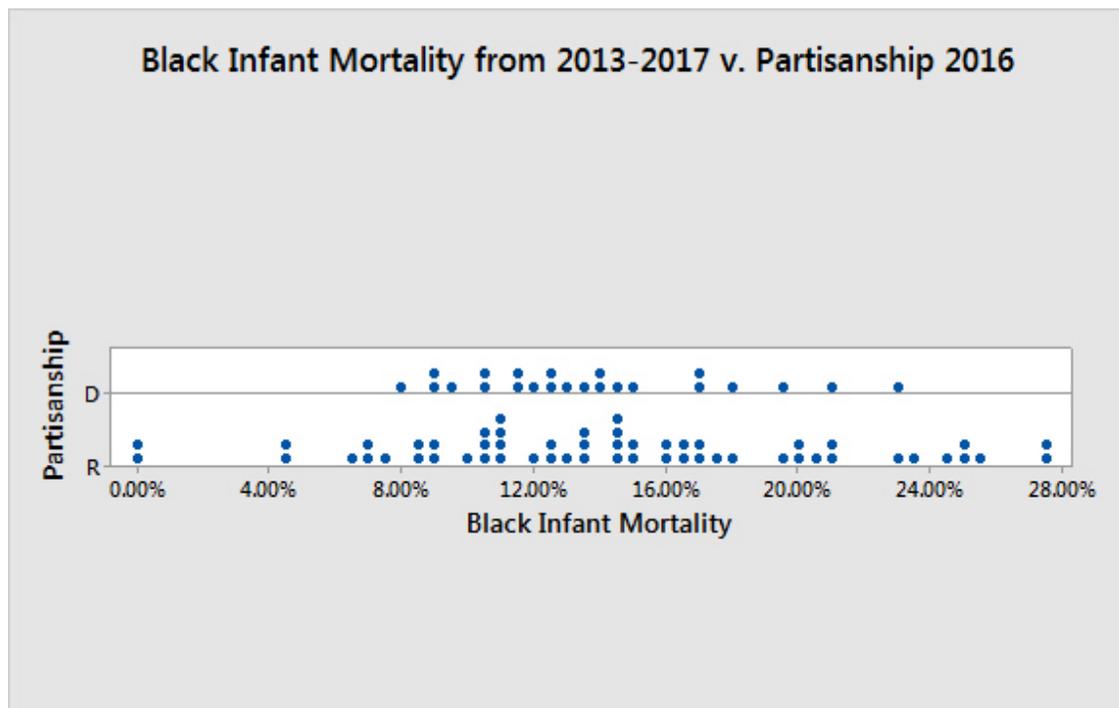


Figure 3. Black Infant Mortality from 2013-2017 v. Partisanship 2016

hypothesis. Therefore, there is no significant difference in the means of Black Infant Mortality in counties that voted Republican or Democrat in the 2016 Presidential election. Figure 4, shows the dot plot of White Infant Mortality v. Partisanship and similarly to Black Infant Mortality the variability in mortality rates is greater in Republican counties. The p-value for this test is 0.825 (Table 3), and we fail to reject the null hypothesis. Which means, that the long-term means per county are equal to one another.

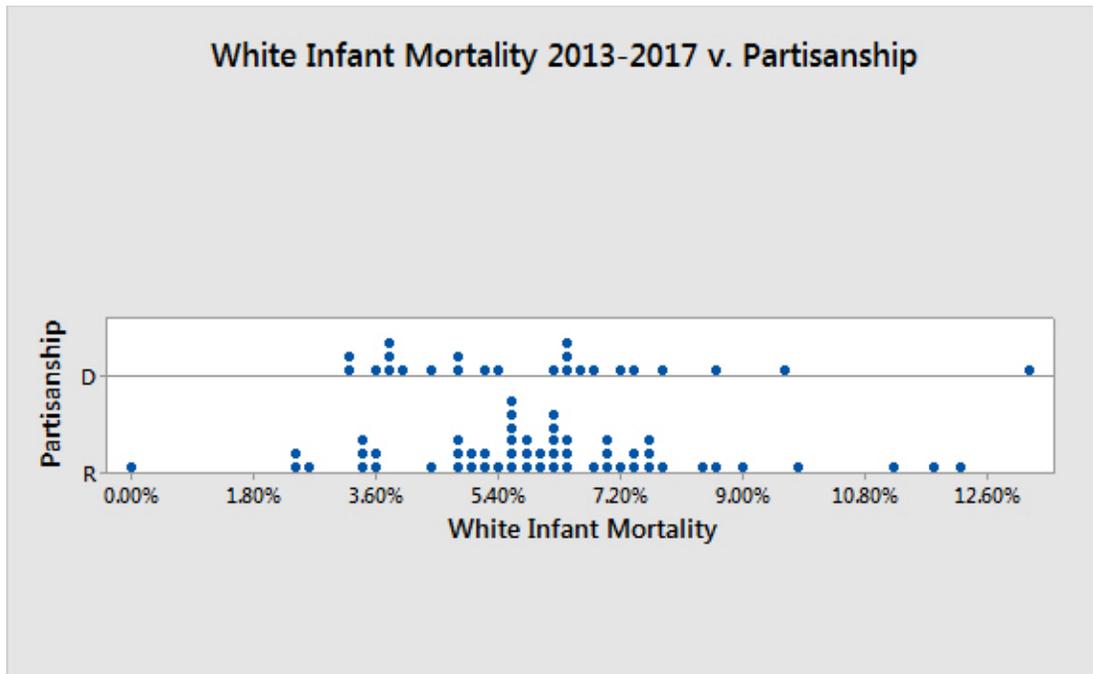


Figure 4. Dot plot of White Infant Mortality 2013-2017 v. Partisanship

Figure 5 shows the comparison of White and Black Infant mortality v. Partisanship. Upon observation, the data for Black Infant mortality displays that there are typically higher rates and the rates have more variability. White Infant mortality typically has lower rates with less variability. In addition, though there are no statistically significant differences observed concerning the variables partisanship and infant mortality (Black and White), Figure 5 shows that higher rates of infant mortality tend toward Republican counties.

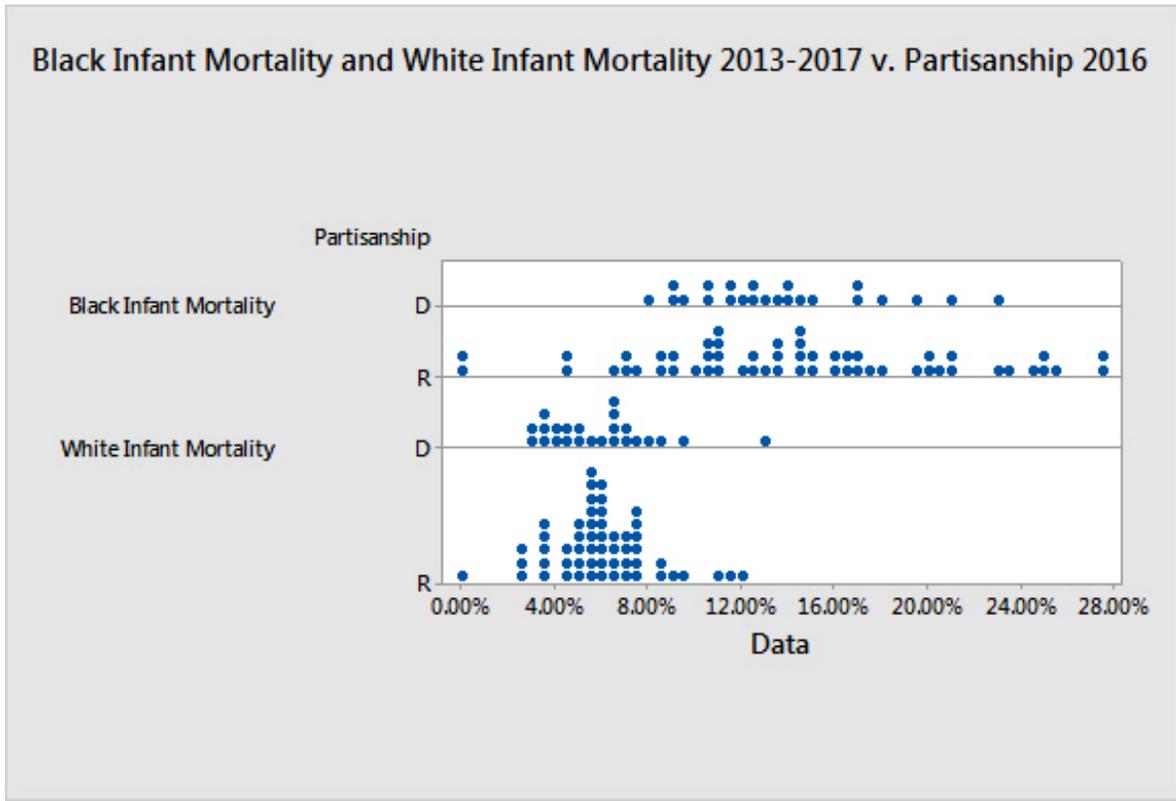


Figure 5. Black Infant Mortality and White Infant Mortality 2013-2017 v. Partisanship 2016

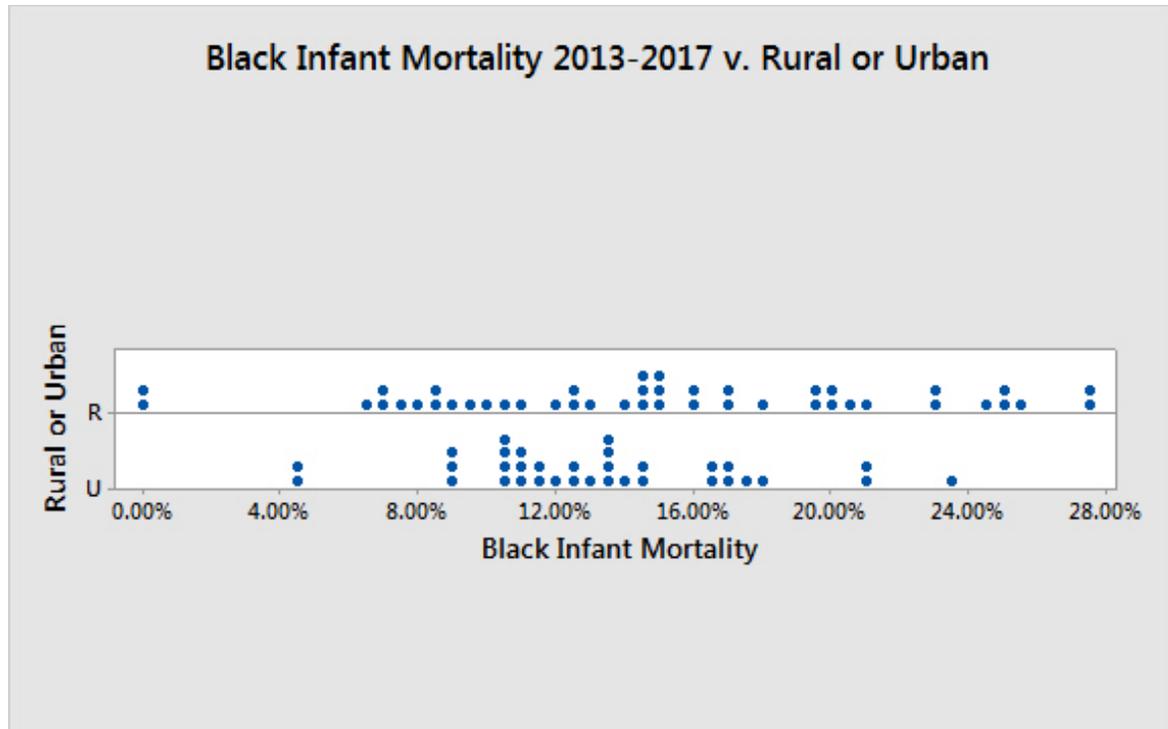


Figure 6. Black Infant Mortality 2013-2017 v. Rural or Urban

Next, the variable of rural or urban location was tested. This was done by utilizing state data that had categorized each county into either areas of rural or urban parameters. Figure 6, is a dot plot of Black Infant Mortality v. Rural or Urban. The dot plot shows that the data is clustered closer in Urban locations rather than Rural locations. The standard deviation of data is greater for rural areas (0.105) than urban areas (0.0415) which is reflective of a higher variability of rates. The mean of Black infant mortality rate per county is also slightly larger for rural areas at 0.162 than urban areas at 0.1320. The p-value yielded was 0.152 (Table 3), this value is larger than 0.05. Therefore, the null hypothesis cannot be rejected meaning there is no significant difference in the means of Black Infant Mortality in Rural or urban areas. The same observations made for Figure 6 were made for Figure 7. The p-value for White Infant Mortality v. Rural or Urban was 0.200, thus the null hypothesis cannot be rejected.

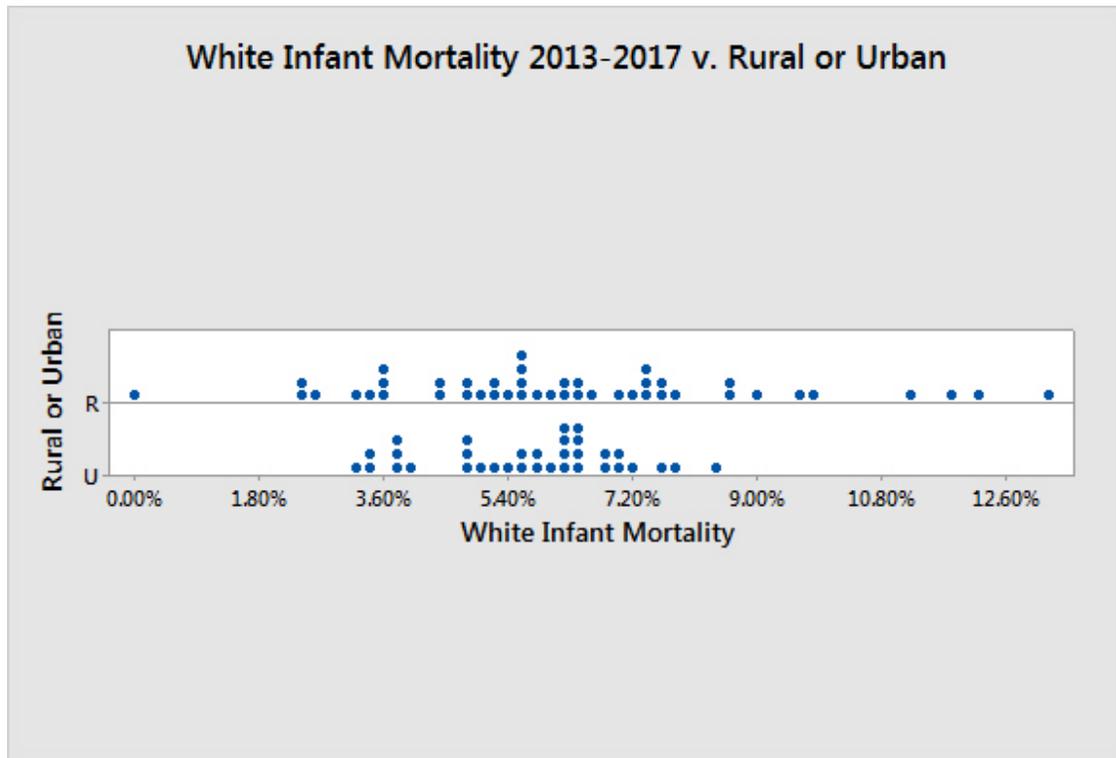


Figure 7. White Infant Mortality 2013-2017 v. Rural or Urban

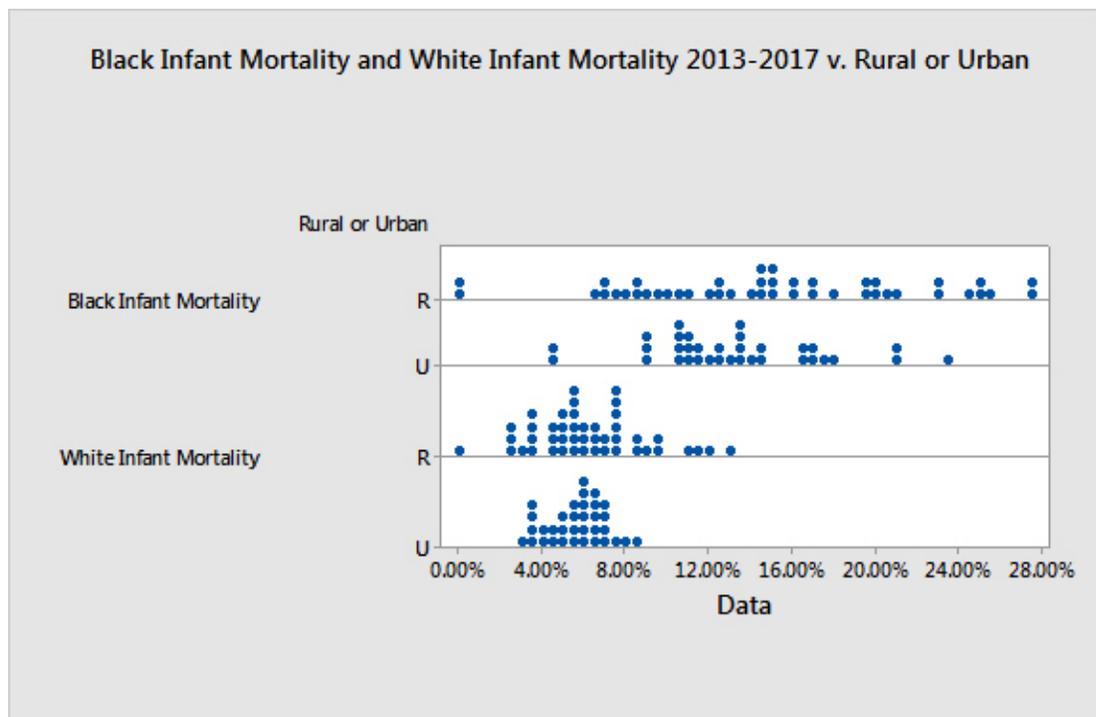


Figure 8. Black Infant Mortality and White Infant Mortality 2013-2017 v. Rural or Urban

Figure 8 displays White and Black Infant Mortality rates in Rural or Urban locations. Figure 8 shows that rates of Black and White Infant Mortality data are clustered differently. The spread of the data for Black Infant mortality is has more variability as the standard deviation is larger. Conversely, the spread of the data for White Infant mortality is clustered more closely and there is less variability. Also, variability and rates are higher in rural areas rather than urban areas for both Black and White Infant mortality. Therefore, though there are no statistically significant differences observed, instances of infant mortality for both Black and White populations tend toward rural areas. These findings are similar to the report released by North Carolina Health News, as Eastern North Carolina displayed an infant mortality rate three times higher than the national average.

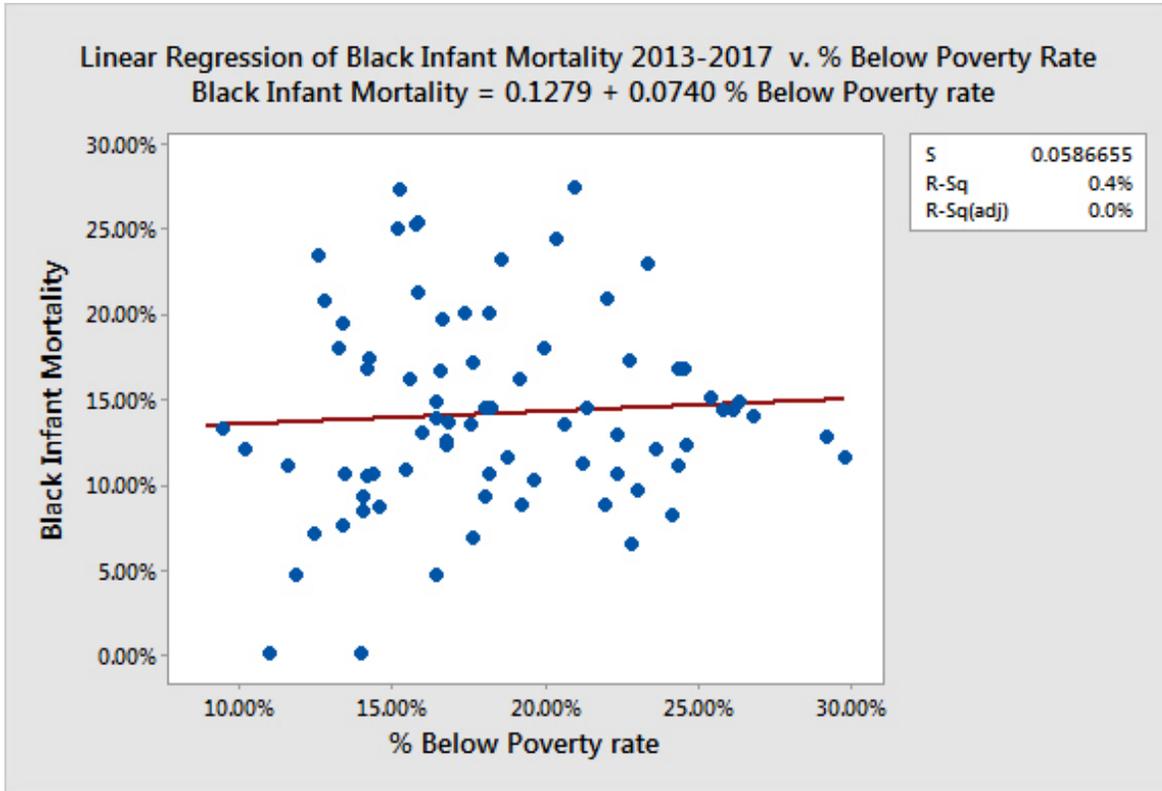


Figure 9. Linear Regression of Black Infant Mortality v. % Below Poverty Rate in North Carolina

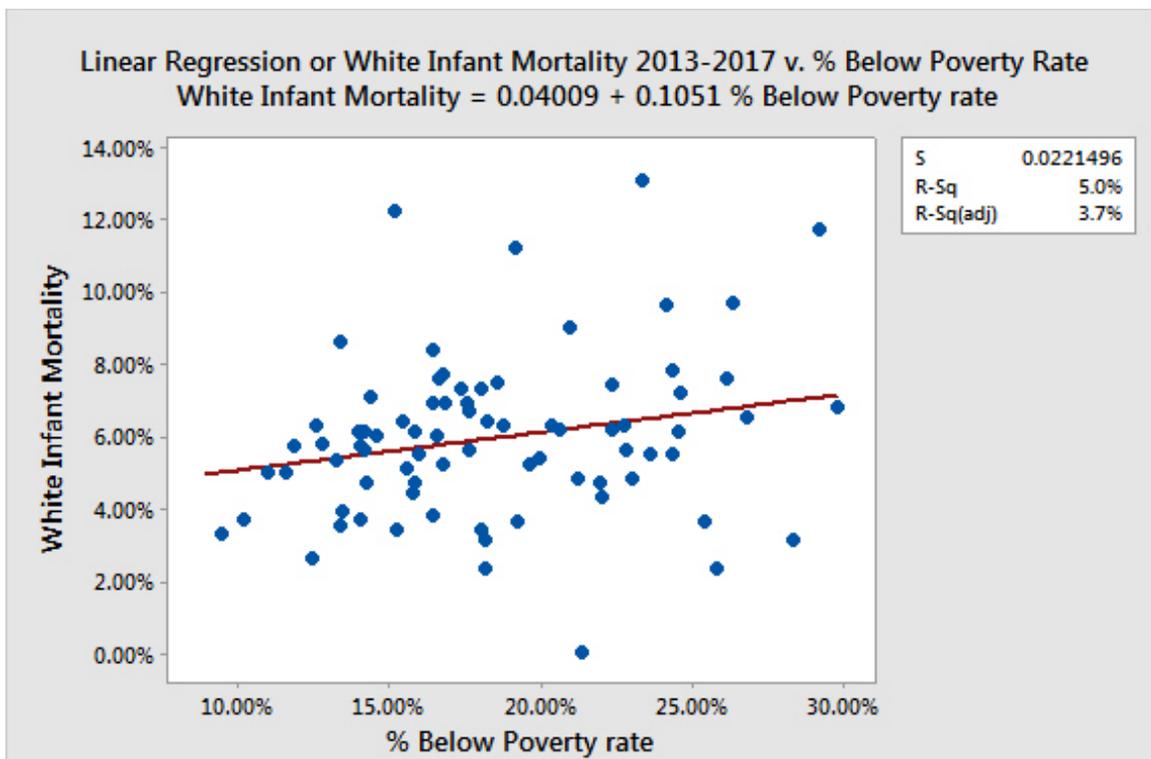


Figure 10. Linear Regression of White Infant Mortality v. Below Poverty Rate in North Carolina

The last variable tested is, income which is operationalized in the terms of the percent of individuals below the poverty line in each North Carolina county. Figures 9 and 10, show the linear regression of the data. In Figure 9, the data points have a cloud form around the trend line, which means the data does not closely fit the trend line. Also, the r-squared value is 0.4%. The r-squared value is statistical measure of how well the data is fitted to the regression line, and can be referred to as a correlation coefficient. Overall, it is the percentage of the response variable variation is explained by a linear model. An r-squared value of 0.4% (Table 4) indicates that the model explains none of the variability of Black infant mortality around its means considering percent below poverty rate. Therefore, Black infant mortality cannot be explained by poverty rates. This is further supported by the p-value found from a regression analysis which was 0.608. This value is greater than 0.05 and thus does not denote a significant statistical difference.

In Figure 10, the data points have a tighter fit around than trend line than Figure 9. The r-squared value is 5.0% (Table 4), which means that as a r-squared value greater than 1 the model explains 5.0% of the variability. Overall, there is stronger correlation between White infant mortality and % below poverty rate than Black infant mortality and % below poverty rate. Furthermore, the p-value attained from a regression analysis was 0.050. In this case, the null hypothesis can be rejected, which means there is a significant statistical difference present among White infant mortality and % below poverty rate. The results of Figures 9 and 10, relate to the story of Serena Williams, as she nearly became a victim of a negative birth outcome regardless her wealth, health, and educational achievement.

Lastly, Table 5. exhibits all the p-value outputs for analyses concerning maternal mortality. Maternal mortality data was unable to be recorded at county level, as there is always fewer than 20- pregnancy and < 100 pregnancy associated deaths each year for the entire state as

stated by NCDHHS statistician Zachary Schafer. Therefore, the rates would be unreliable. In Table 5. The first row shows the p-value for the total pregnancy related deaths in the state of North Carolina from 1999-2013. This p-value was calculated utilizing a two-proportion test. The second and third rows show the p-values for the rates of Maternal mortality for Non-Hispanic White and Black women from 2000-2013 compared to the percentage of individuals below poverty rate from 2000-2013. The p-value yielded for pregnancy related mortality from 1999-2013 is 0.000. Therefore, there is a significant difference between the means of pregnancy related deaths over a 14-year time period.

Table 5. Maternal Mortality and Pregnancy Related Deaths data

	P-value	Test
Pregnancy-Related Mortality per 100,000 live births 1999-2013	0.000	Two Proportion Test
	R-Value	Test
Non-Hispanic Black Maternal Mortality v. Poverty Rate 2000-2013	26.8%	Regression Analysis
Non-Hispanic White Maternal Mortality v. Poverty Rate 2000-2013	28.3%	Regression Analysis

Table 5, shows the P-values and R-values yielded from two proportion tests and regression analyses respectively. The two-proportion test was calculated by taking the total amount of maternal pregnancy-related deaths among Black and White women and dividing it by the total amount of maternal deaths in the state of North Carolina. The resulting p-value shows that there is a significant difference in the proportions of Black and White maternal deaths from 1999-2013.

Similarly, both of the R-values yielded from the linear regression suggests that there is some correlation between the tested variables. Below is Figure 11, which shows the linear regression for Non-Hispanic Black Maternal mortality v. Poverty rate from 2000-2013.

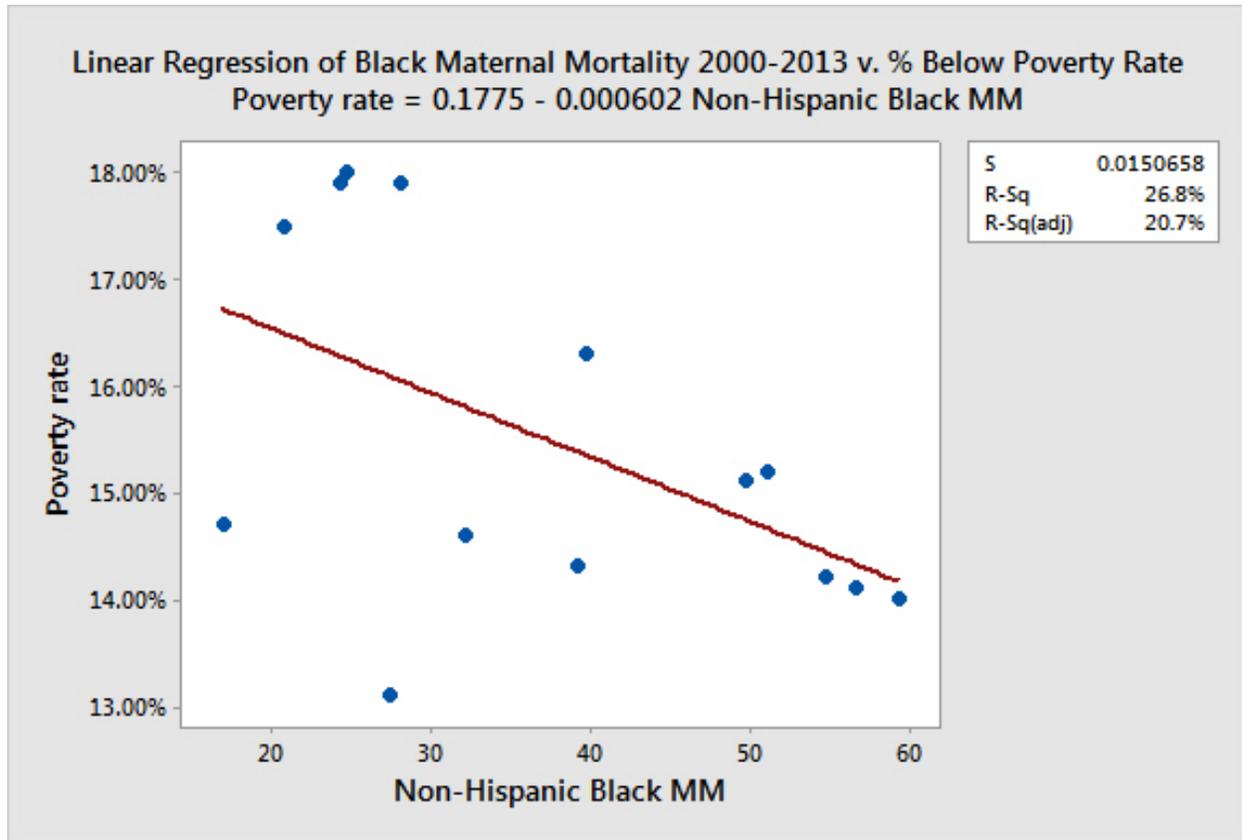


Figure 11. Linear Regression of Black Maternal Mortality 2000-2013 v. % Below Poverty Rate

The linear regression shows a negative correlation. This means that as one value increase another decreases.

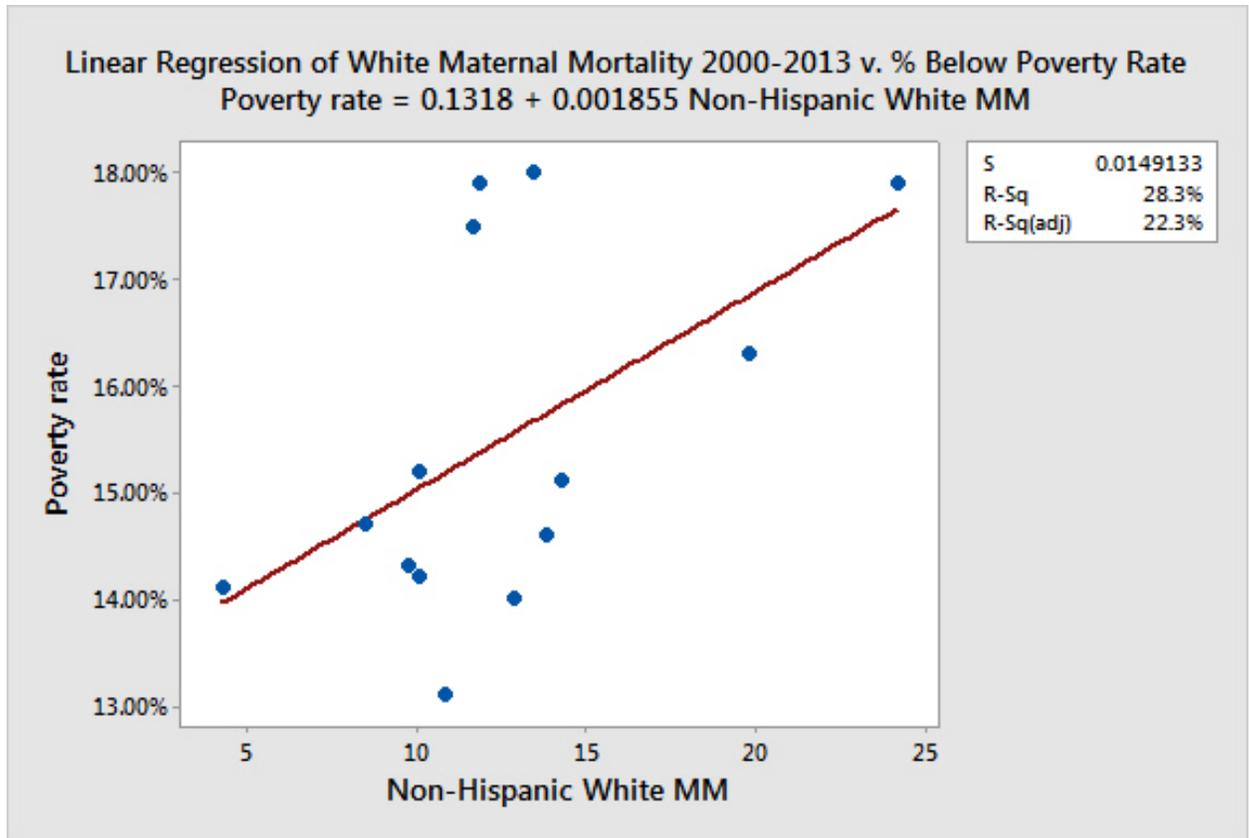


Figure 12. Linear Regression of White Maternal Mortality 2000-2013 v. % Below Poverty Rate

Conversely, Figure 12 shows that there is a positive correlation between White maternal mortality and poverty rate from 2000-2013. However, I take caution in drawing definite conclusions from figures 11 and 12 as more in depth data of populations below the poverty rate is needed. Therefore, I use a time plot series to better illustrate the relationship between maternal mortality and poverty level. Figure 13, displays Black and White maternal mortality from 1999-2012. Black maternal mortality is decreasing while White maternal mortality is increasing. The two populations meet at the end of 2012, where Black maternal mortality is at 26.4% and White maternal mortality at 26.3%.

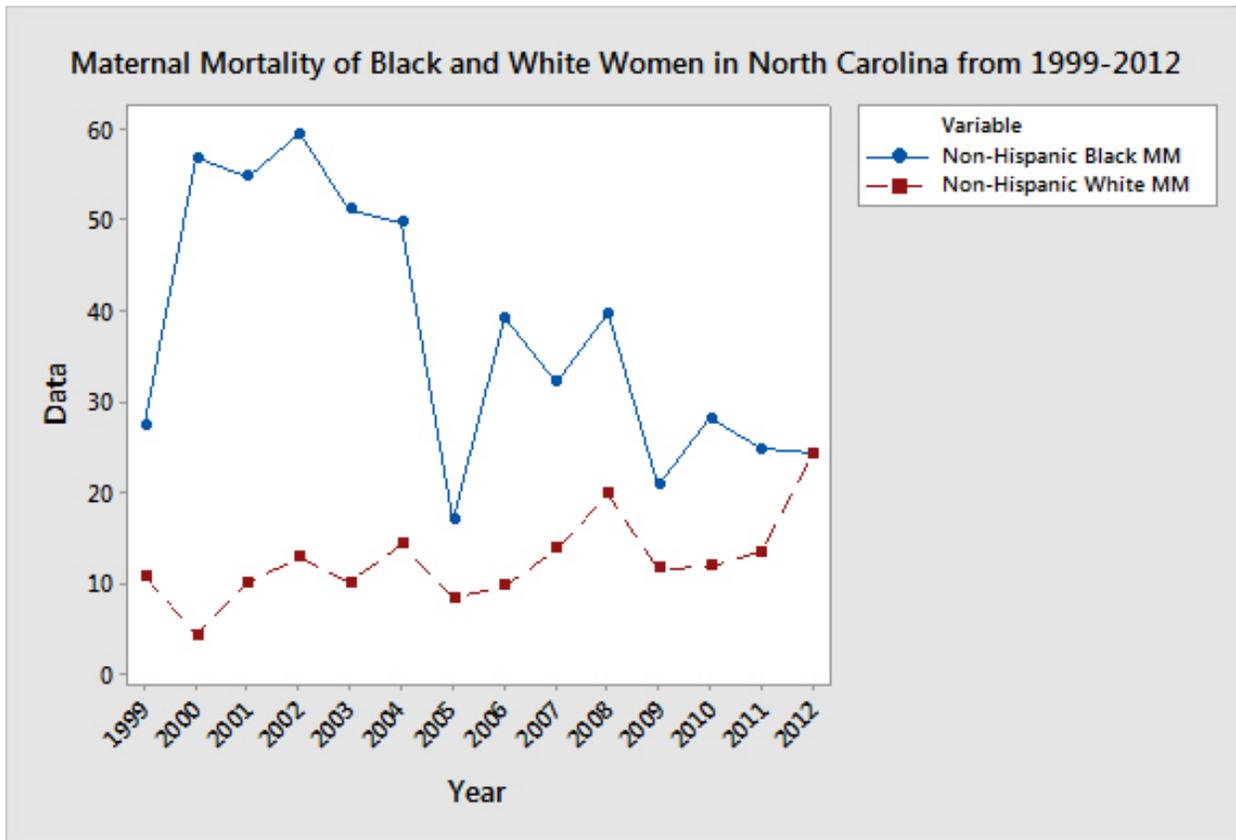


Figure 13. Time Plot Series of Black and White Maternal Mortality 1999-2012

Continuing on, looking at Figure 14, poverty levels have increased from 1999-2012. Therefore, as state poverty levels and White maternal mortality have a positive increasing relationships. While, state poverty levels and Black maternal mortality has an inverse relationship. These findings are consistent with the NCDHHS concerns of rising maternal mortality among White women (NCDHHS 2017).

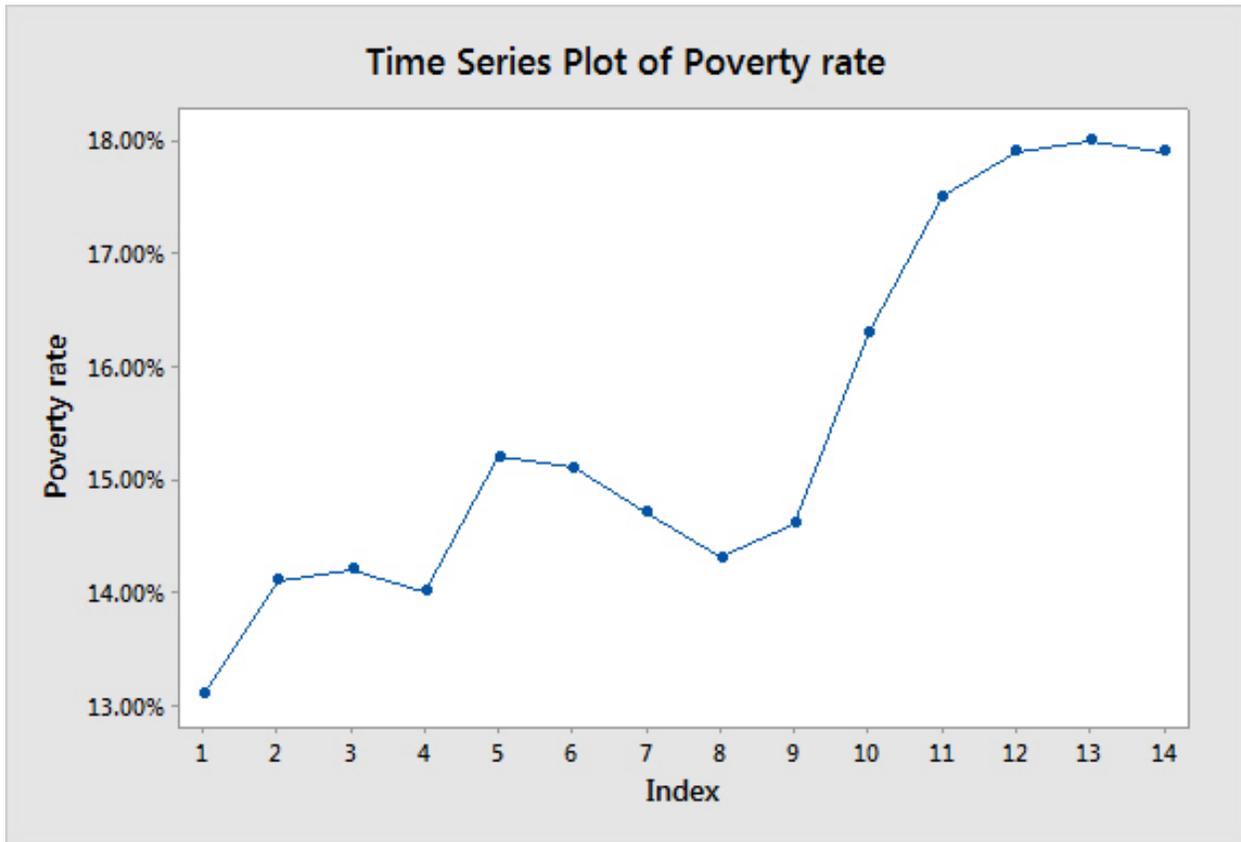


Figure 14. Time Series plot of % below poverty 1999-2013

Medicaid In North Carolina

This section covers the findings of maternal mortality and Medicaid expansion. I hypothesized that states that did not expand Medicaid would display higher rates of maternal mortality. Below are two dot-plots that show the rates of infant mortality and maternal mortality in non-Medicaid and Medicaid expanded states.

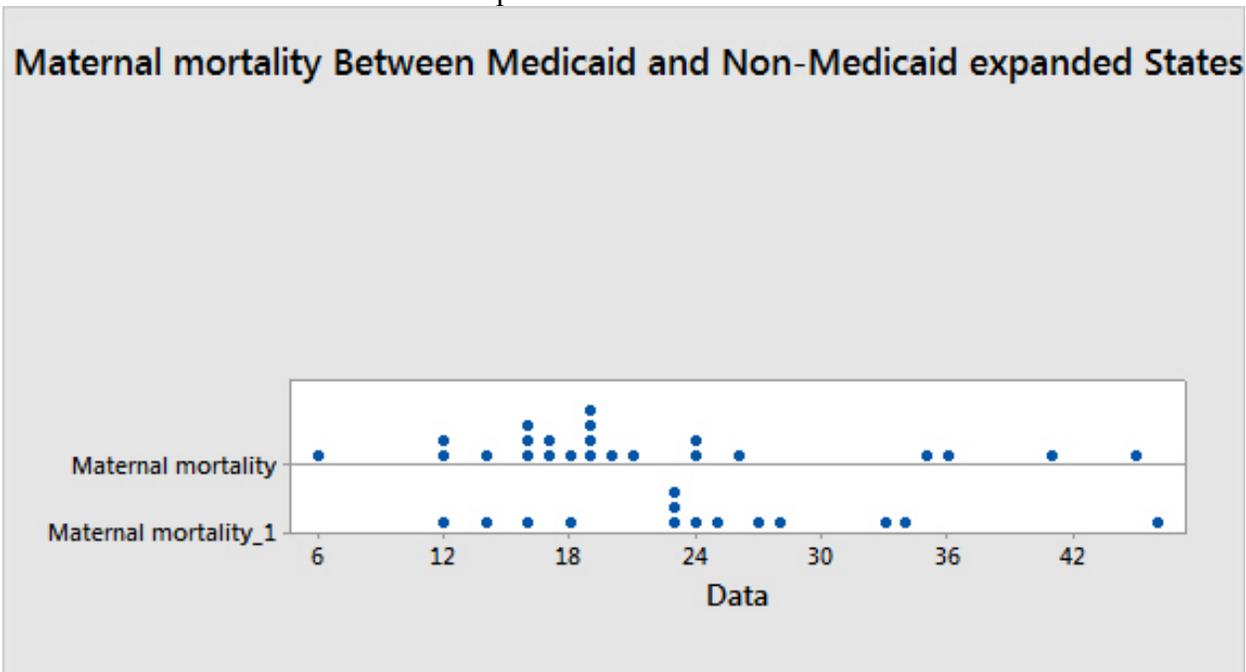


Figure 25. Dot plot of Maternal Mortality Between Non-Medicaid and Medicaid Expanded States 2017

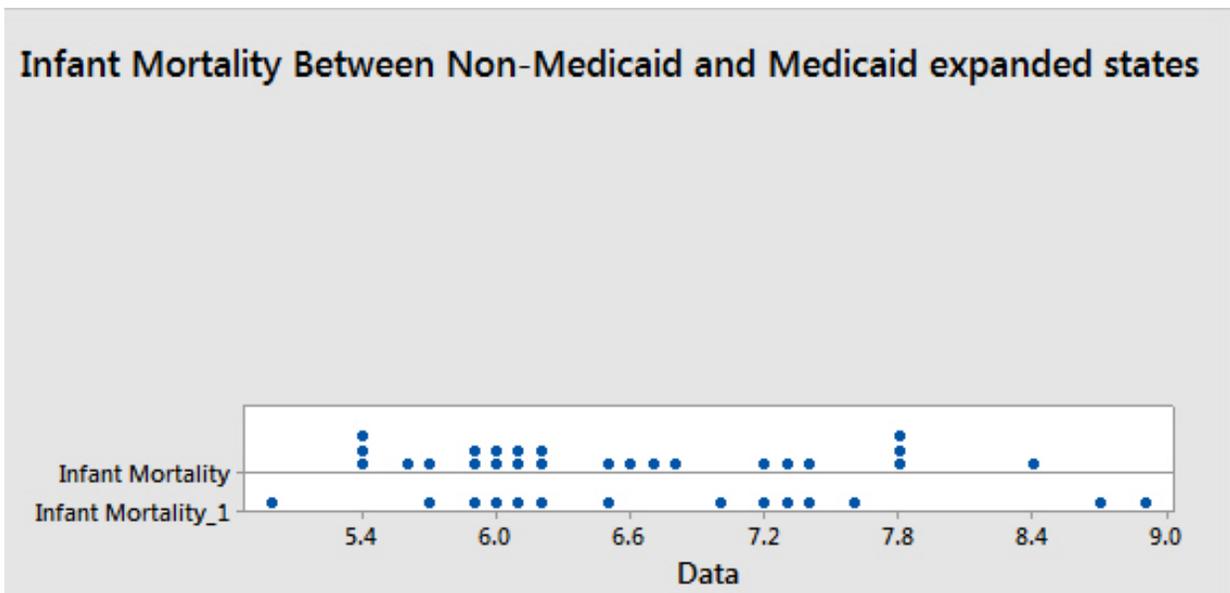


Figure 16. Dot plot of Infant Mortality Between Non-Medicaid and Medicaid Expanded States 2017

Upon executing the descriptive statistics, the average rate of infant mortality for Non-Medicaid expanded states was slightly larger than Medicaid expanded states. The mean for Non-Medicaid expanded states was 6.82% and the mean for Medicaid expanded states was 6.508%. However, after observing the p-value of 0.379 it was greater than 0.05. The threshold for accepting statistical significance, requires for the p-value to be less than 0.05. The same was true for the mean values and p-value for Maternal mortality of the differing state groups. The mean for Non-Medicaid expanded states was 24.64% and the mean for Medicaid expanded states was 21.37%. The observed p-value was 0.303, this value is also greater than 0.05 and fails to yield statistical significance.

For pregnant women in North Carolina that apply to Medicaid in North Carolina the following services are provided:

- Prenatal care, delivery and 60 days of postpartum care
- Services to treat medical conditions that may complicate pregnancy
- Childbirth classes
- Family planning

Below is a table that illustrates that monthly family income limits associated with pregnant women applying for Medicaid:

Table 6. Monthly Income Limits: Medicaid for Pregnant Women

Family size	Monthly Income Limit
1	\$1,983
2	\$2,689
3	\$3,395
4	\$4,100

(NCDHHS 2018)

In 1965, Medicaid was created to serve low income individuals, pregnant women, families with children, disabled individuals, and elderly. The costs of this programs were jointly shared by

the federal government and the states, with the federal government shouldering 57% of the costs (Prokop 2015). Upon the passage of the ACA by Obama in 2010 states had the option of refusing the expansion after a 2012 Supreme Court ruling. The ruling asserted that the individual mandate for which Medicaid would be expanded to be unconstitutional. As a result, generosity of coverage varied wildly from state to state as it enforced more rigid requirements. Consequently, as of 2016, the U.S. uninsured rate is at 8.8% (28.5 million people) and the North Carolina uninsured rate is 10.4% (1 million people). These rates come six years after the passage of American Care Act (ACA) in 2010, and they have both respectively lowered from 14.5 and 15.6 in 2013 (Kaiser Health News 2017). However, as North Carolina remains among the states that have not expanded Medicaid, the Kaiser Family Foundation notes that North Carolina will make up 10% of adult individuals within the coverage gap. While the Southern region of the United States alone will make up 89% of adult individuals within the coverage gap (Prokop 2015).

On January 30, 2013, a North Carolina Republican introduced Senate Bill 4 (S.B.4) to prohibit Medicaid Expansion. The highlights of this bill included the prohibition of any state department, agency, or institution from expanding the state's Medicaid program under the Patient Protection and Affordable Care Act. In summary, expansion was disallowed without the consent of the General Assembly. This bill was passed in the Senate with 31 yeas and 16 nays; and passed in the House with 74 yeas and 39 nays. The bill went into effect on March 6, 2013. However, as of 2017 Roy Cooper has taken office as the Governor of North Carolina and his first task has been to expand Medicaid coverage. With expansion of Medicaid in North Carolina, it is estimated that 624,000 residents and household incomes up to 138 percent of the poverty level would become eligible.

Arguments for the expansion of Medicaid, assert that it was the only affordable way for many low-income people to have access to health insurance. Also, that by expanding coverage it would remedy the coverage gap created by the original design of the ACA. Furthermore, the states would be able to cover a significant number of uninsured individuals for a moderately small investment. “The Congressional Budget Office estimated that over the next decade, states expanding Medicaid would only see their state costs rise 1.6 percent more than states that didn’t expand” (Prokop 2015). Finally, supporters argued that by refusing to participate resident tax dollars still contributed to funding the expansion in other states, but their residents did not benefit.

Arguments against Medicaid centered around the weariness of promised federal funding. As opponents felt that the states would have to shoulder the majority of the funding, as funding could be drawn back overtime. Moreover, many conservatives have wanted to repeal Medicaid altogether as it has been viewed as undesirable expansion spending. Also, opponents have criticized Medicaid for its lack of quality and cheapness of which it was then termed dysfunctional.

NC H662 was introduced on April 6, 2017 and in committee on April 11, 2017. The bill is titled Carolina Cares and would work to provide health coverage to residents of North Carolina under the Carolina cares program (Bill Track 50 2017). This is a bipartisan bill, with the four main sponsors being Republicans, that would expand Medicaid coverage to adults under 133 percent of the Federal Poverty Line and also includes a work requirement for able-bodied individuals. Conversely, the bill made little to no progress in the following year and was deemed dead/failed on August 27, 2018. Previously, Governor Roy Cooper intended on submitting a proposal to the CMS (Centers for Medicare & Medicaid Services) that included amending a 1115 waiver North Carolina had submitted in 2016. The amendment would have activated the expansion of Medicaid in the state and compelled hospitals to contribute the funds needed to cover the state’s portion of

the cost of expansion. Nevertheless, Republican lawmakers in North Carolina contacted the CMS and asked for the rejection of Governor Cooper's proposal as it was considered illegal under S.B. 4. Subsequently, NC House Speaker, Tim Moore and Senate President Pro Tem, Phil Berger filed a federal lawsuit against Cooper's efforts to expand Medicaid. The lawsuit was dropped in July 2017, after the January 14, 2017 ruling by a federal judge that issued an order to block CMS approval of Governor Cooper's proposal (Norris 2018). Cooper's administration and researchers have noted that North Carolina is missing out on billions of federal dollars, the chance to create upwards of 35,000 jobs for residences, and ensure the continued operation of rural hospitals. North Carolina has a long history of attempted expansion and reform of current Medicaid laws, but they have remained the same since 2013 with little progress.

The above findings can be summarized as follows: Black infant mortality rates are not affected by partisanship, rural or urban location, and poverty level. However, White infant mortality was influenced by poverty levels. Overall, Race yielded the majority of statistically significant data. Concerning, Black maternal mortality, race showed a significant difference. In addition, poverty levels have a correlation with both Black and White maternal mortality rates. However, a higher correlation was observed between White maternal mortality and poverty level. Lastly, there was no statistical difference in the means of maternal mortality rates between Medicaid and non-Medicaid expanded states.

Conclusion/Discussion

The implications of these findings are not only that Medicaid expansion could improve maternity health, but that future empowerment of health departments to institute case management care programs could lead to increased positive maternal health outcomes. Furthermore, that regardless of rural or urban location, partisanship, and income maternal and infant mortality rates for Black women remain higher than their white counterparts. Among all examined variables, along with the addition of partisanship, race is the superseding factor of negative birth outcomes. The data collected and analyzed displays that race was the only variable for Black women that yielded a significant statistical difference. However, income appears to affect infant and maternal mortality negatively regardless of race. Conversely, race as a contributing factor may not be based in common genetic issues that African-American women face, more likely explained by the condition of Black women in America. Though this research primarily focuses on the infant health and maternal health of Black women, further research in this field may need to assess how American society contributes to the overall health of Black women in the United States.

A study done in 2005, explores the disparities of infant mortality and the possibility of genetics being a causal factor. The study links geographic ancestry to instances of good and failing health. The researchers searched for “preterm birth genes” that could possibly “explain the disparity in prematurity and infant mortality between Black and Whites” (David and Collins 2007). The term “preterm birth genes” was included among other complex conditions such as heart disease, hypertension, and diabetes. The study indicates the possibility of an unhealthy society being the causal factor of poor birth outcomes for African-American Mothers. This was investigated through the “healthy immigrant” effect, that hypothesizes that Black immigrants from black majority, African, or Caribbean countries have healthier and more positive birth outcomes.

This hypothesis was supported as Black African and Caribbean immigrants gave birth to “girls who were heavier than the girls born into established Black American families. Most striking, these first-generation Black girls grew up in the United States and went on to have daughters whose birth-weights were lower on average than their own weights had been at birth” (David and Collins 2007). In addition, the opposite is true for White European immigrant families. However, it was found that White Americans fare worse than White individuals in other countries. This finding might be linked to strong instances of educational and economic achievement. It would be interesting to do more research on this phenomenon and what factors introduced by the American experience contribute to the declining maternal health of Black women. Furthermore, the study cited the work of the Organization for Economic Co-operation and Development found the following:

“the rates of low birthweight and infant deaths from all causes were lower in those countries with more voter turnout, more left votes, more left members of parliament, more women in government, a stronger social pact and various aspects of the welfare state, and low income inequality, as measured in a variety of ways” (Muntaner, et al. 2002).

The authors of the study thought that this finding might aid in investigating the extent to which political and racial identity inhibits class identity. As it might lead to the reduction of class unity and class political power. More research into how these notions are connected would allow for more empirical evidence linking partisanship or political identity to birth outcomes.

An article published in the *Maternal Child Health Journal* in 2009, points to racism as an explanatory factor for negative birth outcomes. The study highlights that stress due to experienced racism could contribute to African-American women’s adverse birth outcomes (Nuru-Jeter, et al.

2008). The study was conducted to provide new measures of racism for studying birth outcomes. The researchers conducted six focus groups with 40 African-American of diverse socioeconomic backgrounds between the ages 18-39 in four cities in Northern California. Women in the focus groups reported experiencing racism of varying levels whether they be from childhood experiences, institutional, internalized, hostile, etc. Childhood experiences had the most saliency and enduring effects on the women. The study concludes that birth outcome studies concerning African-American women need to include the overall complex experience as an African-American woman. Researchers found that direct or passive racism, internalized negative stereotypes, institutionalized racism, and anticipation of future racism events may contribute to enduring stress (Nuru-Jeter, et al. 2008). Subsequently, the enduring stress can lead to potentially dangerous implications for birth outcomes of Black women. This study is one among many that call for the re-sculpting of birth outcome studies concerning Black women.

Generally, North Carolina has provided the framework for a non-partisan strategy to reducing infant and maternal mortality. The North Carolina Pregnancy Home answers the question posed in the title of this paper: What's Partisanship Got to do with it? The answer is nothing. The North Carolina Pregnancy Medical home reinforces the efficacy of community led initiatives and care. Overall, the study calls for a more introspective assessment of how American history has shaped our institutions and conceptions of race and needed health initiatives. Subsequently, this can be achieved by comparing the entirety of America to the rest of the world and redirecting the scope of health disparities research. This scope may need to realign to holistically assess a combination of social plights and health disadvantages that Black women face, as there is no *one* causal factor when it comes to race.

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