Historical Redlining Practices: Influences on Rising Contemporary Infant Mortality Rates in Richmond, Virginia

by Aashka Shah

Redlining was a discriminatory practice employed in the 1930s of denying loans, credit, and other services to families based on the economic status of their neighborhoods. The practice began when the Home Owners' Loan Corporation (HOLC) drew maps of residential neighborhoods in 239 cities across the United States between 1935 and 1940 and assigned each neighborhood a grade. The practice of redlining was used to target neighborhoods that had large minority populations, thus reducing their social mobility and quality of life and often leading to dramatic racial disparities in healthcare outcomes. The Fair Housing Act of 1968 banned redlining, but the consequences of this discriminatory practice still affect people living in these neighborhoods today. The purpose of this study was to analyze the effects of historical redlining on infant mortality rates in Richmond, Virginia. A literature search of relevant articles from electronic databases was performed from January 2010 to December 2024 to identify original research pertaining to the impact of historic redlining on current infant mortality-related healthcare outcomes. The redlining status of all the neighborhoods in Richmond, Virginia was analyzed to find patterns related to infant mortality, and infant mortality rates were found to be significantly higher in previously redlined neighborhoods due to less access to resources, worse environmental conditions, and racial disparities. Legislative actions to alleviate the effects of redlining such as building hospitals and healthcare facilities, improving access to educational resources, and increasing access to economic opportunities in these neighborhoods are recommended.

Keywords: Redlining, Historical Discrimination, Racial Disparities, Health Inequity, Infant Mortality, Preterm Birth

Introduction

According to the Centers for Disease Control and Prevention, the infant mortality rate in Virginia was 6.21 deaths per 1,000 births in 2020, an almost 12% decrease since 2011. Advancements in medicine have led to dramatic decreases in infant mortality and health outcomes in general, but everyone does not get equal access to these benefits. The infant mortality rate was 4.6 for the White population in Virginia from 2019-2021 while the rate for the Black population was a staggering 10.4 (Centers for Disease Control and Prevention, 2021).

Redlining is a historically discriminatory practice that started in 1934 and was used to deny financial services like loans and credit to people based on the economic status of their neighborhoods. This practice started after the Great Depression when the Home Owners' Loan Corporation (HOLC) analyzed hundreds of neighborhoods around the United States and reported how risky they were for economic investment. The HOLC drew maps for over 200 cities around the United States of America, and they gave each neighborhood a letter grade corresponding to their risk factor. The "best" neighborhoods that were predicted to grow in value were given an A and colored in green, "still desirable" neighborhoods were given a B and colored in blue, and "declining" neighborhoods were given a C and colored in yellow. Neighborhoods that were considered hazardous to investment had a red line drawn around them and were given a D. These neighborhoods were then discriminated against and deprived of access to many economic services and opportunities. For example, many people living in redlined neighborhoods were denied loans when individuals with similar credit histories in other neighborhoods were easily accepted for the same loan (Swope et al., 2022).

Large minority populations were often targeted by redlining, and the government used this practice as a way to make racial discrimination legal. Many

of the descriptions in the HOLC manual stated that a low grade was assigned to certain neighborhoods due to the large African American population residing there. Many neighborhoods with large minority populations and the same economic status as a predominantly White neighborhood were given much lower grades, and their houses were therefore considered to be of less value (Egede et al., 2023, p. 1534). Redlining was eventually outlawed by the Fair Housing Act of 1968, but its effects are still prevalent with previously redlined neighborhoods often facing discrimination today.

An example of this disparity still existing today is the fact that the infant mortality rate is almost 2.4 times greater for the Black population compared to the White population (Jang and Lee, 2022, p. 257). Potential reasons for this disparity include inadequate access to healthcare, and education, poor economic stability, and discrimination. Infant mortality is defined as the death of an infant before their first birthday, and the infant mortality rate (IMR) is determined by measuring the number of infant deaths for every 1000 live births. Infant mortality is a good measure of general population health and the well-being of mothers and their families. Causes of infant mortality include birth defects, birth complications, diseases, smoking during pregnancy, and various other situational and environmental factors (Jang and Lee, 2022).

The lasting impacts of redlining and specifically the correlation between redlining and infant mortality can be better understood by looking at Richmond, Virginia, the former Capitol of the Confederacy and a major part of the transatlantic slave trade. Richmond, Virginia has a long and complicated history of disenfranchisement, and previously redlined neighborhoods in Richmond have been found to have higher concentrations of Black residents, higher health risks, lower incomes, higher temperatures, fewer trees, and lower valued homes (Schmidt, 2022). Because historically redlined neighborhoods decrease access to resources and exacerbate already existing racial disparities, historical redlining may still affect current health outcomes, especially infant mortality, in redlined neighborhoods in Richmond, Virginia.

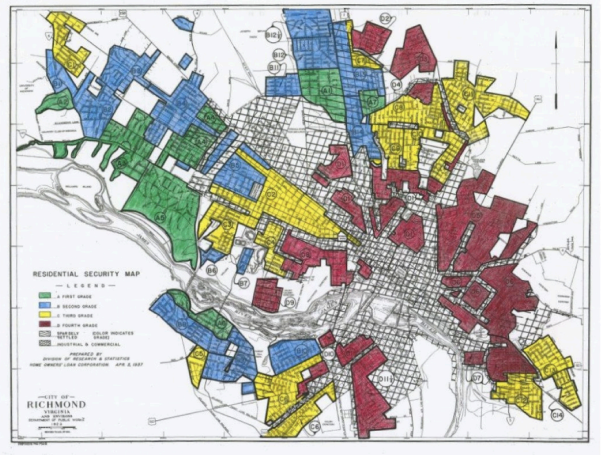

Figure 1. HOLC Map of Richmond City (Schmidt, 2022)

Social and Cultural Constructs

Education and Access to Resources

Because redlining decreases access to resources and increases environmental degradation, areas that have historically been redlined suffer from income and health disparities. In a study to examine infant mortality's relationship to education, Nardone et al. (2020) analyzed birth outcomes data from the California Office of Statewide Health Planning and Development between January 1, 2006 and December 31, 2015 and analyzed security maps for these neighborhoods. Nardone et al. (2020) used propensity score matching to help discover what percentage of each type of neighborhood fell into the different educational categories (p. 6). Nardone et al. (2020) found that 65. 3% of pregnant women living in neighborhoods that were previously redlined paid for delivery care with Medi-Cal, 63.4% received the special supplemental nutrition program for women, infants, and children, and only 11.1% had bachelor's degrees. In comparison, only 8.9% of women living in a neighborhood that used to have a grade of A used Medi-Cal, 9.5% received the special supplemental nutrition from the program, and 38.3% had bachelor's degrees (p. 8).

In a study analyzing the effect of maternal education on infant mortality, Okobi et al. (2023) used a retrospective observational design to analyze the trends and factors associated with infant mortality rate using data from 2007 to 2020 from the CDC WONDER database. This study, which explored the

effect of maternal education on infant mortality rate, found that infants born to mothers with higher levels of education had lower rates of infant mortality with a rate of 1.06 for mothers with a doctorate degree compared to 3.48 for mothers with no high school diploma in 2020 (p. 8). Krieger et al. (2020) examined NYC birth data from January 1, 2013, to December 31, 2017, by analyzing the NYC DOHMH vital statistics birth certificate data (p. 1047). In this study of the association between census characteristics and redlining and infant mortality, Krieger et al. (2020) explained how worse HOLC grades are associated with worse census tract characteristics. Two percent of mothers in neighborhoods with an HOLC grade of A had less than a high school education, while 23% of mothers in neighborhoods with an HOLC grade of D had less than a high school education. Lower rates of education have been associated with higher rates of preterm birth and infant mortality (p. 1049).

In a study of the racial, educational, and geographic disparities that contribute to infant mortality, Sing and Yu (2019) performed log-linear regression and inequality indices to analyze temporal infant mortality data from the National Vital Statistics System and the National Linked Birth/Infant Death files according to maternal and infant characteristics (p. 20). Singh and Yu (2019) explained how White mothers with a college degree have an IMR of 2.9, while Black mothers without a high school diploma have an IMR of 13.4 (p. 23). Singh and Yu (2019) discussed how White mothers without a high school diploma had a 5.2 times greater post-neonatal mortality rate compared to White mothers with a college degree (p. 23). Krieger et al. (2020) explained how worse HOLC grades are associated with worse census tract characteristics. Two percent of mothers in neighborhoods with an HOLC grade of A had less than a high school education while 23% of mothers in neighborhoods with an HOLC grade of D had less than a high school education (p. 1049). Krieger et al. (2020) also explained that worse HOLC grades are associated with worse census tract characteristics. Zero percent of households in neighborhoods with an A were in the worst tercile for racialized economic segregation compared to 49% of households in neighborhoods with a grade of D (p. 1049).

Access to resources can also impact the type of delivery. Okobi et al. (2023) stated that hospital deliveries have lower mortality rates compared to deliveries that take place outside the hospital (2.69 versus 3.09), and infants born through vaginal delivery had lower rates compared to babies born via cesarean sections (2.61 versus 2.86) (p. 8). Egede et al. (2023) analyzed the effects of redlining and proposed policies to move forward. Egede et al. (2023) explained how redlined communities have less access to hospitals and medical care due to the systematic closure of hospitals across historically redlined communities (p. 1535).

Racial Factors

Because redlining in the US has focused on racial minorities, primarily Black Americans, Black Americans disproportionately suffer from the repercussions of redlining. According to Okobi et al. (2023), African Americans have the highest infant mortality rate of 4.83 per 1000 infants with a p-value of 0 compared to White Americans (2.34 per 1000 infants with a p-value of 2.34). American Indians had an infant mortality rate of 3.48 per 1,000 infants with a p-value of 0.120, and Asian Americans had an infant mortality rate of 1.82 per 1,000 infants with a p-value of 0.081 (p. 4). Nardone et al. (2020) found that the proportion of births delivered by non-Hispanic (NH) Black and Hispanic women was 5.1% and 12.1%, respectively, in grade A neighborhoods and 8.9% and 67.2%, respectively, in grade D neighborhoods. Significantly more Black and Hispanic women gave birth in redlined neighborhoods, and Black and Hispanic women had higher rates of infant mortality, which help support the correlation between redlining and increased rates of infant mortality (p. 5).

Singh and Yu (2019) explained there was a slower decline in mortality for Black infants compared to White infants, leading to the racial disparity in the IMR increasing between 1916 and 2017. In 1916, the rate for Black infants was 184.9 deaths per 1,000 live births, 87% higher than the rate for White infants (99.0), in 1920, the black IMR was 43% higher than the White IMR, and in 2017, the Black IMR was 10.8 per 1,000 live births, 122% higher than the White IMR of 4.9 (p. 22). Singh and Yu (2019) discussed

how in 2017, the post neonatal mortality rate for Black infants was 151% greater than the rate for White infants (p. 22).

Singh and Yu (2019) discussed how in 2016, Black infants were 2.6 times more likely to die from perinatal conditions and had a 26% higher chance of dying due to birth defects compared to White infants (p. 23). Singh and Yu (2019) explained how the racial disparity grew over time because the infant mortality rate decreased at a faster rate for White infants compared to Black infants. Singh and Yu (2019) helped further dive into the racial disparities in infant mortality that have already been established and further explain the reasons behind them. 65% of all infant deaths in 2016 were a result of congenital anomalies (birth defects), short gestation/low birthweight, sudden infant death syndrome (SIDS), maternal complications of pregnancy, unintentional injuries, cord and placental complications, and respiratory distress syndrome (RDS) (p. 23).

Matoba et al. (2019) explained that interpersonal racism is a racial prejudice that leads to assumptions about people often based on stereotypes, and studies by Jones et al. (1996) and Krieger (1990) have shown that exposure to interpersonal racism and racially charged situations leads to increased stress hormones, higher blood pressure, and poor health outcomes (p. 102193). Collins et al. (2000) that found African American women who delivered babies weighing under 1500g, the marker for a very low birth weight, were twice as likely to report experiencing interpersonal racism during pregnancy compared to women who delivered babies over 2500 g (p. 102193). Matoba et al. (2019) explained that institutional racism, a systematic distribution of resources based on race, includes practices like residential redlining, which can result in unfair disparities in wealth, income, access to healthcare, education, and more (p. 102193). Matoba et al. (2019) also note that studies have found correlations between redlining and poor health outcomes, and discuss how this disparity was attributed to inaccessible healthcare, lack of healthy food options, no safe places for physical activity, exposure to environmental hazards, and greater stress (p. 102193).

Physical and Scientific Manifestations

Because birth outcomes are inextricably linked to income and environmental conditions, redlined communities may suffer from higher infant mortality rates. The Center on Society and Health at Virginia Commonwealth University found that the life expectancy for residents of low-income Black communities in the East End of Richmond is on average 20 years shorter compared to White residents in wealthy West End neighborhoods, and the Virginia Department of Health found that African Americans were hospitalized at 1.7 times the rate of White residents (Schmidt, 2022, 108).

Preterm Birth

Krieger et al. (2020) described how there is a significant difference between rates of preterm birth in neighborhoods of different HOLC grades. The preterm birth rate is 5.0% in neighborhoods with an A compared to 7.3% in neighborhoods with a D (p. 1049). Hollenbach et al. (2021) described how a retrospective cohort study of patients with live births from 2005 to 2018 was conducted using data from the Finger Lakes Region perinatal and obstetric data system, a New York State Department of Health electronic birth certificate database (p. 2) Hollenbach et al. (2021) stated that the rate of periviable birth was 3-fold higher in the "hazardous" neighborhood (26 births) compared to the "best" or "still desirable" neighborhood (7 births) (p. 5). Hollenbach et al. (2021) explained how there was a graded increase in preterm birth with worsening HOLC designation with adjusted odds ratios of 1.19 (95% CI, 1.08-1.31) for "Definitely Declining" (P = .001) and (95% CI, 1.25-1.53) for "Hazardous" (P < 001) (p. 5). Matoba et al. (2019) described how the leading cause of infant mortality and morbidity in the United States was preterm birth despite the many advances in perinatal care (p. 102193). This study explained how preterm birth affected African Americans more than White women, as the preterm birth rate in 2016 was 13.8% for African American mothers compared to 9.0% for White mothers (p. 102193). Matoba et al. (2019) explained how at first it seemed that individual-level risk factors like prenatal care utilization contributed to this disparity, but further research shows that a contribution of contextual factors like exposure to interpersonal and institutional racism has been correlated with the morbidity and mortality of African Americans (p. 102193).

In a study examining the association between historical redlining and preterm birth rates, Matoba et al. (2019) analyzed data from the Illinois Transgenerational Birth File and the Home Mortgage Disclosure Act (HMDA) database to perform a cross-sectional, retrospective population-based study investigating [RB1]the association between redlining and preterm birth (p. 102193). This study found that the preterm birth rate for African American women in redlined neighborhoods was 18.5%, and the preterm birth rate for African American women in non-redlined neighborhoods was 17.1% (p. 102193). Similarly, Hollenbach et al. (2021) performed a retrospective cohort study of 199,088 live births from 2005 to 2018 using data from the Finger Lakes Region perinatal and obstetric data system, a New York State Department of Health electronic birth certificate database (p. 2). Hollenbach et al. (2021) explained how the prevalence of preterm birth increased with worse HOLC grades with a birth rate of 7.55% (217 of 2873 births) in the "best" and "still desirable" neighborhoods and a birth rate of 12.38% (427 of 3449 births) in the "hazardous" neighborhoods (p. 4). Similarly, Hollenbach et al. (2021) explained how there was a graded increase in preterm birth with worsening HOLC designation, with adjusted odds ratios of 1.19 (95% CI, 1.08-1.31) for "Definitely Declining" (P = .001) (95% CI, 1.25-1.53) for "Hazardous" (P < 001) (p. 5). Matoba et al. (2019) also found that the odds of preterm birth for African American women living in redlined neighborhoods compared to non-redlined neighborhoods was 1.12. Matoba et al. (2019) found that preterm birth rates were 18.2% in high-proportion African American redlined census tracts and 16.7% in high-proportion African American non-redlined census tracts (p. 102193).

Environmental Factors

In a study examining the effect of redlining on PM levels, Herrera et al. (2024) performed a longitudinal cohort study using data from the National Institute of Health Environmental Influence on Child Health Outcomes Programme to analyze exposure to fine particulate matter (PM) and birth outcomes. After sourcing historical redlining data from overlaying the Inter-University Consortium for Political and Social Research with the HOLC mortgage security risk maps (p. 2), this study found that the average residential PM exposure during pregnancy was 7.0 μg/m3 (p. 4). They also found an association between a redlined or ungraded census tract and higher exposure to PM with an increase of 0.43 μg/m3 (with a 95% CI of 0.36 to 0.51) for redlined tracts and an increase of 0.59 ?g/m3 (with a 95% CI of 0.45 to 0.72) for ungraded tracts (p. 4). Herrera et al. (2024) explained that there was a decrease of 0.15 (with a 95% CI of -0.23 to -0.08) in birth weight z-scores for those living in a lower-grade census tract compared to those living in a higher-grade census tract, a decrease of 0.14 (with a 95% CI of -0.21 to -0.06) when present-day maternal sociodemographic factors were controlled, and a decrease of 0.16 (with a 95% CI of -0.25 to -0.07) when tract-level characteristics were controlled (p. 4). They also explained that there was a 1.24 (with a 95% CI of 0.97 to 1.58) increase in preterm birth for redlined tracts compared to the non-redlined tracts, but these results were null, and there was an increase of 2.56 for the odds of a low birth weight (with a 95% CI of 1.31 to 5.03) compared to a non-redlined tract, but no statistically significant associations were found between redlining and a low birth weight (p. 5).

High exposures to PM have been associated with poor pregnancy outcomes and lower redlining grades potentially due to the PM impairing the placental function by placing oxidative stress on the placenta or by creating inflammation (Hollenbach et al., 2021, p. 5). Hollenbach et al. (2021) explained that the prevalence of preterm birth increased with worse HOLC grades with a birth rate of 7.55% (217 of 2873 births) in the "best" and "still desirable" neighborhoods and a birth rate of 12.38% (427 of 3449 births) in the "hazardous" neighborhoods (p. 4). Hollenbach et al. (2021) stated that the rate of periviable birth was 3-fold higher in the "hazardous" neighborhood (26 births) compared to the "best" or "still desirable" neighborhood (7 births), hinting at a correlation between higher PM exposure, lower redlining grade, and worse birth outcomes. Herrera et al. (2024) explained how redlined census tracts have been documented to have less green space, reduced tree canopy, and increased heat (p. 5).

Nardone et al. (2020) found that the proportion of births delivered by non-Hispanic (NH) Black and

Hispanic women was 5.1% and 12.1%, respectively, in grade A neighborhoods and 8.9% and 67.2%, respectively, in grade D neighborhoods. Nardone et al. (2020) also found that mean maternal age decreased as HOLC grade decreased from 33.8 (±5.2 years) to 29.1 (±6.3 years) (p. 7). Okobi et al. (2023) reported the highest infant mortality rate was found in infants born to teenage mothers, with a rate of 6.8 for mothers under 15 and a rate of 3.52 for mothers 15-19 in 2020, while also noting a high infant mortality rate of 4.74 for mothers 45-49 years old. This may be due to inadequate access to prenatal care among teenage mothers and increased risk of various complications among mothers of advanced maternal age (p. 8).

Okobi et al. (2023) stated that there are many different causes of infant mortality, including congenital malformations, deformations, and chromosomal abnormalities. Over the years, these values all tend to fluctuate. The rates for congenital malformations and short gestation periods have been decreasing over time while the rates for SIDs have been fluctuating. In 2023, the mortality rate related to congenital malformations was between 1.35-1.12, the rate due to short gestation and low birth weight ranges ranged from 1.13 to 0.87, and the rate for SIDs ranged from 0.57 to 0.38 (p. 4). Nardone et al. (2020) reported that the odd ratio of infant mortality was 0.69 in B vs. A neighborhoods, compared to 1.08 for D vs. C neighborhoods (p.10). Nardone et al. (2020) claimed that neighborhoods with worse HOLC grades experience higher rates of infant mortality and worse birth outcome data in general (p. 10).

Lasting Impacts of Redlining in Richmond, Virginia

Because Richmond, Virginia was previously redlined and the racial minorities faced a lot of legalized discrimination, large disparities still exist for those living in these redlined neighborhoods today. These redlined neighborhoods were mostly found towards the inner city, while the areas with grades of A and B were found towards the outside of the city (Schmidt, 2022, p. 105). Some neighborhoods that were particularly affected by redlining include Church Hill, Jackson Ward, Fulton, and Gilpin.

Parkhurst (2016) performed a case study on the gentrification in Church Hill and discussed how the HOLC stated that this neighborhood had zero favorable influence due to the "Infiltration of Negroes with a population of 80% Negro and increasing" (p. 21). However, due to Church Hill's proximity to the historic St. John's Church, a group of White Richmonders attempted to restore the homes in this neighborhood and turn it into a tourist destination (p. 24). The neighborhood was completely transformed with a 673 percent increase in value, but the residents living in this neighborhood could no longer afford to live there. These mostly Black families had to leave, and they were replaced by White families moving to this now flourishing neighborhood. Redlining laid the foundation for the gentrification of Church Hill by denying the families living there access to credit, homeownership, and investment, resulting in Church Hill being incredibly undervalued. This led to low property values in an urban location, which was attractive to developers and higher-income residents. As capital re-entered these neighborhoods, property values and living costs increased, leading to the displacement of the long-term Black residents who had been cut off from any wealth-building opportunities. (p. 29). Jackson Ward and Fulton were two other previously redlined neighborhoods in Richmond, Virginia. Both of these neighborhoods were very well-established Black neighborhoods that were destroyed by the Richmond City Council. Jackson Ward had a very vibrant community and was known as the Harlem of the South, but in 1953 the Richmond-Pestersburg Turnpike was built through this neighborhood, splitting it apart and displacing many of its residents. The residents of this neighborhood led opposition to the plan, but the Council ignored them and destroyed the entire community (p. 18 & 19). The neighborhood of Fulton experienced a similar destruction. Fulton was another African American neighborhood with one of the highest homeownership rates for working-class families, but the media labeled it as a slum. The city council decided to bulldoze the neighborhood in order to create space for industry, completely destroying Fulton (p. 19). Brad Plumer and Nadja Popovich (2020) discuss the long-term effects of redlining in Gilpin. Gilpin was isolated during the building of the new highway, which led to high poverty rates and a lack of resources. Gilpin faces high amounts of pollution from the highway,

few trees and green spaces, high temperatures, and no nearby grocery stores or doctor's offices, leading significantly worse health conditions and high infant mortality rates (Plumer and Nadja Popovich, 2020).

Data on infant mortality for redlined versus non-redlined neighborhoods was not available, but other factors demonstrating the large disparities and poor general health in previously redlined areas were still found. These disparities were found in many areas, including education, economic status, and environment. According to the Federal Reserve Bank of Richmond, 42.9% of Virginia's White population has a bachelor's degree while only 25.2% of the state's Black population has a bachelor's degree, and Black people from Virginia with a bachelor's degree make on average 10% lower than their White counterparts with the same level of education (Schmidt, 2022, p. 107). Since lower levels of education have been associated with higher levels of infant mortality rates, the infant mortality rate is most likely higher in the previously redlined neighborhoods of Richmond. According to Schmidt (2022), in 2017, an average of 26 homes were bought by a White person each day while only six homes were bought by a Black person in Richmond, Virginia (p. 105). According to Schmidt (2022), on average, previously redlined neighborhoods in Richmond, Virginia are five degrees hotter compared to non-redlined neighborhoods with differences as high as twelve degrees in some areas. This increase in average temperature can be attributed to the lack of tree cover and green spaces and the large amount of heat-absorbing surfaces like concrete in redlined districts. This is due to the decades of disinvestment in infrastructure and poor environmental planning in these areas, and elevated temperatures are associated with increased energy costs, heat-related illnesses, and poorer overall health outcomes. (p. 108).

The University of Richmond's Digital Scholarship Lab created an open-access project that publishes redlining maps of cities and the grades they had in their past with their present-day characteristics: Social Vulnerability Index, Percent Minority, Life Expectancy, Median Age, Percent over 65, Percent living in Poverty, Percent with Asthma, Percent with Cancer, Percent with Diabetes, Percent with High Blood Pressure, Percent with Kidney Disease, Percent with Mental Health Problems, Percent with Obesity, and Percent with Pulmonary Disease. The data from each neighborhood in Richmond for all the characteristics was compiled, and the mean was found for each characteristic for each HOLC grade. The data was extracted from the Digital Scholarship Lab to make these original tables.

HOLC Grade	Social Vulnerability Index	Percent Minority	Life Expectancy	Median Age	Over 65 (%)
A	0.16	26.51	80.59	41.00	17.64
B	0.28	30.27	78.38	39.51	17.04
C	0.48	57.75	74.97	37.18	12.78
D	0.70	74.43	71.74	33.12	11.39

Table 1. Demographics for each HOLC Grade using data from the University of Richmond's Digital Scholarship Lab (Nelson et al., 2023)

HOLC Grade	Poverty (%)	Asthma (%)	Cancer (%)	Diabetes (%)	High Blood Pressure	Kidney Disease (%)	Mental Health Problems (%)	Obesity (%)	Pulmonary Disease (%)
A	7.43	9.01	7.06	9.23	29.49	2.69	10.26	26.43	5.16
B	10.62	9.28	6.59	9.05	28.78	2.69	11.15	26.90	5.36
C	20.70	11.05	5.52	13.52	35.53	3.48	14.46	34.95	7.31
D	30.39	11.90	5.28	16.02	39.60	4.03	16.38	39.21	8.49

Table 2. Health Conditions for each HOLC Grade using data from the University of Richmond's Digital Scholarship Lab (Nelson et al., 2023)

When comparing neighborhoods in Richmond that previously received an A to neighborhoods that received a D, the average social vulnerability index increased from a 0.16 to a 0.70, the percent minority increased from 26.51% to 74.43%, and the life expectancy decreased from 80.59 years to 71.74 years, as seen in Table 1. The prevalence of all the stated health conditions increased as the grades went from A to D for all of the listed conditions except for cancer (see Table 2).

Conclusion

Clearly, there is a large disparity in infant mortality rates in Richmond, Virginia, and other redlined cities in the United States, and this disparity is at least partially due to the effects of historical redlining practices. Taking action and implementing policies to help close the gap and improve health equity is an essential next step. Redlining has been banned for over half a century and should no longer be hindering the growth of the neighborhoods that were unfairly subjected to this policy. Actions need to be taken to help ensure that redlined neighborhoods have access to the opportunities and resources that they were deprived of when the Home Owners' Loan Corporation drew their maps. These include building hospitals and healthcare facilities

closer to redlined neighborhoods, improving their access to doctors, prenatal care, and treatment facilities, expanding their insurance coverage, and improving their access to education, proper housing, and economic opportunities. Other essential changes include building more grocery stores closer to redlined neighborhoods, reversing implicitly racist policies, advocating for more green spaces and climate protection measures, and incentivizing investment in economically deprived areas (Egede et al., 2023, 1536).

In Modern Day Consequences of Historic Redlining: Finding a Path Forward, Egede et al. (2023) discussed many potential policy initiatives to alleviate the effects of redlining. These focused on economic support, educational reform, healthcare reform, economic empowerment, and environmental reform. The quality of housing in these neighborhoods can be improved by providing support through vouchers, tax credits, and developmental grants, and the educational opportunities can be improved by expanding early childhood schooling programs, expanding funding for special needs education in public schools, and altering the underlying public school funding mechanisms. Expanding Medicaid, revising value-based care reimbursement models, standardizing asset limits in public benefit programs, and offering tax incentives for the creation of employment opportunities would also help alleviate the impacts.

Murry et al. (2023) analyzed the educational outcomes from 667 African American families in Georgia undergoing the Strong African American Families (SAAF) efficacy trials. SAAF is a culturally tailored preventative family-based program with the goal of preparing youth to advance academically. Murry et al. (2023) reported that assignment to this program led to improvements in parents' academic racial socialization ($\beta=0.09$, $p<0.05$), improvements in youths' racial pride ($\beta=0.15$, $p<0.001$) during pre-adolescence, youths' racial pride at age 12, and increases in academic competence in middle adolescence (age 15; $\beta=0.22$, $p<0.001$). In contrast, exposure to racial discrimination at age 15 led to decreases in academic competence ($\beta=0.24$, $p\leq0.001$), and at age 16, increased rates of academic failure predicted school dropout ($\beta=0.23$, $p\leq0.001$) (p. 6). Implementing similar education programs for students living in underprivileged and previously redlined neighborhoods while decreasing exposure to racial discrimination can help the youth excel academically and slowly improve the opportunities available in these neighborhoods.

Reversing the effects of redlining will be a long and complicated process, but this change is long overdue. The citizens living in these neighborhoods deserve the effects of redlining to be fully understood and for holistic action to be taken to improve their infant mortality rates and general well-being.

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