Relationship between Rurality and Cancer Mortality among North Carolina Counties

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Introduction

- Cancer is a leading cause of death in the United States.
- In 2022, an estimated 22,000 adults died from cancer in North Carolina.
- Additionally, in 2022, an estimated 70,000 adults had cancer in North Carolina.
- Research shows that rural compared to urban areas, have higher cancer mortality rates.
- Rural areas may have higher cancer mortality rates due to lower socioeconomic status, lower access to health care, and less health care providers.
- While cancer mortality rates have been decreasing overall, there are reported increases in rural areas. Therefore, it is important to investigate cancer disparities by rurality.
- However, research on county-level variation is sparse in North Carolina.

Objectives

To determine the county-level association between rurality and cancer mortality rates in North Carolina from 2018 to 2022.

Methods

Data Source:
- National Cancer Institute, 2018-2022
- Rural-Urban Continuum Codes, 2020
- County Health Rankings, 2020

Study Design:
- Ecological study
- N = 100 counties

Exposure Assessment:
- Rurality: Rural vs. urban
- Rural N = 55 counties
- Urban N = 45 counties

Outcome Assessment:
- Age-adjusted cancer mortality rate

Confounders:
- Primary care physicians' rates
- Preventable hospitalization rate
- Median household income

Statistical Analysis, R 4.2.1:
- Adjusted linear regression

References

Centers for Disease Control and Prevention. (2024, May 2). *Leading causes of death*. Centers for Disease Control and Prevention.

National Cancer Institute. (2024, May 9). *Cancer statistics.* U.S. Department of Health and Human Services, National Institute of Health.

NC Department of Health and Human Services. (2024, August 9). *SCHS: Cancer projections*. NC Department of Health and Human Services.

Results

Figure 1: Cancer Mortality Rates Among North Carolina Counties

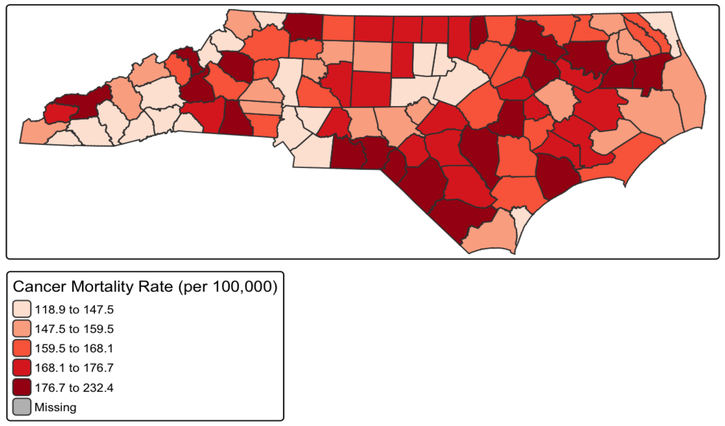

Figure 2: Rural and Urban Counties in North Carolina

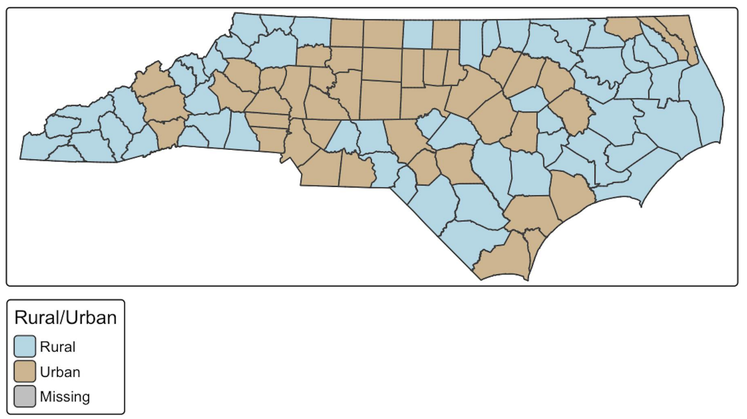

Table 1: Adjusted Linear Regression Model of Cancer Mortality Rate

Predictors	Beta Estimates	Confidence Intervals	P-value
(Intercept)	186.20	163.08 – 209.33	<0.001
Rural vs. Urban	2.84	-4.24 – 9.93	0.428
Primary Care Physicians Rate	-0.12	-0.22 – -0.01	0.030
Preventable Hospitalization Rate	0.01	0.00 – 0.01	<0.001
Median Household Income	-0.00	-0.00 – -0.00	<0.001

Referent: Rural area
R2/Adjusted R2: 0.519 /0.49

- Rural counties had significantly **higher age-adjusted cancer mortality rates compared to urban counties (167.6 vs. 158.1 per 100,000; p = 0.0088).**
- After adjusting for key confounders, the multivariable linear regression model showed no statistically significant difference between rural and urban counties in cancer mortality rate (p = 0.428).
- Other **county-level confounders, such as lower median household income and lower primary care physician rates, were associated with higher county-level cancer mortality rates.**

Conclusions

- Overall, **rural counties had higher cancer mortality rates compared to urban counties.**
- Adjusted models revealed socioeconomic status and physician rate are associated with county-level cancer mortality rates.
- Targeted interventions in rural counties that address structural factors, such as healthcare access, may reduce the burden of cancer mortality.