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# Data Analysis of Cancer Incidence and Mortality Disparities Among African Americans in Louisiana

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## Abstract

Cancer is a major cause of death in the United States. Different racial and ethnic groups have different cancer rates and survival chances. In Louisiana, African Americans have some of the highest cancer rates in the state, according to a recent report. Louisiana also ranks fifth in the country for cancer deaths, making the issue even more serious. Several factors contribute to these differences. Many African Americans in Louisiana have limited access to healthcare, struggle financially, and live in areas with environmental risks. Because of these challenges, they often cannot get cancer screenings and treatment early, leading to late diagnoses and worse health outcomes. Low income and unemployment make it even harder to get proper medical care. Some areas also have high pollution, which can increase cancer risk. Cancer rates vary between cities and rural areas in Louisiana. Rural areas have fewer hospitals and doctors, causing delays in diagnosis. Cities may have more hospitals, but more pollution, which can raise cancer risks. Gender also affects cancer rates. African American men are more likely to get prostate and thyroid cancer, while African American women are more likely to develop severe types of liver and breast cancer. These differences show the need for better prevention and treatment plans. In this research, we study the five most common cancers among African Americans in Louisiana over the past five years, focusing on gender and location. Using Python and tools like Pandas, Seaborn, Matplotlib and SAS, the research analyzes cancer patterns and causes. The goal is to find useful information to improve public health and make healthcare more accessible for African Americans in Louisiana.

## Keywords

Data Analysis, Cancer, African Americans

## 1. Introduction

Cancer is one of the leading causes of illness and death in the United States, affecting millions of people each year [1]. In 2024, about 2 million people in the United States were diagnosed with cancer. Breast cancer was the most common, with around 310,720 cases in women and 2,790 in men. Prostate cancer was the most common cancer in men and the second most common overall, with about 299,010 cases. Lung and bronchus cancer was the third most common, with around

234,580 new cases [2]. However, the impact of cancer is not the same for everyone. Different racial and ethnic groups experience significant differences in both cancer occurrence and survival rates [3]. According to U.S. Cancer Statistics, cancer rates in Louisiana were more than 40% higher than the national average [4]. Louisiana has the fifth-highest overall cancer death rate in the country [5]. Figure 1 illustrates the trends in cancer death rates from 2018 to 2022 across various

parishes in Louisiana. The average death rate in rural areas is significantly higher compared to urban areas, likely due to disparities in access to healthcare services, availability of preventive screenings, and socioeconomic factors that influence health outcomes. However, higher cancer rates in some urban areas might also be linked to environmental factors, such as exposure to pollutants or industrial carcinogens. These findings emphasize the intricate relationship between geographic, environmental, and socioeconomic factors in cancer outcomes, highlighting the need for targeted interventions to reduce disparities and enhance cancer care across all regions.
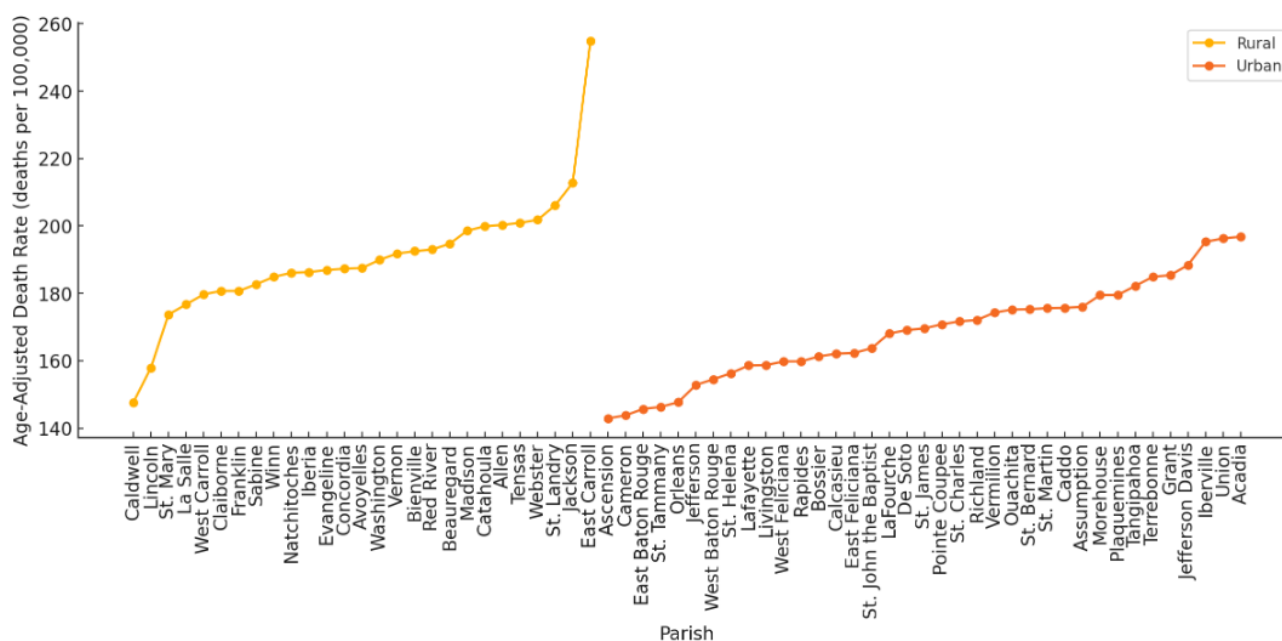


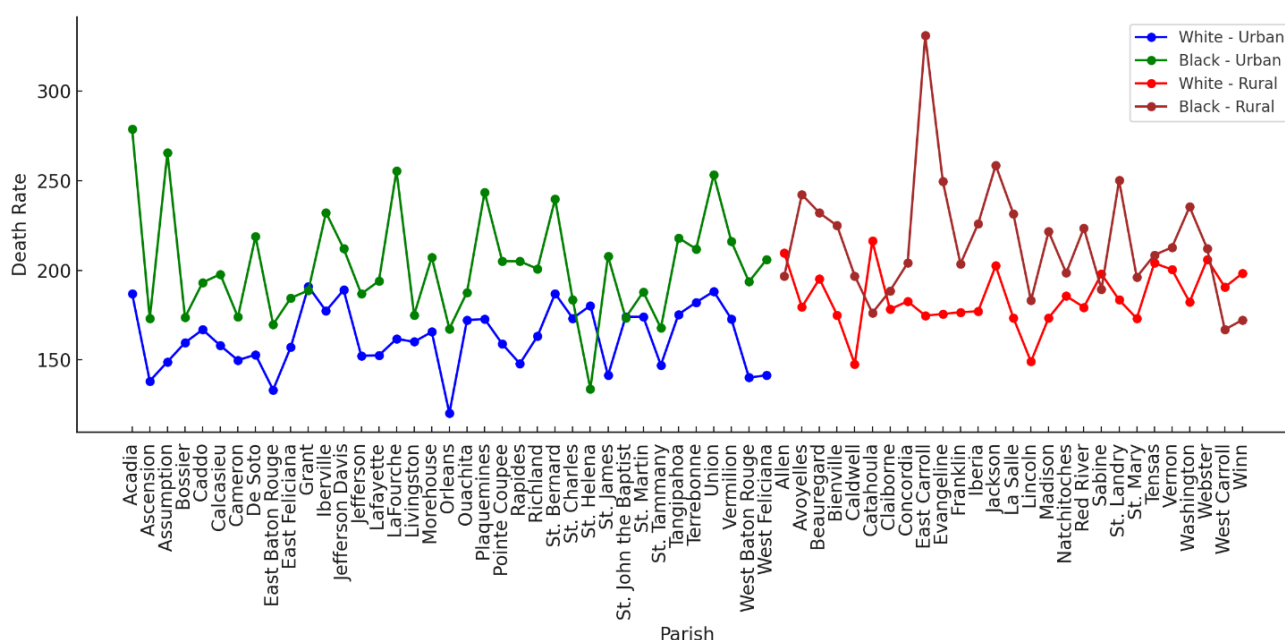***Figure 1.*** *Death Rate (2018-2022).*



***Figure 2.*** *Death Rate by Race (2018-2022).*

Figure 2 provides a breakdown of cancer mortality rates, demonstrating that African Americans experience higher death rates. Despite advancements in cancer treatment and national efforts to reduce mortality, African Americans in

Louisiana continue to face disproportionate risks. The persistence of these disparities suggests underlying systemic barriers, including lower participation in cancer screenings, and difficulties in adhering to treatment regimens [5]. Broader social determinants of health, such as financial constraints and inadequate health insurance coverage, also play a significant role in limiting the availability of timely and effective care. As a result, many individuals are diagnosed at later stages when treatment options are less effective, leading to worse health outcomes [6]. In addition, environmental factors play a crucial role in increasing cancer risks. Prolonged exposure to harmful chemicals and pollutants in these areas has been linked to a higher likelihood of developing cancer, particularly lung and liver cancer [7].

Addressing cancer disparities among African Americans in Louisiana requires a comprehensive approach that tackles socioeconomic, environmental, and healthcare-related barriers. In this research, we analyze cancer trends among African Americans in Louisiana over the past five years, focusing on variations by gender and geographic location (urban vs. rural). By leveraging data analysis tools such as Python, Pandas, Seaborn, Matplotlib and SAS, this research aims to identify patterns in cancer incidence and mortality. The findings will provide valuable insights for healthcare providers, policymakers, and community leaders to develop effective cancer prevention and treatment strategies.

The remainder of this paper is structured into four key sections. The second section offers a detailed background and examines existing literature on cancer disparities. The following methodology section outlines the data sources, research design, and analytical methods employed in this study. The results section presents the findings, followed by a discussion of their implications. Finally, the paper concludes with a summary of key insights, along with recommendations for policy improvements and directions for future research.

## 2. Literature Review

Studies on cancer disparities in the United States often point to significant differences in incidence and mortality between racial groups. Researchers have consistently found that African Americans experience higher rates of certain cancers, such as breast, prostate, and colorectal cancers [8-12]. These gaps can partly be explained by factors like poverty, lack of insurance, and lower access to routine screenings. In addition, social determinants of health such as education, housing conditions, and workplace hazards further affect the likelihood of cancer diagnosis and survival [13]. Although there is broad agreement on the role of these factors, the exact pathways often vary from one region to another.

In Louisiana, local research confirms national trends while highlighting unique local influences. Several analyses show that African Americans in certain parts of Louisiana face especially severe barriers in accessing healthcare [14]. A study on spatial accessibility of primary care in Louisiana found that disparities in physical access to primary care are exacerbated in areas such as rural regions with concentrated disadvantages, impacting predominantly Black neighborhoods [15]. These challenges are worsened by limited public transportation and health insurance coverage. In addition, environmental risks such as exposure to industrial pollutants remain a key concern in communities located near chemical plants. Recent evaluations have also underlined the increasing need to address air quality and other ecological factors that can contribute to higher cancer rates in underserved areas [16]. For example, a study highlighted that air pollution is linked to higher cancer rates among Black communities in Louisiana [17, 18].

Researchers have also examined the role of culture and health literacy in cancer outcomes. Some studies suggest that mistrust of the healthcare system and fear of diagnosis can cause individuals to delay or avoid medical help [19]. Moreover, limited awareness of cancer signs and recommended screening guidelines may lead to later-stage diagnoses [20]. Community-based programs that offer culturally sensitive outreach have shown promise in improving early detection [21]. By collaborating with local leaders, such programs can address misinformation, reduce stigma, and encourage regular health check-ups. More recent research emphasizes the importance of virtual education tools and online community forums that can broaden access to vital health information [22].

Health policy discussions emphasize that systematic changes are often needed to lower cancer disparities. Scholars argue for expanding Medicaid coverage and investing in local healthcare infrastructure, especially in underserved areas. Studies further highlight the importance of preventative measures, such as routine screenings and patient navigation services, which help individuals overcome logistical and financial hurdles. Although several state and federal initiatives aim to improve health equity, consistent funding and community engagement remain critical for sustaining these efforts. Recent policymaking studies also point to the value of cross-sector collaborations linking health agencies, educational institutions, and local businesses to strengthen the overall healthcare safety net.

Despite these numerous studies, there is still a lack of comprehensive, localized research that explores how specific socioeconomic, cultural, and environmental factors intersect to influence cancer disparities among African Americans in Louisiana. While many reports recognize the statewide or national scope of the problem, relatively few examine the unique community-level dynamics that drive higher cancer rates and poorer outcomes. To address this gap, the present research investigates these intersecting factors in depth and uses detailed local data to pinpoint the conditions most strongly linked to elevated cancer risk. By focusing on multiple parishes and employing rigorous analytical methods, this study aims to fill an important gap in the existing literature, offering targeted insights that can guide more effective interventions and policy responses.

## 3. Methodology

This study utilized data from the State Cancer Profiles [23], a publicly available dataset developed by the National Cancer Institute (NCI) and the Centers for Disease Control and Prevention (CDC) [24], to examine cancer incidence and mortality trends across Louisiana. The dataset was selected for its comprehensive coverage of state- and county-level cancer statistics, including mortality rates. As shown in Figures 3 and 4, to explore potential factors contributing to these rates, we used a model from County Health Rankings, looking at health behaviors, socioeconomic and environmental influences [25]. The study analyzed cancer incidence and mortality differences between urban and rural parishes, investigating the factors influencing cancer outcomes. To explore potential contributing factors to cancer disparities, we employed Pearson and Spearman correlation analyses to measure relationships between cancer incidence and health behaviors, socioeconomic status, and environmental factors. A multiple linear regression model was used to assess the impact of healthcare access and environmental exposures on cancer rates. These analyses were conducted using Statistical Analysis Software (SAS) [27].
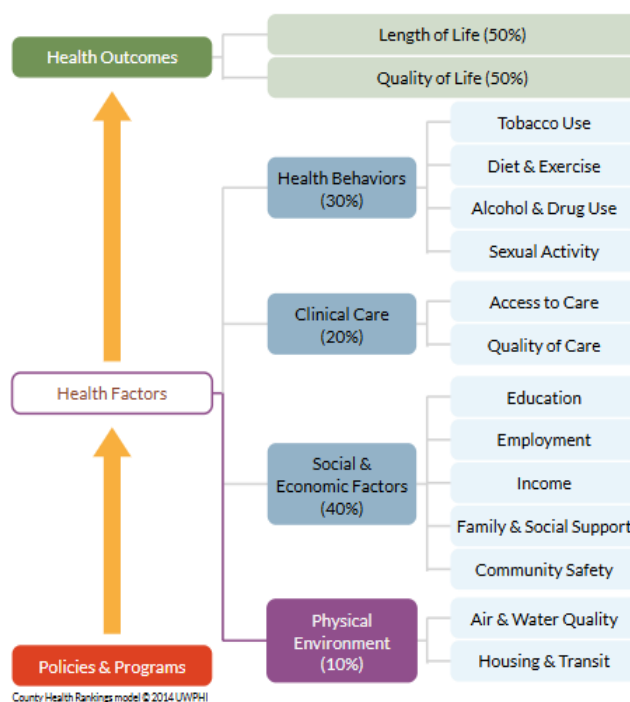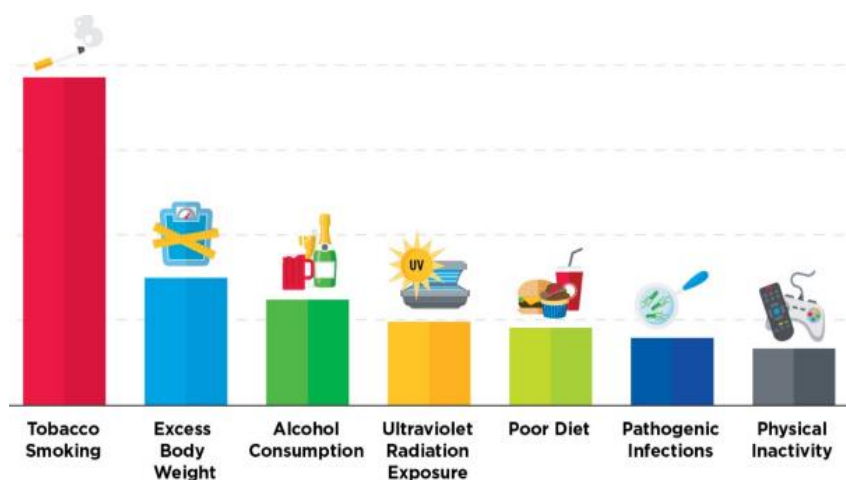


**Figure 3**. *Model of Health [25]*.



**Figure 4**. *Cancer Risks [26]*.

## 4. Results

The results of this study highlight significant disparities in cancer incidence and mortality among African Americans in Louisiana. By analyzing various graphs and visualizations, the findings reveal the impact of geographic, socioeconomic, and behavioral factors on cancer outcomes. The data show a rise in cancer death rates over time, with African Americans disproportionately affected. Key observations include differences in cancer rates between urban and rural areas, gender-based disparities, and the prevalence of specific cancer types. Below is an explanation of each graph in detail.

Figure 5 shows the five parishes in Louisiana with the highest cancer death rates among African Americans. These parishes face significant challenges that contribute to these elevated rates. Socioeconomic factors play a major role. These factors limit access to quality healthcare and preventive services. Residents in these areas may not have insurance or face financial barriers that prevent them from seeking timely care. Environmental risks in these parishes may further increase cancer rates. Behavioral factors also con-

tribute to the high death rates. Smoking, obesity, and physical inactivity are more common, especially in communities with fewer resources. These behaviors are linked to higher cancer risks.

Figure 6 shows cancer death rates among African American women in Louisiana. The data reveals that African American women face a high risk of dying from cancer. Breast cancer is a major contributor. These cancers often have worse outcomes because they are harder to treat and are diagnosed at later stages. Limited access to timely cancer screenings is a key issue. Many African American women do not have regular access to mammograms or preventive healthcare services. This leads to late diagnoses when cancer is more advanced and treatment options are fewer. Socioeconomic challenges further limit access to care. Lifestyle factors also contribute to the high death rates. Obesity and physical inactivity are common in some communities, which increases the risk of breast and other cancers.

Figure 7 presents the cancer death rates among African American men in Louisiana. Prostate cancer is the most significant contributor to these deaths, followed by lung and colorectal cancers. African American men face a higher risk of developing and dying from these cancers compared to other groups. Late diagnosis is a major factor. Many African American men do not receive regular screenings, such as prostate-specific antigen (PSA) tests, which can detect prostate cancer early. The lack of routine health checkups and preventive care leads to advanced-stage diagnoses when treatment is less effective. Socioeconomic challenges play a significant role. High poverty levels and limited access to healthcare facilities prevent many men from seeking timely medical care. Cultural and social factors, such as mistrust of the healthcare system, may also contribute to low screening rates.
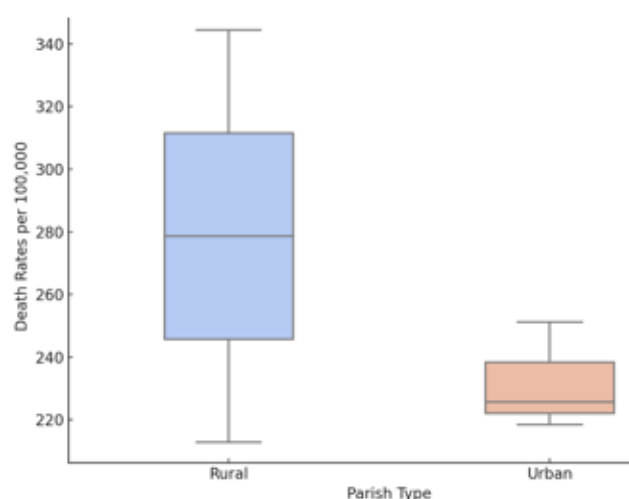


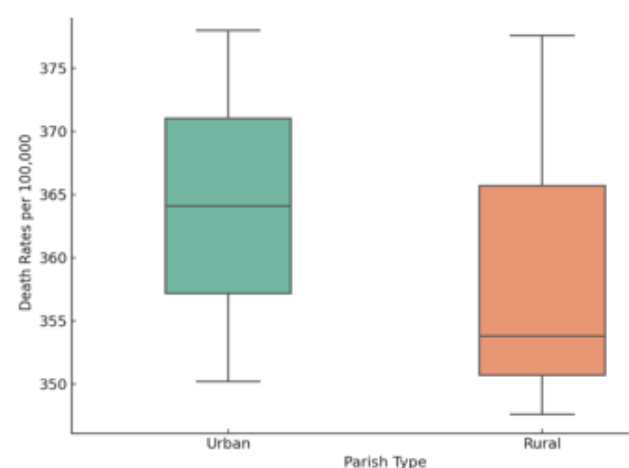**Figure 6.** *Death Rate of Black Females.*



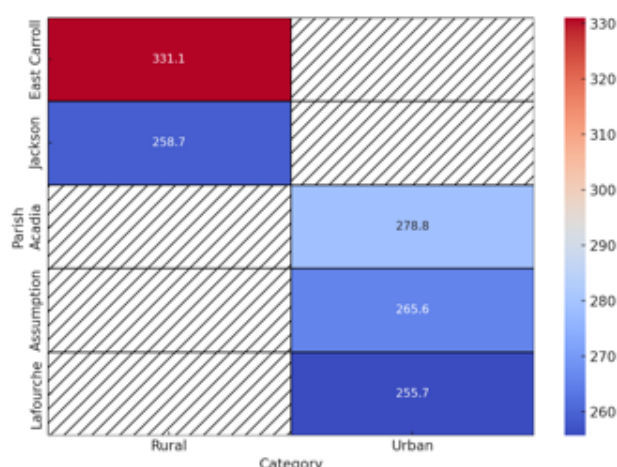**Figure 7.** *Death Rate of Black Males.*



**Figure 5.** *Death Rate of Top 5 Parishes.*

Behavioral risks like smoking and physical inactivity further increase the likelihood of lung and colorectal cancers. Smoking is a strong risk factor for lung cancer, while poor diet and inactivity contribute to colorectal cancer. Figure 8 identifies the top five parishes (Acadia, East Carroll, Avoyelles, Union and Red River) in Louisiana where African American men have the highest cancer death rates. These parishes face a combination of social, economic, and healthcare challenges that contribute to these outcomes. Prostate and lung cancers are the leading causes of death in these regions. Limited access to healthcare services is a significant issue. Many men in these areas do not have access to regular cancer screenings, early detection programs, or advanced treatments. This lack of access leads to late diagnoses when cancer is more advanced and harder to treat. Socioeconomic barriers, such as poverty, unemployment, and low education levels, worsen the situation. These factors limit the ability of individuals to afford healthcare or travel to medical facilities. Many residents in these areas are uninsured, which prevents them from seeking

timely medical care. Environmental risks also contribute to the high death rates. Parishes near industrial zones or with poor air quality may expose residents to carcinogens that increase cancer risk over time. In addition, lifestyle factors like smoking, which is more common in low-income areas, further elevate the risk of lung cancer.

Figure 9 shows the top five parishes in Louisiana where African American women have the highest cancer death rates. These regions face similar challenges as those affecting men, including limited healthcare access, socioeconomic barriers,

and environmental risks. Breast cancer, particularly aggressive forms, is the most common cause of death among women in these areas. The lack of preventive healthcare services, such as mammograms, is a major issue. Many women in these parishes do not have regular access to cancer screenings, leading to late diagnoses. This delay significantly reduces the chances of successful treatment and increases mortality. Socioeconomic factors also play a major role. Women in these areas may not have health insurance or the financial resources to seek care.
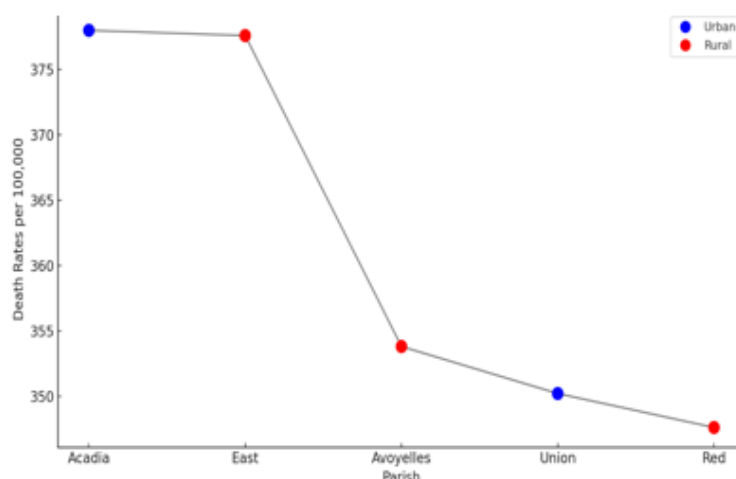


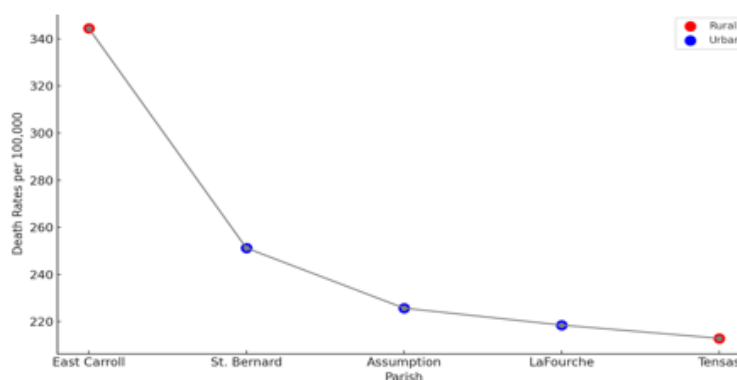***Figure 8.*** *Top 5 Parishes with Highest Death Rate of Black Males.*



***Figure 9.*** *Top 5 Parishes with Highest Death Rate of Black Females.*

These challenges are compounded by transportation barriers, making it harder to access healthcare facilities. Environmental exposures in some of these parishes may increase cancer risk. Poor air and water quality or proximity to industrial zones may expose residents to harmful pollutants. In addition, high rates of obesity and physical inactivity in these communities increase the risk of developing aggressive breast and other cancers.

Figure 10 illustrates the percentage distribution of different cancer types among African American men in Louisiana. Prostate cancer is the most prevalent, accounting for a sig-

nificant portion of cases. The dominance of prostate cancer among African American men highlights an urgent need for targeted awareness and screening programs. Prostate cancer often has high survival rates when detected early, but many men in this group face barriers to timely diagnosis. These barriers include a lack of routine screenings, limited healthcare access, and low awareness about the importance of early detection. Lung and bronchus cancer is another notable contributor, largely linked to smoking and environmental exposures. High smoking rates, combined with potential exposure to industrial pollutants, increase the risk.

Figure 11 shows the distribution of cancer types among African American women in Louisiana. Breast cancer accounts for the largest proportion of cases, followed by cancer in digestive system. The high prevalence of breast cancer, particularly aggressive types like triple-negative breast cancer, points to significant gaps in prevention and early detection. Breast cancer outcomes are heavily influenced by access to regular screenings, such as mammograms. Delayed diagnoses often result in more advanced cancer stages at the time of treatment, reducing survival rates.
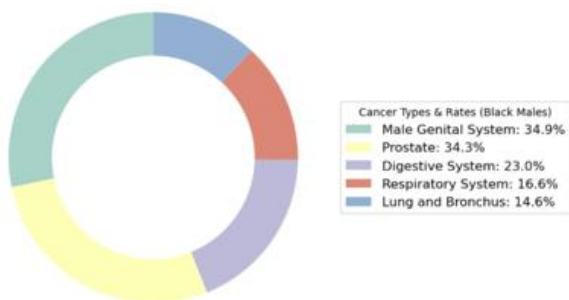


*Figure 12. Rising Cancer Sites of Black Males.*



*Figure 10. Percentage Distribution of Cancer Sites for the Black Males.*



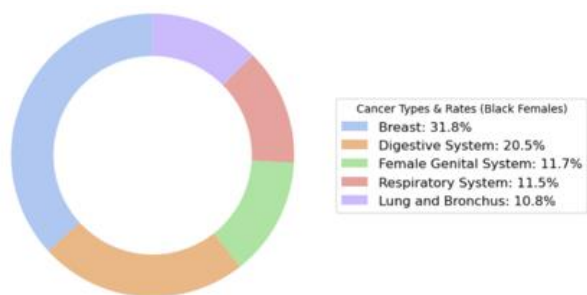*Figure 13. Rising Cancer Sites of Black Females.*



*Figure 11. Percentage Distribution of Cancer Sites for the Black Females.*

Figure 12 highlights the types of cancers that are increasing among African American men in Louisiana. Thyroid cancer shows the most significant rise, followed by prostate cancer. This trend reflects persistent challenges in preventive care and early detection for these cancers within the community. Many African American men are not regularly screened due to a lack of access to healthcare, low awareness of prostate cancer risks, and financial barriers. Early detection of prostate cancer can significantly improve survival rates, making screening programs crucial.

Figure 13 illustrates the types of cancers with increasing cases among African American women in Louisiana. Liver cancer has the sharpest rise, followed by uterus cancer. Liver cancer, may be linked to higher rates of obesity, hepatitis infections, and alcohol use. These risk factors should be addressed through comprehensive public health strategies.
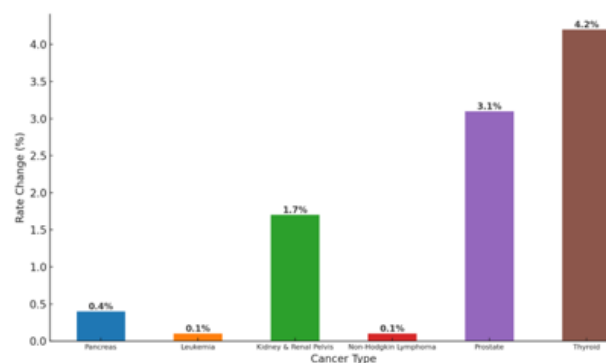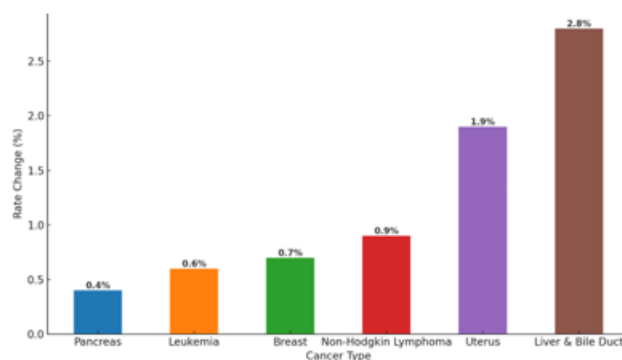
Figure 14 examines health factors in the parishes with the highest cancer death rates among African American women. The data reveals high levels of obesity, physical inactivity, and smoking in these regions. These behaviors are known to significantly increase the risk of various cancers. Obesity is particularly concerning, as it is associated with higher rates of aggressive cancers. Physical inactivity further compounds this issue, as regular exercise is known to reduce cancer risks. Smoking, a leading risk factor for lung cancer, also contributes to poorer health outcomes in these areas. Figure 15 analyzes the health factors in the parishes with the highest cancer death rates among African American men. Similar to the findings for women, these regions show high rates of smoking, obesity, and physical inactivity. These behaviors are strongly linked to the development of prostate and lung cancers, which are prevalent among African American men. Figure 16 explores the combined health and socioeconomic factors affecting parishes with the highest cancer death rates for both African American men and women. East Carroll Parish exhibits the lowest percentage of high school completion and limited access to exercise opportunities, indicating a greater need for educational and recreational resources. Lafourche and Union Parishes, in contrast, shows higher levels of high school completion and the best access to exercise opportunities. Mammography screening rates are highest in Acadia. Rates of uninsured and unemployed individuals remain relatively consistent and low across parishes. These findings

highlight specific regional disparities and suggest targeted interventions may be needed, particularly in parishes like East Carroll and Tensas, to improve overall health and socioeconomic conditions.

Figure 17 presents a regression analysis examining the relationships between key behavioral risk factors and cancer death rates. The analysis shows strong positive correlations between smoking, obesity, and physical inactivity with cancer mortality. These behaviors are major contributors to poor health outcomes and significantly increase the risk of developing and dying from cancer. Smoking has a moderate positive association with cancer death rates. This means that higher smoking levels are linked to increased cancer deaths, particularly for lung and other smoking-related cancers. Reducing smoking rates through public health programs could help decrease these deaths. Obesity also shows a clear positive correlation with cancer mortality. Excess body weight is

linked to several cancer types, including breast, colorectal, and liver cancers. Physical inactivity further compounds this issue, as regular exercise helps lower cancer risks by improving overall health and reducing obesity. Interestingly, the analysis highlights the protective role of preventive healthcare measures, such as mammograms and vaccinations. These interventions show a negative correlation with cancer death rates, indicating that increased access to and participation in preventive care can significantly reduce mortality.

Figure 18 provides a correlation matrix that examines the relationships between health behaviors, socioeconomic factors, and cancer death rates. The analysis reveals significant interconnections, showing how these factors collectively contribute to the high cancer mortality rates in African American communities in Louisiana. Smoking, obesity, and physical inactivity are positively correlated with cancer death rates.
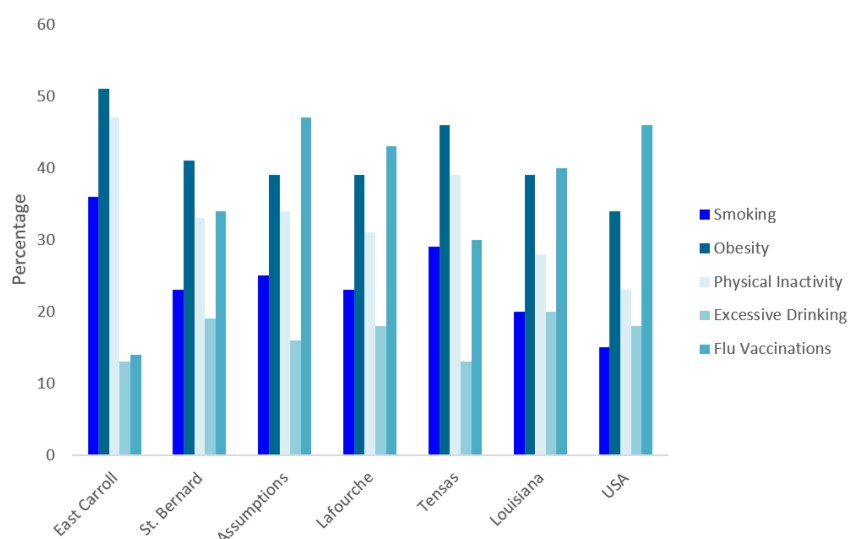


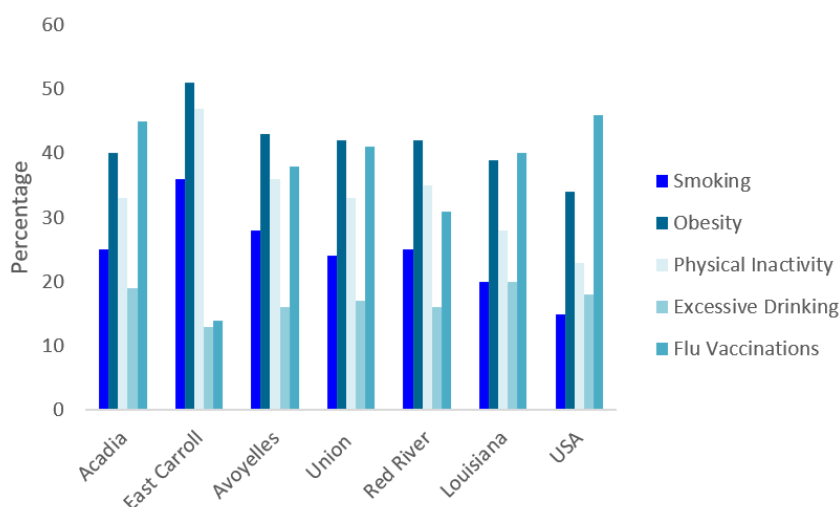*Figure 14. Health Factors of Parishes with Highest Death Rates of Black Females.*



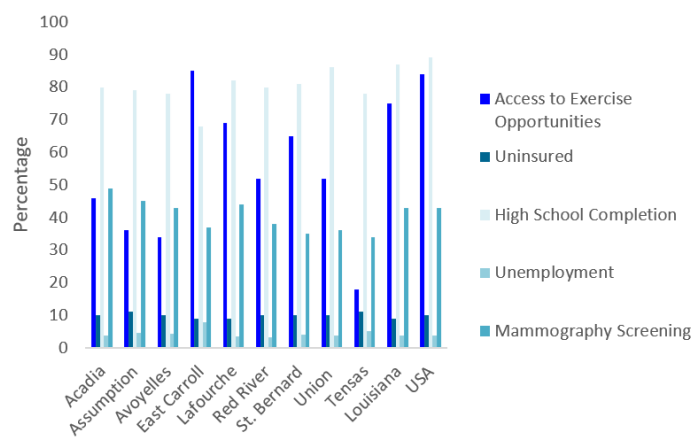*Figure 15. Health Factors of Parishes with Highest Death Rates of Black Males.*

***Figure 16.*** *Health and Social Economic Factors of Parishes with Highest Death Rates of Black Males and Females.*
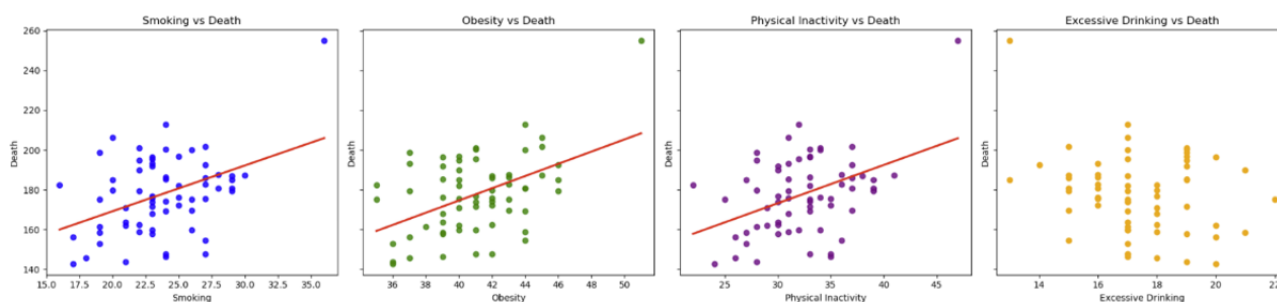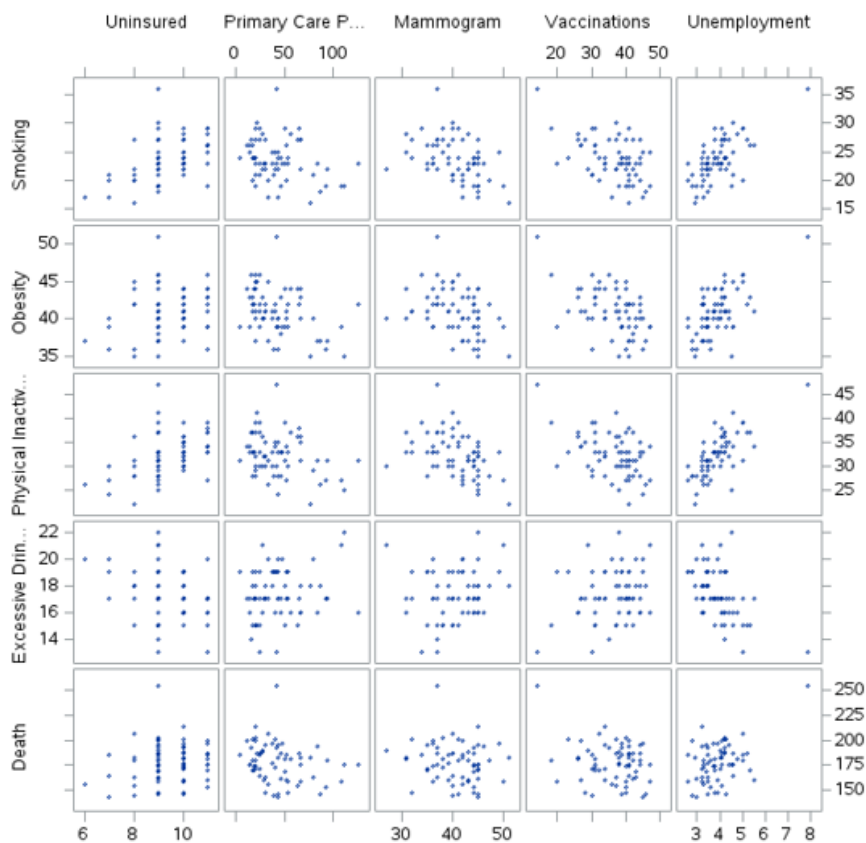


***Figure 17.*** *Regression Analysis.*



***Figure 18.*** *Correlation Analysis.*

## 5. Discussion

The findings of this study highlight persistent disparities in cancer mortality among African Americans in Louisiana compared to national trends. While cancer mortality rates have been declining both nationally and in Louisiana, Louisiana continues to report higher cancer mortality rates than the national average. The decline in mortality can be attributed to advancements in early detection, improved treatment options, and public health initiatives, yet the slower progress in Louisiana suggests underlying healthcare access barriers, socioeconomic challenges, and environmental risk factors that disproportionately affect African American communities. At the national level, cancer mortality rates have steadily decreased over the past decade, largely due to increased awareness, widespread cancer screenings, and improved medical treatments. This trend is also observed in Louisiana; however, Louisiana's cancer mortality rates remain significantly higher than the national average. Factors contributing to this disparity include delayed diagnoses, limited access to specialized cancer care, and higher prevalence of behavioral risk factors such as smoking and obesity.

Despite national improvements in breast and prostate cancer survival rates due to early detection and targeted treatments, Louisiana continues to experience higher mortality rates in these cancers, particularly among African Americans (Figures 1 and 2). Limited access to affordable screenings, such as mammograms and PSA tests, results in late-stage diagnoses, reducing survival rates. Similarly, lung and colorectal cancer mortality remains disproportionately high in Louisiana, despite nationwide progress in reducing deaths through preventive screenings and smoking cessation programs.

This study utilizes data from reputable sources, including State Cancer Profiles, County Health Rankings, and reports from the National Cancer Institute (NCI) and CDC. While these datasets provide valuable insights into cancer mortality trends, certain limitations must be acknowledged in this study. The accuracy of cancer incidence and mortality rates may be affected by potential biases in data collection. While this study compares Louisiana's trends with national patterns, regional variations within Louisiana, such as differences between urban and rural areas, are not fully captured. Another limitation is the ecological nature of this study, which focuses on population-level trends rather than individual risk factors, such as genetics, lifestyle behaviors, or healthcare access at the individual level. Despite these limitations, the findings provide a crucial understanding of cancer disparities in Louisiana and highlight the need for further research incorporating more localized and individual-level data to refine these observations.

## 6. Policy Recommendations for Reducing Cancer Disparities

To address the significant cancer disparities among African Americans in Louisiana, a comprehensive set of public policies is needed. These policies should focus on expanding access to preventive healthcare, promoting healthy lifestyles, addressing socioeconomic and environmental barriers, and improving healthcare infrastructure. Implementing these measures can significantly reduce cancer mortality and improve overall health equity. Expanding access to preventive healthcare services is essential. This can be achieved by increasing the availability of cancer screenings such as mammograms, prostate-specific antigen (PSA) tests, colonoscopies, and HPV vaccinations in underserved areas. Mobile health clinics should be established to provide free or low-cost screenings, particularly in rural and high-risk parishes where healthcare infrastructure is limited. Statewide awareness campaigns should educate the public on the importance of early detection and regular screenings, with targeted efforts to reach African American communities. Promoting healthy lifestyle interventions is another critical component. Community-based programs should be launched to encourage smoking cessation, with free counseling and nicotine replacement therapies. Investments in public exercise facilities and organized fitness initiatives can combat physical inactivity, while increasing access to affordable healthy foods through farmer's markets and nutrition education programs will address obesity-related cancer risks. These interventions must prioritize accessibility in economically disadvantaged areas.

Socioeconomic barriers must also be addressed to improve healthcare access. Expanding Medicaid coverage and other affordable health insurance options will ensure that low-income individuals can obtain necessary medical care. Transportation assistance programs can help residents in rural areas reach healthcare facilities for screenings and treatments. Job training and employment initiatives are needed to reduce poverty and unemployment, which are closely linked to poor health outcomes and limited healthcare access. Improving healthcare infrastructure is vital for reducing delays in diagnosis and treatment. Incentives such as loan forgiveness or tax benefits should be offered to attract healthcare providers and specialists to underserved regions. Local hospitals and clinics must be equipped with advanced diagnostic tools and cancer treatment technologies. Partnerships between public health organizations and private healthcare providers can further enhance the availability and quality of cancer care services. Environmental risks, a significant factor in high cancer rates, must be mitigated through stricter regulations on industrial emissions and pollutants in affected areas. Environmental assessments should be conducted in high-risk parishes, with cleanup and mitigation efforts implemented as needed. Public education campaigns

can inform residents about environmental health risks and provide practical solutions to reduce exposure.

Community engagement is critical to the success of these policies. Culturally tailored educational programs should raise awareness about cancer risks and encourage participation in preventive measures. Collaboration with community leaders, churches, and local organizations can build trust and promote health education. Efforts to address mistrust in the healthcare system should focus on improving patient-provider communication and ensuring diverse representation in healthcare teams. Increasing investment in cancer research is also essential. Funding should be allocated for studies exploring genetic, behavioral, and environmental factors contributing to higher cancer risks in African Americans. Research on tailored interventions, such as personalized screening schedules and culturally adapted health programs, will provide evidence-based strategies to reduce disparities. Schools and workplaces should also play a role by integrating cancer awareness and healthy lifestyle education into curricula and wellness programs. Implementing these policies, public health authorities can address the multifaceted factors driving cancer disparities in Louisiana. These measures will not only reduce cancer mortality but also promote overall health equity and improve the quality of life.

# 7. Conclusion

This study found that African Americans in Louisiana have higher cancer rates and death rates compared to other groups. The data showed that people living in rural areas face more challenges, including fewer hospitals, fewer doctors, and less access to cancer screenings. In cities, while hospitals are more available, pollution and other environmental risks may contribute to cancer rates. Many of the cancers are diagnosed too late, making treatment less effective. One of the main reasons for this is low access to healthcare, as many people do not have health insurance, money for treatment, or access to doctors and hospitals. Our research also showed that lifestyle factors like smoking, obesity, and lack of exercise play a big role in increasing cancer risks. The data showed that getting regular check-ups, cancer screenings, and vaccinations can help lower cancer death rates. Environmental risks are another big concern. Some of the areas with the highest cancer rates are near industrial zones with high pollution, which may increase cancer risks over time. This means that better environmental protections and stricter pollution laws may help reduce cancer cases.

# Abbreviations

| | |
|---|---|
| NCI | National Cancer Institute |
| CDC | The Centers for Disease Control and Prevention |
| PSA | Prostate-specific Antigen |
| HPV | Human Papillomavirus |

# Author Contributions

**Prasanthi Sreekumari:** Conceptualization, Data curation, Funding acquisition, Investigation, Methodology, Project administration, Resources, Software, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing

**Abhishek Amgain:** Conceptualization, Data curation, Formal Analysis, Investigation, Methodology, Resources, Software, Validation, Visualization, Writing – review & editing

# Conflicts of Interest

The authors declare no conflicts of interest.

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