The following analysis presents an overview of cancer rates in different regions of the United States. The data includes average cancer incidence and death rates, providing insights into regional variations and trends. Understanding the patterns of cancer rates can help inform public health strategies and interventions aimed at addressing this significant health concern.

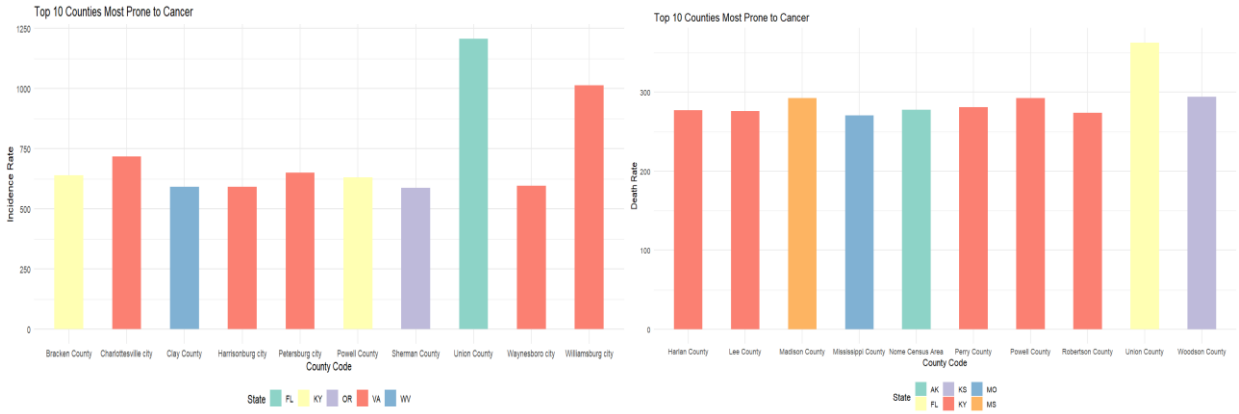
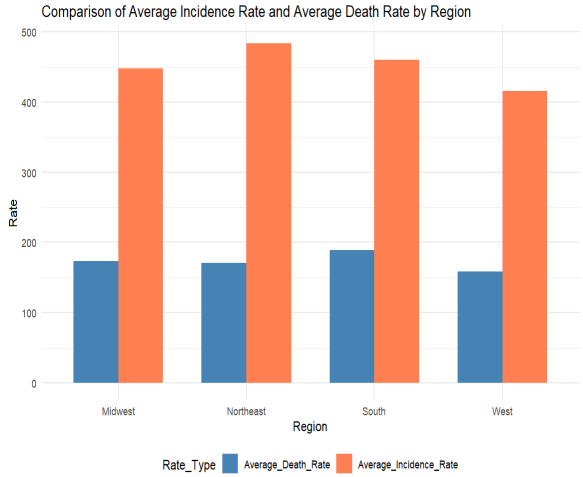


Figure 1,2: Top 10 Counties Most Prone to Cancer based on Death Rate and Incidence Rate

The data reveals that the top 10 counties with the highest incidence and death rates due to cancer are a cause for concern. Union County in Florida has the highest incidence and death rates, and both Union County and Powell County are among the top 10 counties for both measures. Virginia has 5 counties in the top 10 for cancer incidence rate, which warrants attention, and Kentucky has 5 counties in the top 10 for cancer death rate, which is particularly alarming.



The given data provides information on the average incidence rate and average death rate for different regions (Midwest, Northeast, South, and West). The Midwest region has the lowest average incidence rate , while the Northeast region has the highest average incidence rate. The West region has the lowest average death rate, while the South region has the highest average death rate. These findings highlight regional differences in the incidence and death rates, which could have implications for public health efforts, resource allocation, and targeted interventions.

Figure 3:Comparision of Average Incidence Rate and Death Rate by Region

However, it's important to acknowledge the limitations of the data and further research may be needed to explore potential risk factors or protective factors associated with the observed differences.

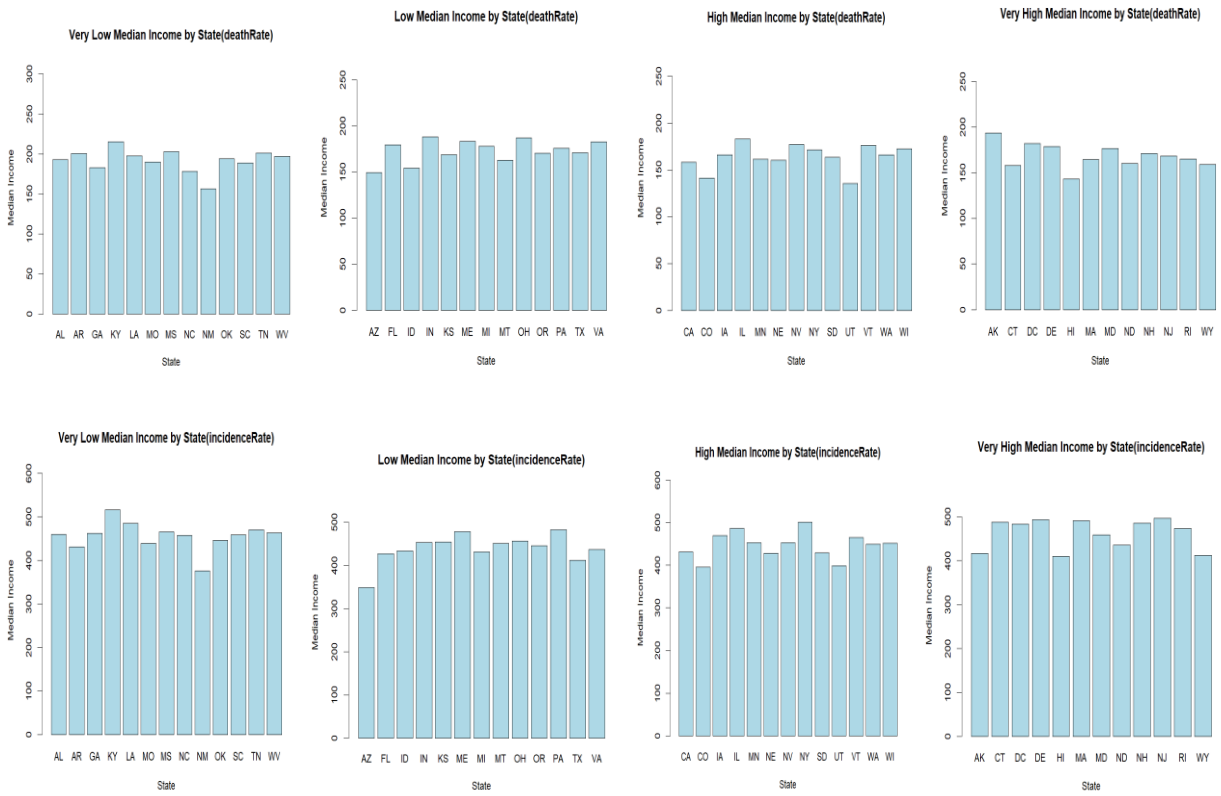
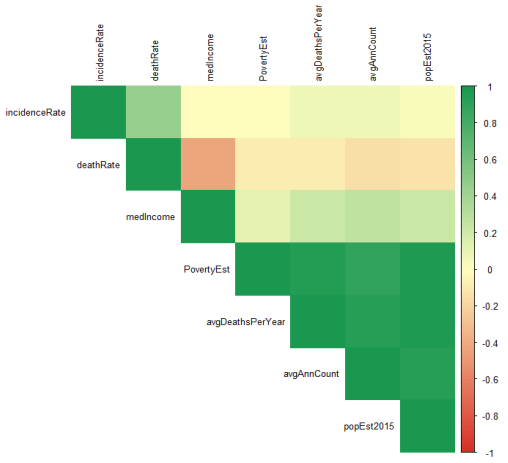


Figure 4: Comparison of the Incidence Rate and Death Rate based on 4 Levels of Median Income

The data suggests that states with lower median incomes tend to have higher incidence and death rates of cancer, which may be attributed to limited access to quality medical facilities and insufficient funds for proper healthcare. Interestingly, the incidence rates for the low, middle, and high income groups appear to be similar, with no significant differences. Surprisingly, the death rate for the high income group is the lowest among the four income groups. This finding is contrary to the expectation that the very high income group would have the lowest rates, as their rates are similar to those of the low and middle income groups.

Figure 5 : Heatmap of Correlation



The data suggests that the death rate from cancer tends to increase as the incidence rate of cancer increases, although not perfectly. Additionally, higher median income may be associated with slightly lower cancer incidence rates. Poverty estimate, on the other hand, has a weak positive correlation with cancer incidence rates, suggesting that higher poverty rates may be associated with higher cancer rates. Furthermore, higher average deaths per year and average annual cancer cases tend to be associated with higher poverty rates, indicating a strong positive correlation. In summary, the data indicates that cancer incidence, death rate, and related factors such as median income and poverty estimate are interconnected, with various correlations observed among them.

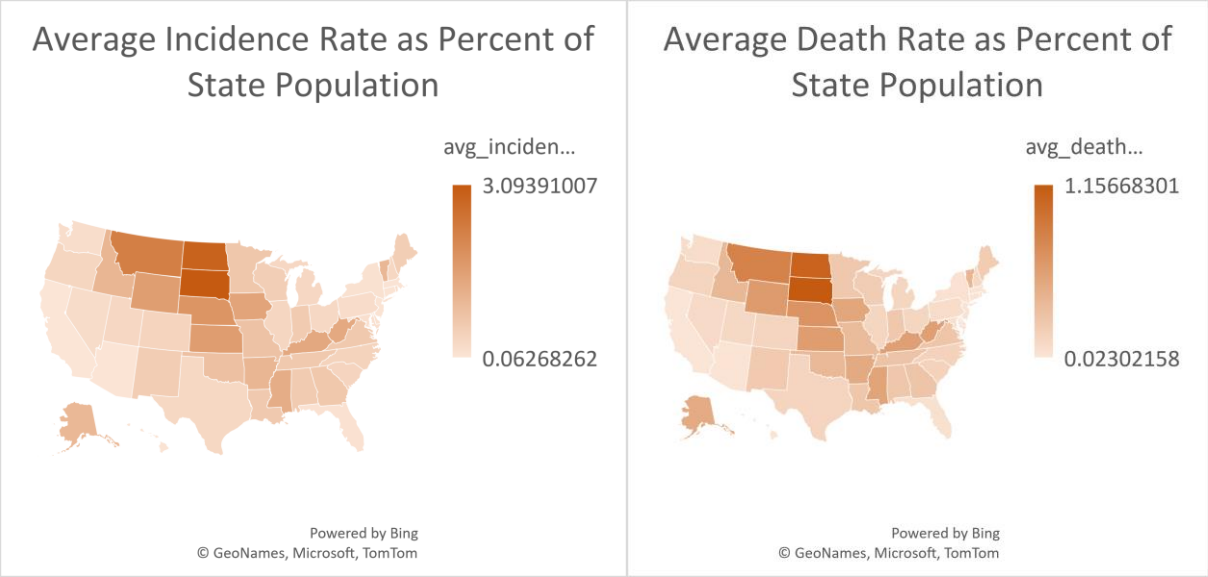


Figure 6 : Average Incidence Rate and Death Rate as Percent of State Population

States such as North Dakota, South Dakota, and Montana have alarmingly high cancer incidence and death rates per state population, indicating a need for urgent attention and preventive measures. Similarly, states like Wyoming, Nebraska, Kansas, Iowa, Mississippi, Kentucky, and West Virginia also exhibit high cancer rates, highlighting the importance of implementing measures to prevent further harm. On the positive side, there are states with lower cancer death and incidence rates, which is encouraging.

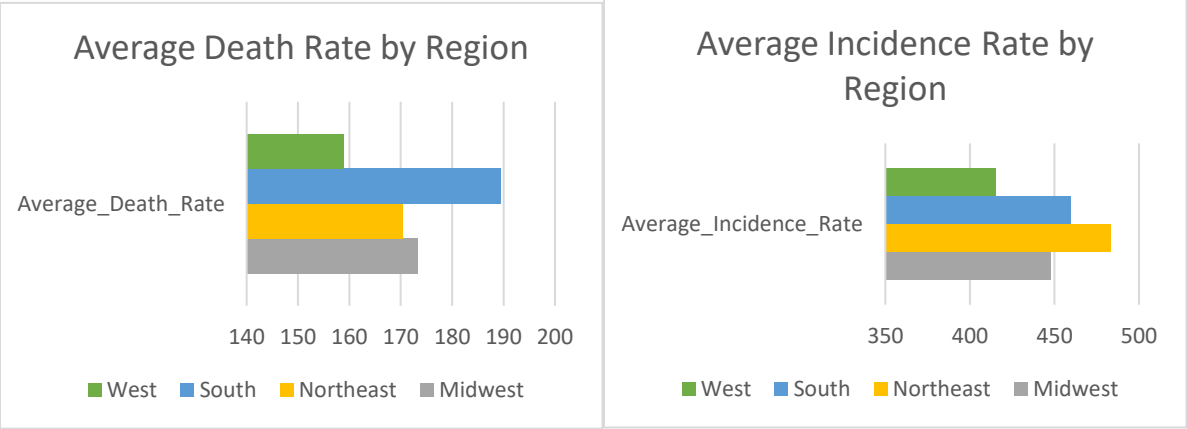


Figure 7: Average Death and Incidence Rate by Regions.

The data provided represents the average cancer incidence and death rates by region in the United States.

The Midwest region has an average cancer incidence rate of 447.6289 and an average death rate of 173.2646. The Northeast region has a slightly higher average cancer incidence rate of 483.4178, but a similar average death rate of 170.4144.

The South region has a higher average cancer incidence rate of 459.7986 and a higher average death rate of 189.4270. Meanwhile, the West region has a lower average cancer incidence rate of 415.2173 and a lower average death rate of 159.0033.

In summary, the data suggests that the Midwest and Northeast regions have similar cancer incidence and death rates, while the South region has higher rates compared to the West region. Further analysis and understanding of the factors contributing to these regional differences in cancer rates may be necessary for appropriate public health interventions and prevention strategies.

Table #1: Regression Results for Incidence Rate for Cancer

	A	B	C	D
incidenceRate	176.404***	-399.462***	53.499	-234.978***
povertyEst	0.0000088	-0.00007263	-	-
popEst2015	-0.000016	-0.00001814	-	-0.0000048
medIncome,	0.000631***	-	-	-
Log(avgDeathsPerYear)	-	-	6.707	-
Log(avgAnnCount)	11.2805***	-	12.317***	-
deathRate	1.0276***	1.1087***	1.0265***	1.0546***
Log(medIncome)	-	54.887***	19.968.	43.1399***
Log(povertyEst)	-	-	-10.659	4.4212***
RegionNortheast	-	-	30.829***	28.4229***
RegionSouth	-	-	-1.298	-10.5673***
RegionWest	-	-	-5.449.	-15.1182***
Log(popEst2015)	-	-	-0.724	-
R Squared	0.3082	0.2546	0.3412	0.3018
Adjusted R-squared	0.3071	0.2536	0.3392	0.3002
No. of Observations	3072			

*, **, *** indicate significance at the 90%, 95%, and 99% level, respectively.

In summary, the linear regression model indicates that poverty, region, median income, and death rate are significant predictors of cancer incidence rate. Higher poverty rates, being in the Northeast region, lower median incomes, and higher death rates are associated with higher cancer incidence rates. The model explains about 30% of the variance in cancer incidence rate. Interventions addressing these factors may help reduce cancer incidence and improve cancer outcomes.

Table #2: Regression Results for Death Rate for Cancer

	A	B	C	D
deathRate	125.1946***	119.5093***	-135.1184**	87.6716**
povertyEst	-0.00009485 **	-0.00007657*	-	-
popEst2015	0.00001321*	-0.0000108*	-	-
medIncome	-0.001021***	-0.0008584***	-	-0.00061399 (0.00006647)
incidenceRate	0.2267***	0.2166***	-	-
RegionNortheast	-	-4.7955**	-5.2236**	-4.9112**
RegionSouth	-	8.8965***	6.0782***	7.5998***
RegionWest	-	-8.6997***	-10.9598***	-9.0160***
Log(PovertyEst)	-	-	16.4688***	-
Log(popEst2015)	-	-	-17.3873***	-
Log(incidenceRate)	-	-	94.8973***	94.5010***
Log(medIncome)	-	-	-20.9919	-45.4800***
Log(povertyEst*popEst2015)				0.0444
R-Squared	0.3879	0.437	0.454	0.4473
Adjusted R-Squared	0.3871	0.4357	0.4528	0.4462
No. of Observations	3072			

*, **, *** indicate significance at the 90%, 95%, and 99% level, respectively.

In summary, the linear regression model indicates that poverty, region, median income, and incidence rate are significant predictors of death rate from cancer. Higher poverty rates, being in the South or West regions, lower median incomes, and higher incidence rates are associated with higher death rates from

cancer. The model explains about 45% of the variance in death rate. Interventions addressing these factors may help reduce cancer-related mortality rates.

	GVIF	Df	GVIF^(1/(2*Df))
PovertyEst	21.305826	1	4.615823
popEst2015	22.381949	1	4.730956
medIncome	1.709239	1	1.307379
Region	1.277584	3	1.170415
deathRate	1.369872	1	1.041673

Table 3: Measure of the Amount of Multicollinearity in Regression Analysis

Based on the table, variables "PovertyEst" and "popEst2015" have relatively high VIF values (above 10), indicating a potential issue with multicollinearity. Variables "medIncome", "incidenceRate", and "Region" have lower VIF values (below 10), suggesting lower levels of multicollinearity. Further analysis and interpretation would be needed to fully assess the impact of multicollinearity on the regression analysis results.

The analysis of variance (ANOVA) results indicates that the state, region and deathrate variable is a significant predictor of the incidenceRate variable. In short, the state, region and deathrate variable are a highly significant predictor of the incidence variable, with a p-value < 0.0000000000000002 and 50 degrees of freedom.

Recommendation:

- Increase funding allocation: Advocate for increased funding towards cancer prevention efforts in regions and states with low funds by engaging with policymakers, healthcare organizations, and advocacy groups.
- Target high-risk populations: Prioritize cancer prevention interventions for high-risk populations within regions and states with limited funds, such as those with higher prevalence of risk factors like smoking, poor diet, lack of physical activity, or limited access to healthcare services.
- Promote awareness and education: Conduct cancer awareness and education campaigns through community-based initiatives, educational programs in schools, and media campaigns to raise awareness about the importance of cancer prevention, early detection, and healthy lifestyle choices.
- Collaborate with local stakeholders: Collaborate with local stakeholders, including community organizations, healthcare providers, and public health agencies, to develop and implement cost-effective cancer prevention interventions that are tailored to the needs and resources of the region or state.
- Implement policy changes: Advocate for and support policy changes at the regional or state level that promote cancer prevention efforts, such as regulations on tobacco control, healthy food options in schools and workplaces, and access to cancer screenings and vaccinations. Implement monitoring and evaluation mechanisms to assess the effectiveness of cancer prevention interventions and seek external funding opportunities to supplement limited funds.