2023 NPCR TENNESSEE SUCCESS STORY

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Training the Next Generation of Public Health Professionals to Analyze Cancer Health Disparities of Significance

National Program of Cancer Registries

SUCCESS STORY

SUMMARY

The Tennessee Cancer Registry (TCR) is a population-based central cancer registry serving the needs of Tennesseans since it was established by the Cancer Reporting System Act of 1983 passed by the Tennessee Assembly. The TCR's goal is to encourage cancer prevention and control; therefore, data collected by the TCR are used to identify cancer disparities in Tennessee. However, data use and analysis has been a challenge for TCR over the years due largely to lack of trained staff. For this reason, the TCR has collaborated with Tennessee-based universities and colleges to provide opportunities for students—particularly public health and biostatistics students—to obtain practical experience using TCR data. The study described below was performed by a master's-level biostatistics student attending Middle Tennessee State University while participating in an internship under the direction of the TCR Director.

Tennessee still experiences one of the highest cigarette smoking prevalences in the United States. The Northwest region of Tennessee displays statistically significant poorer survival outcomes after lung cancer diagnosis. US Cancer Statistics notes that from 2016 to 2020, Tennessee had the fifth highest age-adjusted lung cancer incidence rate in the United States. This study was undertaken to examine disparities in overall lung cancer survival that may inform opportunities for cancer prevention and control.

CHALLENGE

- Smoking prevalence continues to be high in Tennessee and, therefore, lung cancer rates in Tennessee are high.
- The TCR lacks enough trained staff who can analyze cancer data.
- The Tennessee Department of Health created a centralized internship program that allows staff to serve as intern preceptors.
- The TCR needs individuals trained in biostatistics to use collected cancer data.
- Tennessee experiences the fifth highest age-adjusted lung cancer incidence rate in the United States, according to the United States Cancer Statistics website, accessed at the following link: **https://gis.cdc.gov/Cancer/USCS/?CDC_AA_refVal=https%3A%2F%2Fwww.cdc.gov%2Fcancer%2Fdataviz%2Findex.htm#/AtAGlance/**

SOLUTION

- The TCR Director collaborated with the centralized internship program of the Tennessee Department of Health to host a suitably trained student to complete the proposed project.
- De-identified data were obtained from the TCR's main cancer database for the diagnosis period 2010–2016 to perform survival analysis.
- Data were processed using SAS statistical software using Kaplan-Meier and Cox Proportional Hazards methods with a study cutoff date of December 31, 2021.

RESULTS

- Kaplan-Meier analysis was initially used to evaluate the relationship of gender, race, cancer stage at diagnosis, age at diagnosis, and Tennessee Department of Health region (TDoHRegion) in univariate and bivariate analyses. TDoHRegion is the principal independent variable under investigation. Analyses revealed the Northwest TDoHRegion has the poorest survival that was statistically significant compared to the other TDoHRegions. This statistical significance persisted after adjusting for the other covariates individually in the model. The Northwest region of Tennessee is composed of counties with significant rurality, and residents may lack access to cancer treatment centers that are mostly centered in urban areas.
- Cox Proportional Hazards analysis was followed up allowing multivariate analysis. Results of the multivariate analysis are displayed in Table 1 below.
- The key result is the Northwest region of Tennessee displays statistically significant poorer survival outcomes after lung cancer diagnosis compared to all other regions individually, and this result is still significant after adjusting for other variables associated with overall lung cancer survival: gender, race, age at diagnosis, and stage at diagnosis.

Table 1. Cox Proportional Hazards Analysis

Variable	Hazard Ratio	Lower 95% CI	Upper 95% CI	p-value
East TDoHRegion (Northwest region referent group)	0.88	0.83	0.93	<0.0001
Mid-Cumberland TDoHRegion (Northwest region referent group)	0.87	0.82	0.92	<0.0001
Northeast TDoHRegion (Northwest region referent group)	0.93	0.87	0.99	0.01
South Central TDoHRegion (Northwest region referent group)	0.89	0.83	0.95	0.0003
Southeast TDoHRegion (Northwest region referent group)	0.88	0.83	0.93	<0.0001
Southwest TDoHRegion (Northwest region referent group)	0.87	0.82	0.92	<0.0001
Upper Cumberland TDoHRegion (Northwest region referent group)	0.92	0.86	0.98	0.01
Gender Female (Male referent group)	0.82	0.80	0.84	<0.0001
Race Black (White referent group)	1.05	1.01	1.09	0.01
Race Other (White referent group)	0.81	0.71	0.94	0.004
Age at Diagnosis (Continuous variable)	1.02	1.02	1.02	<0.0001
Stage at Diagnosis, Late (Early-stage referent group)	2.69	2.61	2.77	<0.0001

SUSTAINING SUCCESS

The TCR Director will continue to collaborate with the Tennessee Department of Health's internship program to recruit and train interns in the public health sciences. The TCR has hosted dozens of interns over the years; therefore, this success should be sustainable going forward.

REGISTRY CONTACT

https://www.tn.gov/health/health-program-areas/tcr.html

NATIONAL PROGRAM of CANCER REGISTRIES — NPCR — CANCER DATA DRIVING ACTION

U.S. Department of Health and Human Services
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