Cancer in Oklahoma Data Brief Series:

Oropharyngeal Cancer in Oklahoma-2025

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Introduction

For 2018-2022, Oklahoma (OK) ranked 7th-worst in age-adjusted oropharyngeal incidence rates at 13.9 cases per 100,000, while the age-adjusted incidence rate in the United States (US) was 12.1 cases per 100,000.[1] Oropharyngeal cancer is primarily caused by tobacco use, excessive alcohol consumption, and human papillomavirus (HPV).[2,3] Oropharyngeal cancer accounts for 2.9% of cancer diagnoses nationwide, and men are twice as likely to be diagnosed with oropharyngeal cancer both in Oklahoma and nationally.[1,2,4] There are multiple treatments for oropharyngeal cancer based on tumor location, stage at diagnosis, histology, and other factors. These include: chemotherapy, radiation, epidermal growth factor receptor therapy, immunotherapy, or surgery.[5]

HPV vaccination has been shown to be effective at reducing the risk of oropharyngeal cancer.[6,7] To pursue effective diagnosis and treatment, it is crucial to diagnose oropharyngeal cancer as early as possible. Many oropharyngeal cancers can be detected on physical exams performed by dentists, dental hygienists, physicians, advanced practice providers, or other clinicians. However, no evidence currently exists to support the effectiveness of routinely screening individuals, such as those with a history of tobacco use, who are at high risk of developing this form of cancer.[8] However, preventive measures can help prevent the development of oropharyngeal cancer. This Oklahoma Cancer Data Brief highlights trends in oropharyngeal cancer and discusses the implications of these findings for clinical practice and public health policy.

Methods

Data for oropharyngeal cancer incidence were obtained from the Oklahoma Central Cancer Registry (OCCR), 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 potential oropharyngeal screening and risk behaviors was obtained from the Behavioral Risk Factor Surveillance System (BRFSS).

This data brief defines oropharyngeal cancer as the following cancer sites: Oral cavity and pharynx; lip; tongue; salivary glands; floor of mouth; gum and other mouth; nasopharynx; tonsils; oropharynx; hypopharynx; other oral cavity. (ICD-O-3 C0.00-C14.8). To ensure the stability of estimates and confidentiality, CDC and SEER rates were suppressed if fewer than 10 incidence and 5 mortality counts were reported. 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 by sample and population sizes. All incidence and mortality rates are per 100,000. Trends in incidence and mortality were assessed using Joinpoint regression to identify statistically significant changes in the average annual percent change (AAPC) over time.

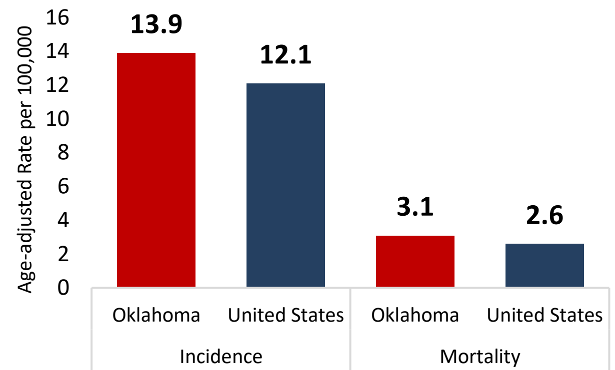
We used the 2023 Rural-Urban Continuum Codes (RUCC), which classify U.S. counties into three metropolitan and six non-metropolitan categories based on population size, degree of urbanization, and proximity to metropolitan areas. In this brief, urban refers to counties in RUCC 1-3, and rural refers to counties in RUCC 4-9. Also, in this brief, the substate planning districts (SSPD) were used for geographic representation. SSPD are voluntary associations of local

governments formed under Oklahoma law that deal with issues and planning needs that cross the boundaries of individual local governments, such as counties, cities, and towns. See **Appendix 1** for definitions of SSPD abbreviations and the counties they include.

Results

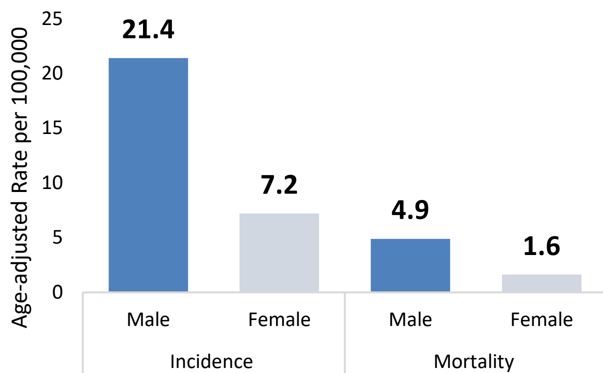
From 2018 to 2022, there were 251,356 diagnoses of oropharyngeal cancer in the US and 3,304 diagnoses in Oklahoma. From 2019-2023, 56,388 deaths occurred in US and 759 in Oklahoma due to this cancer. **Figure 1** shows that Oklahoma's incidence rate was 13.9 per 100,000 persons, higher than the corresponding U.S. rate of 12.1. The mortality rate in Oklahoma from 2019 to 2023 was 3.1 per 100,000 people, again higher than the US rate of 2.6 per 100,000.

Figure 1: Oropharyngeal cancer age-adjusted incidence (2018-2022) and mortality (2019-2023) rates, Oklahoma and the United States



Source: CDC Cancer Data Visualization

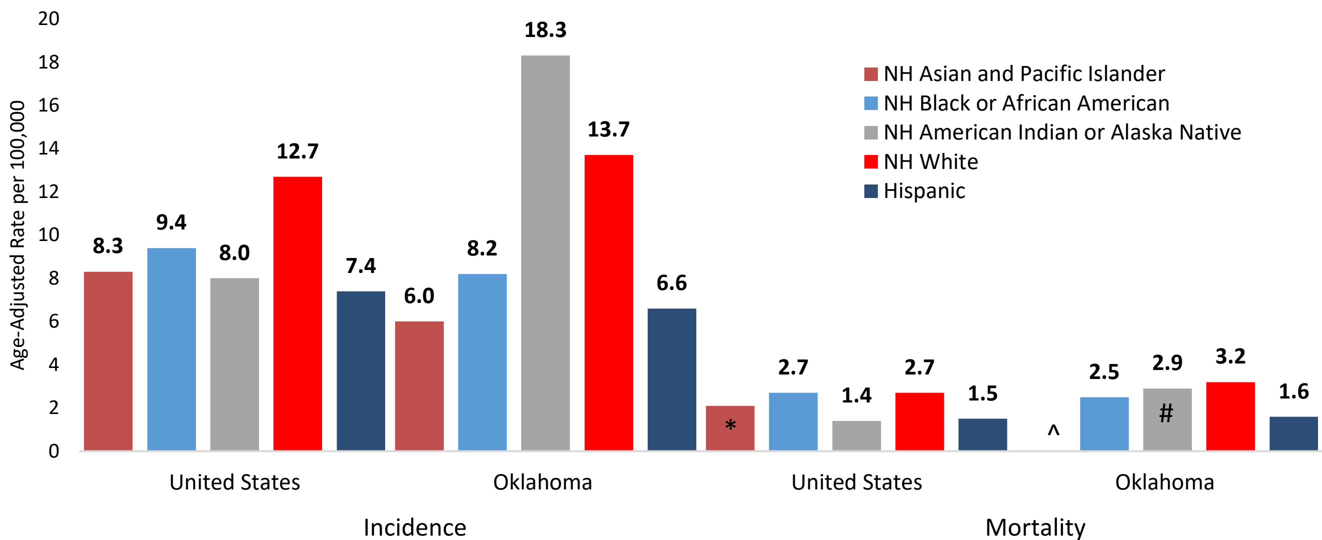
Figure 2: Oropharyngeal cancer age-adjusted incidence (2018-2022) and mortality (2019-2023) rates by sex, Oklahoma



Source: CDC Cancer Data Visualization

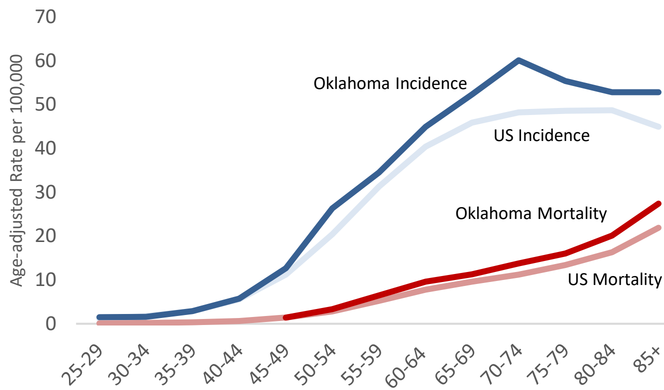
Figure 2 shows age-adjusted incidence and mortality rates in Oklahoma by sex. From 2018 2022, the incidence rate among males in Oklahoma was 21.4 per 100,000, nearly three times higher than the rate among females (7.2 per 100,000). Similarly, the mortality rate among males was 5.1 per 100,000, more than three times higher than the female mortality rate (1.5 per 100,000). These findings highlight a substantial sex disparity in oropharyngeal cancer burden in Oklahoma.

Figure 3: Age-Adjusted Oropharyngeal Cancer Incidence (2018-2022) and Mortality (2019-2023) by Race and Ethnicity in Oklahoma and the United States



*Estimate Asian only; ^ Suppressed; # Estimates suggest a 29% high rate of AIAN mortality not accounted for in this chart
Source: CDC Cancer Data Visualization

Figure 4: Oropharyngeal Cancer Incidence (2018-2022) and Mortality (2019-2023) by Age Group in Oklahoma and the US

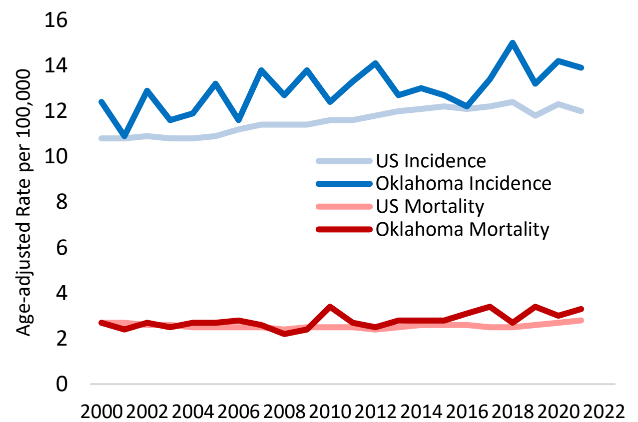


Source: CDC WONDER

Figure 3 shows that, from 2018 to 2022, the Non-Hispanic American Indian or Alaska Native (NH AI/AN) population in Oklahoma had the highest incidence rates of oropharyngeal cancer (18.3 per 100,000), more than double the US NH AI/AN rate (8.0 per 100,000).

Mortality among NH AI/AN populations in Oklahoma (2.9 per 100,000) was also higher than the national rate (1.4 per 100,000). Non-Hispanic White had the second-highest incidence in Oklahoma (13.7 per 100,000) and mortality (3.2 per 100,000), both slightly above US averages. Rates among the Non-Hispanic Black and Hispanic populations in Oklahoma were comparable to or slightly below the national averages.

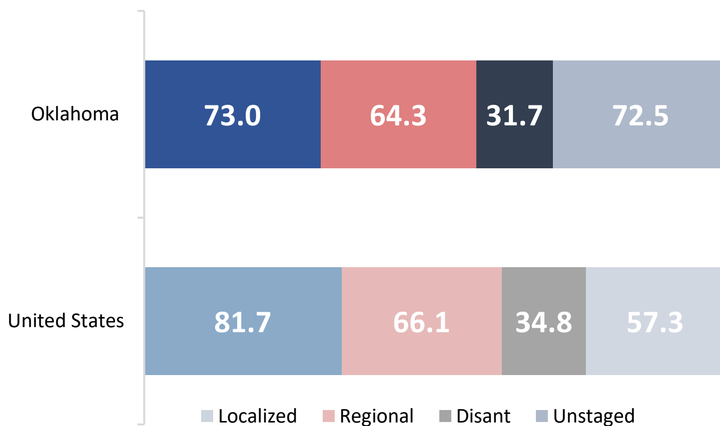
Figure 5: Shows yearly trends of Oropharyngeal Cancer Incidence and Mortality for Oklahoma and the US, (2000 - 2022)



Source: CDC WONDER

Figure 4: Incidence and mortality rates for oropharyngeal cancer increase steadily with age in both Oklahoma and the United States. Across nearly all age groups, Oklahoma consistently reported higher incidence and mortality rates than the national average. Incidence begins to rise sharply after age 45, peaking among adults 70-74 years in Oklahoma, followed by a slight decline in the older age group. Mortality follows a similar upward pattern with age, and Oklahoma mortality remains higher than US mortality at every age group examined, reflecting poorer outcomes for Oklahoma residents. Rates for younger adults aged 25-44 years are suppressed in Oklahoma due to small case counts. Despite this suppression, the observed pattern suggests that the disparity between Oklahoma and the US widens among middle- to older-age groups.

Figure 6: Five-Year Survival Rate by Stage, Oklahoma and the United States

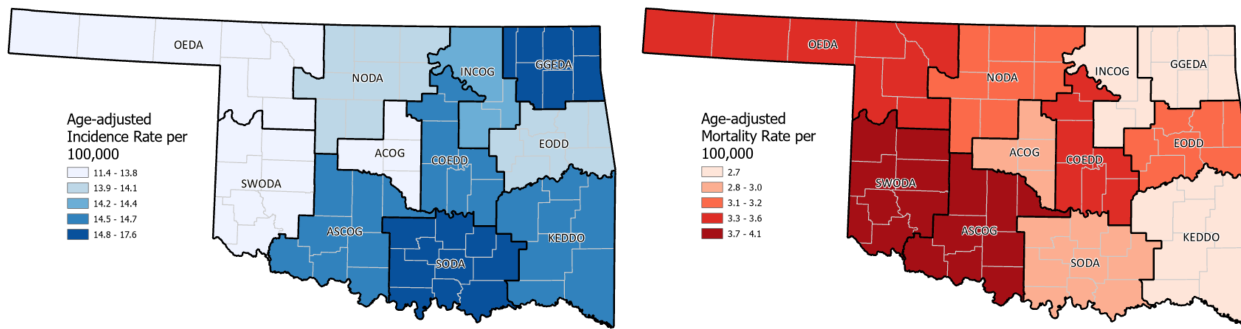


Source: CDC Cancer Data Visualization

Figure 5 shows that oropharyngeal cancer incidence in Oklahoma has increased over the past decade, rising approximately 11 per 100,000 in 2000 to 14 per 100,000 in 2022. This is a significant, consistent upward trend for both the US (AAPC=0.68) and Oklahoma (AAPC=0.82), with Oklahoma's rate increasing more rapidly. Oklahoma mortality rates have shown a significant upward trend (AAPC = 0.97) compared to the non-significant change in the US (AAPC=0.01).

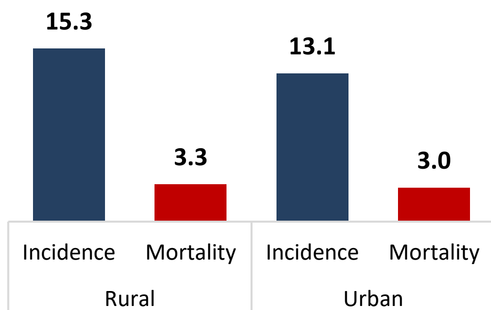
Figure 6 shows the survival rates by stage for Oklahoma and the US. Oklahoma's survival rate is lower than the nation's for every known stage except for unstage cases, suggesting a gap in diagnosis that may contribute to poorer outcomes.

Figure 7: Age-adjusted oropharyngeal cancer incidence and mortality by sub-state planning districts in Oklahoma, 2015-2019



Source: OK2Share

Figure 8: Age-Adjusted Ovarian Cancer Incidence (2018-2022) and Mortality (2019-2023) by Urban Rural Status, Oklahoma



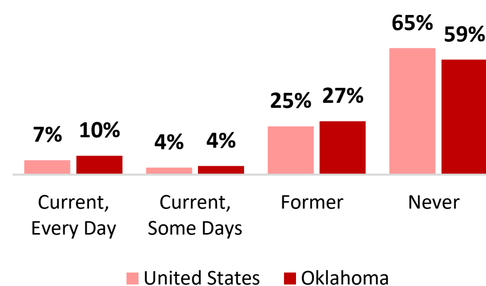
Source: OK2SHARE

Figure 7 shows age-adjusted oropharyngeal cancer incidence and mortality rates by sub-state planning districts in Oklahoma. In the maps, rates are scattered throughout Oklahoma, but the lowest incidence rates appear in the central and the western substate planning districts. For mortality, southwestern Oklahoma has lower rates than eastern Oklahoma. See **Appendix 1** for the underlying number of cancer cases, deaths, and age-adjusted incidence and mortality rates for each sub-state planning district in Oklahoma, as well as a table comprising counties that make up the sub-state planning districts.

Figure 8 shows the age-adjusted incidence and mortality rates for oropharyngeal cancer among urban and rural Oklahomans. Rural Oklahomans had higher incidence (15.3 vs 13.1 per 100,000) and mortality rates (3.3 vs 3.0 per 100,000).

Because smoking is a significant risk factor for oropharyngeal cancer, **Figure 9** shows that in 2024, most of the population in both Oklahoma and the US had never been smokers 59% and 65% respectively. However, around 25% of people in the US and 27% in Oklahoma were former smokers. Around 10% of people in Oklahoma smoke every day, and 7% of those in the US overall do so. Oklahoma's adult smokeless tobacco use rate (6% in 2024) was approximately 2 times the US national rate (3% in 2024) (data not shown). In Oklahoma, 5% of the 2024 population reported heavy alcohol use compared to 6% in the US (data not shown). Oropharyngeal cancers are sometimes diagnosed at dental visits. Among Oklahomans, 39% did not visit a dentist in the past year (2024) compared to 34% of the US population (data not shown). Another important risk factor is HPV, Oklahoma's 2023 13-17 year old HPV vaccination rate was 44% compared to 61% for the US overall (data not shown).[9]

Figure 9: Smoker Status in Oklahoma and the United States, 2024



Source: Behaviors Risk Factor Surveillance System

Conclusions and Implications for Practice and Policy

Oropharyngeal cancer incidence and mortality rates in Oklahoma remain higher than the corresponding US rates. Findings from this brief suggest several recommendations to reduce the disproportionate burden of oropharyngeal cancer in Oklahoma.

The HPV vaccine has been proven to be highly effective in preventing HPV related cancers, including oropharyngeal cancer.

It is estimated that HPV vaccination could potentially prevent around 60-70% of oropharyngeal cancers caused by the HPV strains included in the vaccine.[10-12] By vaccinating individuals against HPV, especially before they become sexually active, the transmission of the virus can be reduced, subsequently lowering the risk of developing associated cancers, including oropharyngeal cancer.

Alcohol use, particularly heavy use, is another well-established risk factor for oropharyngeal cancer. About 35% of oropharyngeal cancer is attributable in part to alcohol use.[13] Reducing or eliminating the use of alcohol can substantially reduce the risk of oropharyngeal cancer, as well as other alcohol related cancers, including cancers of the esophagus, colon and rectum, liver, and breast.

Tobacco use, smoking, and smokeless tobacco are well-established risk factors for oropharyngeal cancer. Quitting tobacco use or not starting in the first place can significantly reduce the risk of developing oropharyngeal cancer. The risk for oropharyngeal cancer in smokers is approximately ten times higher than that of never-smokers.[14] About 17% of oropharyngeal cancers are partially attributable to smoking.[13] Strategies such as anti-smoking campaigns, smoking cessation programs, and policies that discourage tobacco use are prevention measures that can reduce the risk of oropharyngeal cancer and other tobacco-related diseases, such as lung cancer, heart disease, and respiratory disorders.

While universal screening for oropharyngeal cancer is not recommended, dentists and primary care physicians are encouraged and expected to conduct routine oral cancer evaluations for all patients over a certain age or those with a history of tobacco use.[15]

Interventions to improve the quality of oropharyngeal treatment are warranted. For example, clinical trials advance cancer treatment, and participants have been shown to receive high-quality care.[16] This is why clinical trials must enroll participants from diverse backgrounds who are at increased risk for developing cancer, including oropharyngeal cancer. Funding for research should be allocated to ensure diversity among patients enrolled in clinical trials.

Taken together, these additional actions would enable Oklahoma to reduce the unacceptably high burden of oropharyngeal cancer in the state.

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