Cancer in Oklahoma Data Brief Series: Lung Cancer in Oklahoma - Update 2025

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Introduction

Lung cancer is the leading cause of cancer death and the second most frequently diagnosed cancer in both men and women in the United States (US). Nationally, Oklahoma (OK) ranks 10th worst in lung cancer age-adjusted cancer incidence rate, and 8th worst for age-adjusted lung cancer mortality rate from 2018-2022.[1] The majority of lung cancer cases are attributable to cigarette smoking.[2] Although smoking rates in the US have decreased over the past two decades, a large portion of current and former smokers remain at risk for lung cancer.[3] Lung cancer has an overall five-year survival rate of only 28.6%, primarily because diagnosis usually occurs at a late stage, by which time the disease has spread to other regions of the body.[1] Because treatment for early-stage lung cancer greatly improves the likelihood of survival (e.g., five-year survival for individuals with early-stage lung cancer is 60.6%),[1] interventions to shift diagnosis to early-stage disease are needed. In 2013, the United States Preventive Services Task Force (USPSTF) issued a Grade B recommendation, which required health insurance plans to cover annual lung cancer screening with low-dose computed tomography (LDCT) for high-risk individuals.[4] In 2021, the USPSTF broadened the recommendation of high-risk individuals to include adults aged 50 to 80 years who have a 20 pack-year smoking history and currently smoke or have quit within the past 15 years.[4] This brief focuses on lung cancer incidence, mortality, and screening rates in Oklahoma and concludes with a discussion of the significance of findings on clinical practice and public health policy.

Methods

Data for Lung Cancer incidence were obtained from the Oklahoma Central Cancer Registry (OCCR) and the Centers for Disease Control's (CDC) National Program of Cancer Registries (NPCR), and the NCI's Surveillance, Epidemiology, and End Results (SEER) program. Cancer mortality data were from Oklahoma Vital Statistics and the CDC's National Vital Statistics System (NVSS). Information on lung cancer screening was obtained from the Behavioral Risk Factor Surveillance System (BRFSS) accessed through the CDC BRFSS. Five items in 2022 BRFSS were used to estimate lung cancer screening LDCT eligibility and included respondent's age (55-80), a composite measure of smoking history (i.e., "Every day smoker", "Someday smoker", "Former smoker", and "Non-smoker), age when regular smoking began, age last smoked regularly, average number of cigarettes smoked when the respondent smoked regularly (converted to pack years), and never diagnosed with cancer. Lung cancer screening was assessed by asking respondents if they had had a CT scan in the last 12 months. All data sources used in this brief were publicly available.

In this brief, Hispanic persons were categorized as being Hispanic regardless of race. All individuals in the sample were categorized into one of the following ethnic and racial groups: Hispanic, Non-Hispanic (NH) White, NH

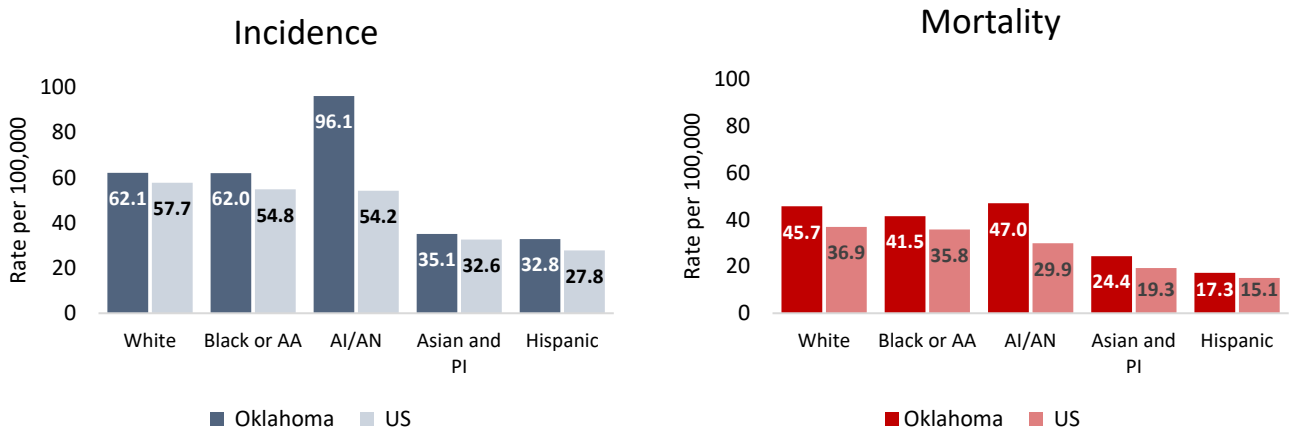
Black or African American, NH American Indian or Alaska Native, or NH Asian or Pacific Islander. This data brief defines lung cancer as lung and bronchus (ICD-O-3 C34.0 – C34.9). To ensure the stability of estimates and confidentiality, rates were suppressed if fewer than 16 counts were reported in a specific category, and all rates were age-adjusted to the 2000 US standard population. BRFSS estimates were suppressed for stability if the unweighted sample size was less than 50. For all analyses, except stage at diagnosis, unknown values were excluded, and the resulting percentages were weighted averages estimated from the sample and population sizes. All incidence and mortality rates are per 100,000 population. Staging for this data brief used the SEER summary staging classification.

Results

Overall, there were 218,893 cases of lung cancer diagnosed in 2022 in the US. Of these cancers, 2,961 (2.2%) cases were in Oklahoma. For mortality in the US, there were 131,584 lung cancer deaths in 2023. Of these cancer deaths, 2,005 (1.5%) were in Oklahoma. The age-adjusted lung cancer incidence rate in the US was 49 per 100,000 population compared to 58 in Oklahoma. During this timeframe, the age-adjusted lung cancer death rate for the US was 29 per 100,000 compared to 39 per 100,000 for Oklahoma.

Figure 1 shows the age-adjusted lung cancer incidence and mortality rates per 100,000 population by race and ethnicity in Oklahoma from 2018 to 2022 and the US from 2017 to 2021. Incidence rates in Oklahoma are higher for all groups compared to incidence rates for the US. Similarly, Oklahoma has substantially higher mortality rates among all groups compared to the US. NH American Indians or Alaskan Natives in Oklahoma had disproportionately higher rates of incidence and mortality than all other racial or ethnic groups. In Oklahoma, Whites and Blacks have higher incidence and mortality rates compared to rates for those in the US.

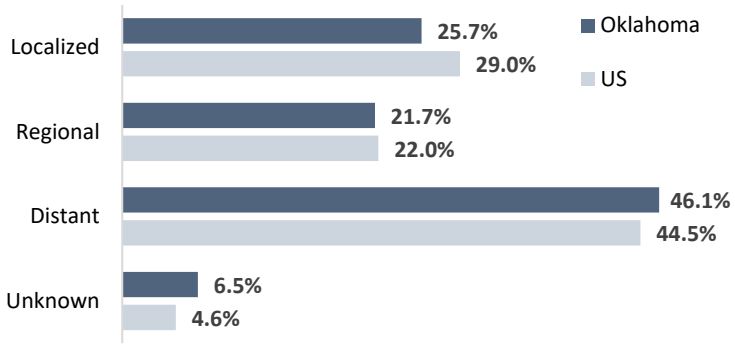
Figure 1: Age-Adjusted Lung Cancer Incidence and Mortality by Race and Ethnicity in Oklahoma and the US, 2017-2021 and Oklahoma 2018-2022



Source: SEER and CDC (NPCR and NVSS)
Abbreviations: AA: African American; AI: American Indian; AN: Alaska Native, PI: Pacific Islander
All race groups are Non-Hispanic

It is important to note that the mortality rate presented for AI/AN persons in Oklahoma is likely to be significantly underestimated. Analyses that used data from prior years linking Indian Health Service data to the national death index revealed higher mortality for this group. However, the Indian Health Service-linked mortality data for the years presented here have not been released. We estimate about a 29% increase when adjusting for misclassification in Oklahoma.[5]

Figure 2: Lung Cancer Percent Stage at Diagnosis in Oklahoma and the US, 2018-2022



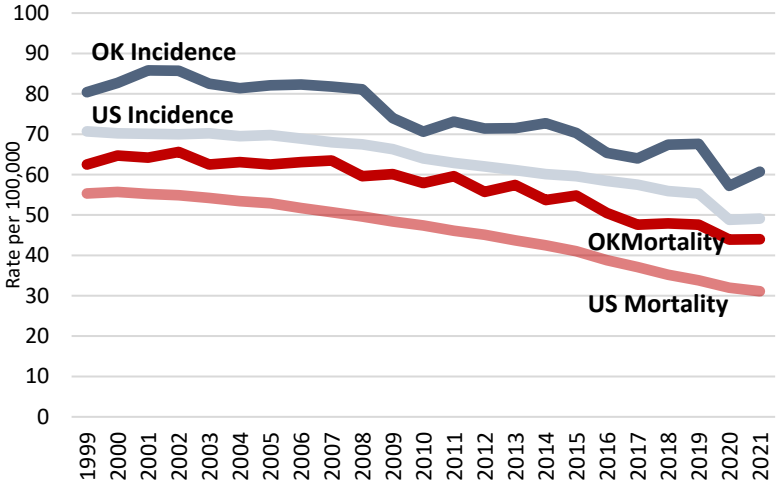
Source: CDC Cancer Data Visualization

Figure 2 shows the percentage stage at diagnosis for lung cancer in Oklahoma and the US from 2018 to 2022. The largest percentage in both Oklahoma and the US is at the distant stage, almost twice the amount of the regional or localized stage.

Oklahoma shows a higher percentage of unknown as the US. See **Appendix 1, Table 1** for trends in rates of percent stage at diagnosis in Oklahoma.

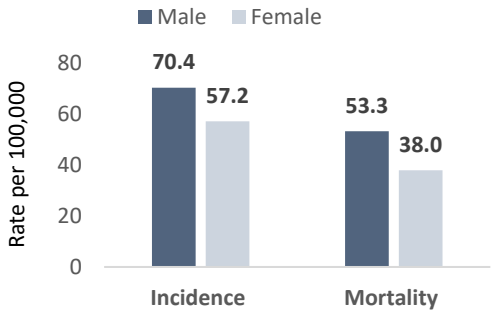
Figure 3 shows yearly trends of lung cancer incidence and mortality for Oklahoma and the US between 1999 and 2021. Overall, trends for both the US and Oklahoma decrease over time; however, Oklahoma maintains consistently higher incidence and mortality rates as the US. Over the interval, the absolute decline in lung cancer incidence for Oklahoma was 15.4%, compared to 17.9% for the US. The absolute decline in lung cancer mortality for Oklahoma was 16.0% compared to 22.0% for the US. In other words, compared to the US, Oklahoma had a similar rate of decline in incidence but a slightly slower decline in mortality with a wider gap in the most recent years.

Figure 3: shows yearly trends of lung cancer incidence and mortality for Oklahoma and the US between 1999 and 2021



Source: CDC Wonder

Figure 4. Age-adjusted Lung Cancer Incidence and Mortality in Oklahoma by Sex, 2018-2022



Source: OK2Share

Figure 4 shows age-adjusted lung cancer incidence and mortality in Oklahoma by sex in 2018-2022. Males have both higher rates of incidence and mortality compared to females. More detailed trends in incidence and mortality rates by sex in Oklahoma can be seen in **Appendix 1**.

Figure 5: Lung cancer age-adjusted incidence and mortality rates per 100,000 by 10-year age group in Oklahoma, 2018-2022

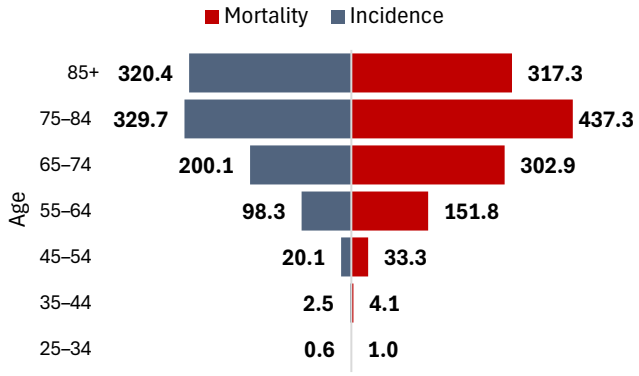
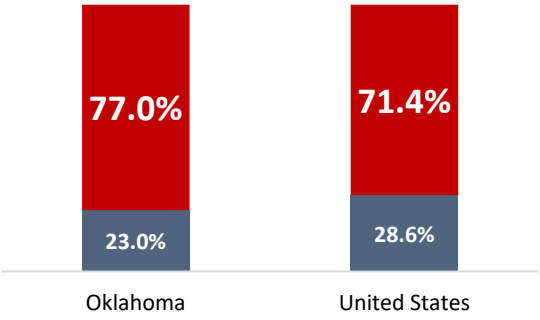


Figure 5 shows lung cancer incidence and mortality rates by 10-year age groups in Oklahoma between 2018 and 2022. Generally, lung cancer incidence and mortality rates increase with age. Those in the youngest age group (25-34 years of age) have relatively low lung cancer rates. Substantial increases in rates for both incidence and mortality are seen for those 45-54 years old, increases from the youngest age group. The highest mortality and incidence rates are seen for those 75-84 years old (329.7 and 437.3 per 100,000, respectively). A sharp decline in incidence rates is seen for those 85 years and older.

Figure 6 shows the five-year survival of Oklahoma and the US. Oklahoma at 22.2% compared to 28.1% in the US overall. Oklahoma had 6 percentage points lower rates of survival compared to the US overall.

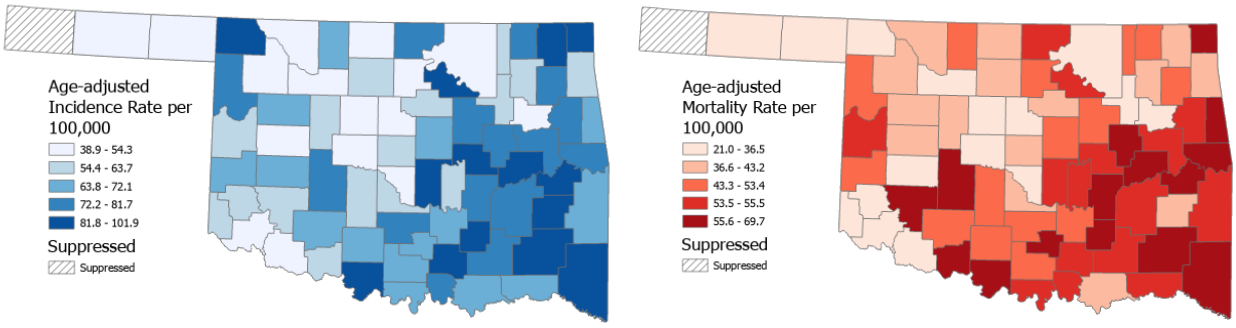
Figure 7 shows maps of age-adjusted lung cancer incidence and mortality rates by county for Oklahoma. Dark shading indicates high rates of lung cancer, whereas light shading indicates lower rates. As seen in the maps above, both incidence and mortality rates are highest within the eastern and particularly southeastern counties of Oklahoma. The underlying number of incident cases, incidence rates, number of deaths, and mortality rates of lung cancer for each county in Oklahoma can be found in Tables 1 and 2 of Appendix 2, respectively. A map of tobacco use estimates by county is shown in Appendix 1, **Figure 3**.

Figure 6: Lung cancer survival in Oklahoma and the United States, 2015-2021



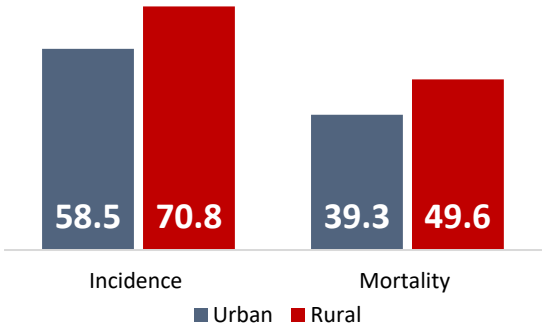
Source: CDC Cancer Data Visualization

Figure 7: Age-Adjusted Lung Cancer Incidence and Mortality by County in Oklahoma, 2018-2022



Source: OK2SHARE

Figure 8: Lung cancer age-adjusted incidence and mortality rates per 100,000 by urban-rural status in Oklahoma, 2018-2022

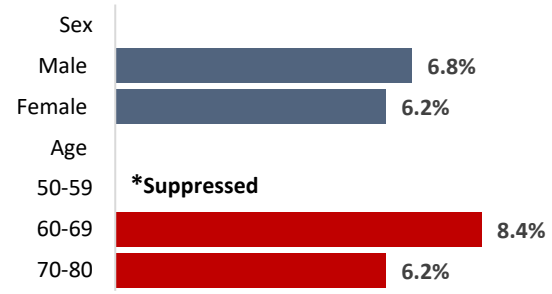


Source: OK2SHARE

Figure 8 shows rural and urban differences. Rural areas have substantially higher incidence (70.8 vs. 58.5) and mortality (49.6 vs 39.3).

Figure 9 shows lung cancer screening participation in Oklahoma by various demographic variables in 2022. Only 6.5% (95 % CI: 4.6, 8.5) of eligible individuals in Oklahoma reported having a CT scan to check for lung cancer within the past 12 months. The variables assessed included sex, level of education, race/ethnicity, age, and income. But only age and sex had a sample size large enough to be reported. The highest screening participation was seen among men. We see that in those 60-69 years of age. But none reached even 10% of the eligible population.

Figure 9: Percent participation in lung cancer screening in Oklahoma by sex and age group, 2022



Source: BRFSS

Conclusions and Implications for Practice and Policy

Lung cancer incidence and mortality rates are improving gradually in Oklahoma, but remain higher than the corresponding US rates, and the mortality gap between Oklahoma and the US is widening. For the stage at diagnosis, we see 2.4 times the rate of unknown as in the US. Additionally, we know that the 5-year survival rate for unknown stage is 17.4% while this is higher than distant stage (7.4%), it is lower than regional and localized stage (28.8% and 51.6% respectively). Thus, the unknown stage at diagnosis was not randomly distributed and would most likely make Oklahoma's distant stage higher than the US overall. Moreover, we see disparities in sex, age, and rural-urban status. Findings from this brief suggest several recommendations that could be used to reduce the disproportionate burden of lung cancer in Oklahoma.

First, there is a pressing need to support tobacco prevention and cessation programs and policies: Oklahoma Tobacco Helpline, a program funded by the Oklahoma Tobacco Settlement Endowment Trust (TSET), provides free services and customized plans to help individuals quit smoking. Free services include counseling and nicotine replacement therapy. Also, the Helpline queries individuals to determine if they are eligible for no-cost lung cancer screening and may start assisting with referrals to those potentially eligible for screening. In 2021, 29,591 Oklahomans used the Helpline for quitting cigarettes and other tobacco products.

Second, there is a need to increase public awareness of USPSTF-recommended annual lung cancer screening with low-dose computerized tomography (LDCT). Since the initial lung cancer screening guideline was issued by the USPSTF in 2013, uptake has remained remarkably low.[6] Because many high-risk individuals may not be aware of this efficacious test, media campaigns and community health education efforts could be used to raise public awareness of and demand for this test. Activities to increase awareness need to reach individuals who are at greatest risk of developing lung cancer, including men, American Indian and Alaska Native persons,

persons living in rural locations, and those who have low educational attainment or income levels. This may be because people in the $15,000 to $24,000 income bracket may not be able to afford private insurance coverage, but also may not qualify for Medicaid coverage. In 2021, Medicaid in Oklahoma began covering lung cancer screening, and in the summer of 2021, Oklahoma became the most recent state to expand Medicaid eligibility through the Affordable Care Act. These changes enabled many low-income Oklahomans who previously could not afford the screening test to receive it. Medicaid expansion has been particularly important for lung cancer screening because rates of smoking are high in the state's lower-income populations.[7]

Third, there is a need to increase lung cancer screening capacity. As demand for lung cancer screening grows, the need for accredited lung cancer screening centers providing LDCT will increase. Among the states, Oklahoma currently has among the lowest per capita supply of lung cancer screening with LDCT.[7] Increased local availability of screening services could improve incidence and mortality within rural areas of Oklahoma, where high lung cancer rates occur and where hospital closures are reducing the availability of CT scanning equipment. Mobile units that provide lung cancer screening with LDCT are one option to increase access in our highly rural state, and in 2025, OU Health began providing that service through a lung cancer screening van.

Fourth, there is a need to increase clinician performance on lung cancer screening with LDCT. Activities are needed to educate clinicians and their health care systems on the current lung cancer screening guideline, which as updated in 2021. In addition, providing regular feedback to clinicians, clinics, and healthcare systems on lung cancer screening performance is an evidence-based approach to increasing screening rates.

Fifth, there is a need to ensure that all Oklahomans diagnosed with lung cancer have access to the newest treatments, as lung cancer treatment is improving. This can be accomplished by providing funds to help patients address the financial challenges of treatment and funds to help defray the costs of traveling for care, including transportation and lodging costs. Also, patients who participate in clinical trials tend to have the best outcomes. Efforts to help increase clinical trials awareness and increase participation in clinical trials, especially among members of high-risk groups, will ultimately improve lung cancer outcomes.

Finally, there is a need to coordinate lung cancer preventive and treatment services. For example, tobacco cessation services need to be linked to lung cancer screening services. Local community and tribal health systems need to be connected with treatment centers that perform state-of-the-art lung cancer treatment. In 2025, the Oklahoma Lung Cancer Roundtable was launched, which brings together a variety of community partners, including the American Lung Association, American Cancer Society, tribal partners, faith-based organizations, primary care clinics, oncology practices, hospitals, and payers in the shared mission to reduce lung cancer in Oklahoma. The OLCRT work groups are meeting regularly to coordinate efforts to increase lung cancer screening, diagnostic follow-up, and treatment services. These types of statewide partnerships will continue to be critical for reducing the heavy weight lung cancer currently places on Oklahomans.

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