Geographic Analysis of Smoking Burden, Late-Stage Lung Cancer Diagnosis, and LDCT Screening Access

Ty-Runet Bryant, MPH., Michael D. Celestin, PhD, Bilikisu Elewonibi, PhD
LSU Health Sciences Center New Orleans, School of Public Health

LOUISIANA TOBACCO CONTROL INITIATIVE

LSU Health NEW ORLEANS School of Public Health

Background

- In 2024, Louisiana had one of the highest smoking rates (15%) in the nation, contributing to a substantial burden of lung cancer morbidity and mortality across the state. (BRFSS, 2024)
- Low-dose computed tomography (LDCT) screening can detect lung cancer at earlier stages and significantly reduce mortality among high-risk individuals.
- High-risk populations are adults aged 50-80 years with a 20+ pack year smoking history who currently smoke or quit within the last 15 years, particularly Black residents and those living in rural communities. (American Lung Association, 2025)
- Despite the effectiveness of LDCT screening, screening uptake remains low (LA 17%; U.S. 18.2%), particularly among high-risk populations and rural communities. (American Lung Association, 2025)
- Geographic disparities in smoking prevalence and healthcare access may contribute to delayed diagnosis and higher lung cancer mortality in certain regions of Louisiana.

Study Objective

- To identify geographic areas in Louisiana with high smoking prevalence and high late-stage lung cancer diagnosis overlaid with the distribution of LDCT lung cancer screening facilities in these areas.

Methods

Study Design

- We used a cross-sectional study design to examine parish-level patterns of smoking prevalence, late-stage lung cancer diagnosis, and LDCT screening facility locations in Louisiana.

Data Sources

Behavioral Risk Factor Surveillance System (BRFSS)	• 2022 Current adult smoking prevalence rates
US Cancer Statistics	• Late-stage Lung cancer incidence data. The most recently available incidence data was the 2017-2021 5-year average age-adjusted rates per 100,00 people.
American College of Radiology Lung Cancer Screening Registry	• Locations of LDCT lung cancer screening facilities

Measures

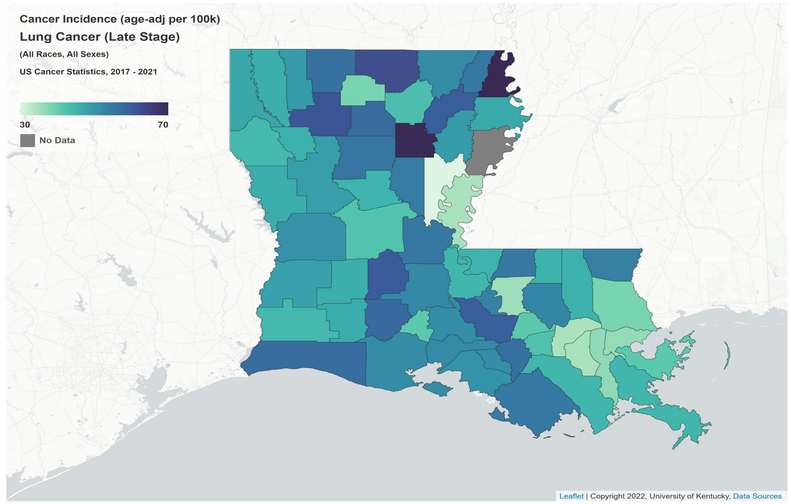
- Late-stage lung cancer incidence was defined as lung cancer diagnosed at the regional or distant stage based on National Cancer Institute Surveillance, Epidemiology, and End Results (SEER) Program summary staging criteria.
- Current adult smoking prevalence was defined as the percentage of adults who reported smoking at least 100 regular cigarettes in their lifetime and currently smoking cigarettes every day or some days.

Geospatial Analysis

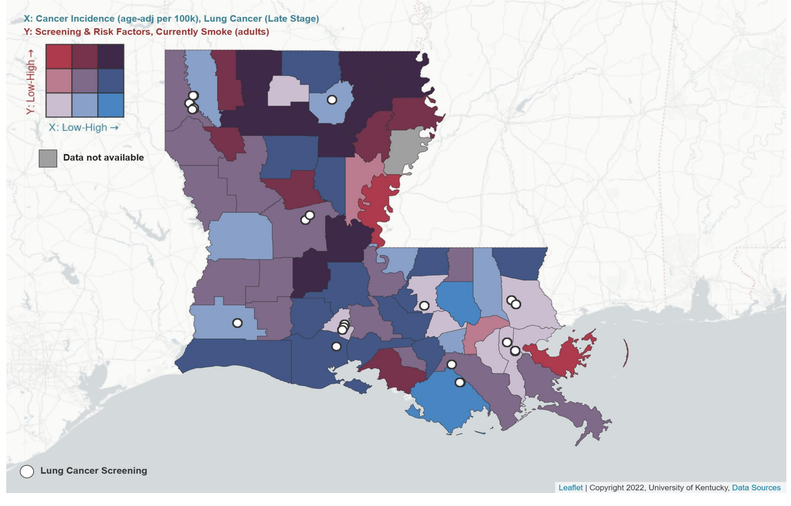
- We used the Louisiana Tumor Registry's Cancer In-Focus tool to conduct all spatial analyses and map visualizations.
- A bivariate choropleth map was created to simultaneously visualize parish level smoking prevalence and late-stage lung cancer incidence.

Results

Map 1. Univariate map of Louisiana, parish-level late-stage lung cancer incidence.

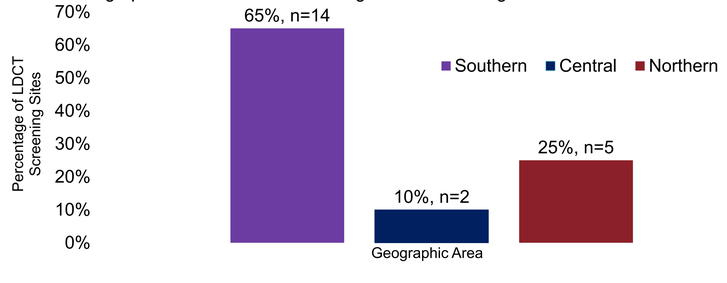


Map 2. Bivariate map of Louisiana, showing parish-level late-stage lung cancer incidence and adult smoking prevalence, with LDCT screening sites.



- Current adult smoking ranged from 15.2% to 27.9%.
- Late-stage lung cancer incidence (age-adjusted per 100,000k persons) ranged from 30 to 70 (all races, all sexes).
- Approximately 20 LDCT lung cancer screening facilities operated across Louisiana, with 65% concentrated in Southern Louisiana.

Chart 1. Geographic distribution of LDCT lung cancer screening facilities in Louisiana.



Results

Highest Burden Areas

- Ten parishes in Louisiana were considered high-burden areas for late-stage lung cancer diagnosis, each with diagnosis rates above 57%.
- East Carroll (69.9%) and Caldwell (69.7%) Parish had the highest late-stage lung cancer diagnosis rates in the state, both located within Louisiana Department of Health Public Health Region Eight.
- Additional parishes with high late-stage lung cancer incidence rates included: Union (62.4%), Bienville (61.3%), Evangeline (60.0%), Richland (59.8%), Iberville (59.5%), Acadia (57.7%), Jackson (57.3%), and Cameron (57.1%).
- Current adult smoking prevalence in this high-burden region ranged from 22.7% to 27.9% vs. 17% to 22% in low burden regions.
- Approximately 72% of lung cancer patients in Louisiana were diagnosed at a late stage (regional or distant disease).
- Parish-level late-stage lung cancer incidence rates ranged from approximately 30% to 70% statewide.
- None of the parishes identified as having both high smoking prevalence and high late-stage lung cancer diagnoses contain LDCT screening facilities.

Discussion

- This study identified geographic areas in Louisiana with high smoking prevalence and high late-stage lung cancer diagnosis overlaid with the distribution of LDCT lung cancer screening facilities.
- This study had several limitations: 1) the analysis used parish-level data, which may mask variation within smaller geographic areas; 2) smoking prevalence estimates may rely on modeled survey data rather than direct measurements in some locations; and 3) the study did not evaluate screening capacity, patient eligibility, or insurance coverage at screening facilities.

Conclusions

- Geographic disparities in Louisiana reveal a disparity between lung cancer risk and the distribution of LDCT screening infrastructure.
- Parishes with the highest smoking prevalence and late-stage lung cancer diagnoses often lack nearby screening facilities.
- Expanding screening access in high-burden regions may improve early detection and reduce lung cancer mortality.

Public Health Implications

- Geographic analyses can help identify priority regions for expanding LDCT screening services.
- Targeted screening programs may improve access for rural and high-risk populations.
- Expanding screening programs in high-burden regions may increase early detection and reduce disparities in lung cancer outcomes.
- Integrating smoking cessation interventions with screening initiatives may further reduce lung cancer burden in Louisiana.

Acknowledgments

Cancer incidence data used in this study were obtained from the Louisiana Tumor Registry, which is supported by the Surveillance, Epidemiology, and End Results (SEER) Program of the National Cancer Institute and the National Program of Cancer Registries of the Centers for Disease Control and Prevention.