Cancer in Oklahoma Data Brief Series:

Cancer among the American Indian Population in Oklahoma - 2026

Janis E. Campbell, Esma Sheikh, Lauri Hunsucker, and Mark P. Doescher

Community Outreach and Engagement, a program of OU Health Stephenson Cancer Center

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Introduction

Nationally, in 2022, 18 states had higher all-cause cancer incidence rates than Oklahoma, yet in 2023, only three states had higher cancer mortality rates.[1] This disparity highlights the need to examine cancer outcomes among high-risk populations in Oklahoma. Historically disadvantaged and minority populations in the US bear a disproportionate cancer burden compared to the non-Hispanic White population.

In the US, Oklahoma has the second-largest number of American Indian and/or Alaska Native (AI/AN) residents (after California) and the second-highest percentage of AI/AN residents (after Alaska) when combined with another race.[2] In 2020, an estimated 3,727,135 AI/AN residents lived in the US (1.1% of the total population), and, when combined with another race, the AI/AN population in the US was estimated at 9,666,058 (2.9%). In Oklahoma, there were an estimated 332,791 AI/AN residents in 2020 (8.4%), and, when combined with another race, the state's AI/AN population was estimated at 633,831 (16.0%).[2]

When reporting cancer for AIAN populations, racial misclassification is often an issue.[3] To improve the accuracy of AI/AN cancer statistics, the most common approach is to link cancer incidence and mortality records with Indian Health Services (IHS) administrative records.[4] Those matched in the IHS database are considered AI/AN, while race is unchanged for those not matched.[5] This is the approach we took with our previous data briefs.[6] These linked datasets are still available for incidence data, but are no longer available for mortality in Oklahoma.

This data brief presents information on overall and cause-specific cancer incidence and estimated mortality rates among the AI/AN population of Oklahoma. It also examines cancer screening rates for the AI/AN population and concludes with a brief discussion of the significance of the findings for clinical practice and public health policy.

Methods

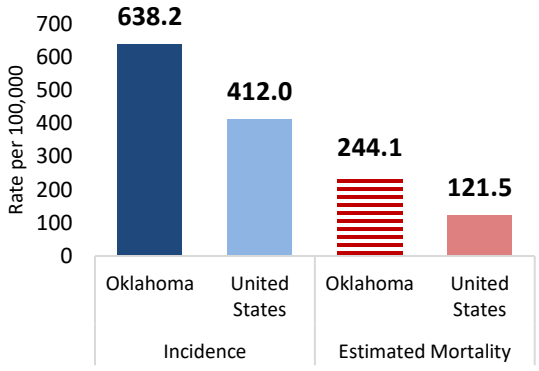
Cancer incidence data were obtained from the Centers for Disease Control's (CDC) National Program of Cancer Registries (NPCR), the NCI's Surveillance, Epidemiology, and End Results (SEER) program, and from the Oklahoma Central Cancer Registry (OCCR). All cancer mortality data were from the National and Oklahoma Vital Statistics programs. Information about cancer screening was obtained from the Oklahoma Behavioral Risk Factor Surveillance System (BRFSS). All data sources used in this brief were publicly available and provided de-identified data

To ensure the stability of estimates and confidentiality, incidence rates were suppressed if fewer than 10 counts were reported in a specific category for incidence, or fewer than 5 for mortality, and all rates were age-adjusted to the 2000 US standard population. Incidence data is limited to invasive cancers, except bladder cancer, which also includes in situ cancers. Behavioral Risk Factor Surveillance System (BRFSS) estimates were suppressed for stability if the unweighted sample size for the denominator was less than 50 or if the Relative Standard Error was above 0.3. All unknown values, except for staging, were excluded, and the resulting percentages were weighted averages estimated from the sample and population sizes.

Those who identified as White or AIAN were classified as non-Hispanic (NH), thus excluding individuals of these groups with Hispanic ethnicity. For incidence data, we used the IHS-linked data for both NH AIAN and NH White. For consistency in this data brief, we will analyze NH AIAN and NH White populations. Analyses of prior-years data, linking IHS data to the national death index, revealed higher mortality among the NH AIAN population in Oklahoma. However, the IHS-linked mortality data for the years presented here have not been released. We thus make a 29% adjustment to account for misclassification in Oklahoma throughout this data brief.[7] Because misclassification is not consistent throughout the US, with higher rates in the southern plains.[8] We chose not to adjust the US mortality rates because we lacked an estimate of the misclassification rate. We represent these estimated data with dashed lines throughout.

Results

Figure 1: Age-adjusted overall cancer incidence (2018-2022) and estimated mortality (2019-2023) Non-Hispanic American Indian and Alaska Native rates, Oklahoma, and the United States

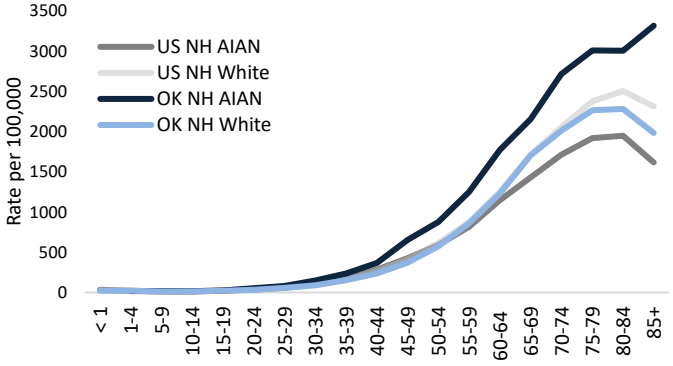


Source: CDC Cancer Data Visualization

US rate of 121.5 per 100,000. NH AIAN populations in Oklahoma were 1.6 times more likely to be diagnosed with cancer compared to those in the US overall. We estimated the death rate at 2.0 times that of the US overall NH AI/AN population.

Figure 2 shows the age-adjusted incidence (2018-2022) and estimated mortality (2019-2023) rates for the NH AIAN

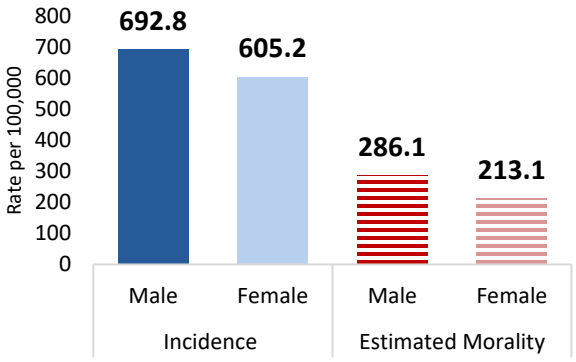
Figure 3: Overall, Cancer Incidence (2018-2022) for Non-Hispanic American Indian or Alaska Native and Non-Hispanic White by Age Group in Oklahoma and the US



Source: CDC WONDER

Overall, there were 57,626 cancer cases diagnosed between 2018 and 2022 in the US for the NH AIAN population; 10,682 (18.5%) of those cases were in Oklahoma. Between 2019 and 2023, there were 15,552 cancer deaths in the US among the AI/AN population; we estimate 3,655 NH AIAN deaths in Oklahoma. **Figure 1** shows that Oklahoma's incidence rate (2018-2022) was 638.2 per 100,000 persons, higher than the corresponding U.S. rate of 412.0 per 100,000 persons. The estimated mortality rate in Oklahoma from 2019 to 2023 was 244.1 per 100,000 people, again higher than the unadjusted

Figure 2: Age-adjusted overall cancer incidence (2018-2022) and estimated mortality (2019-2023) Non-Hispanic American Indian and Alaska Native rates by sex, Oklahoma



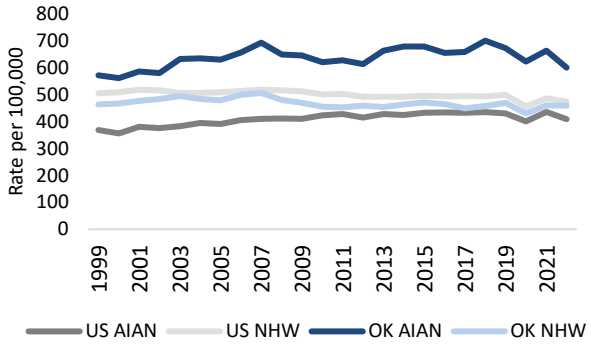
Source: CDC Cancer Data Visualization

population by sex. Males were more likely to be diagnosed with cancer than females, and they were more likely to die from cancer.

Figure 3 shows the overall cancer incidence rate by age groups. From a young age, Oklahoma's NH AIAN population was higher than either the US AIAN, NH White, or Oklahoma's NH White populations.

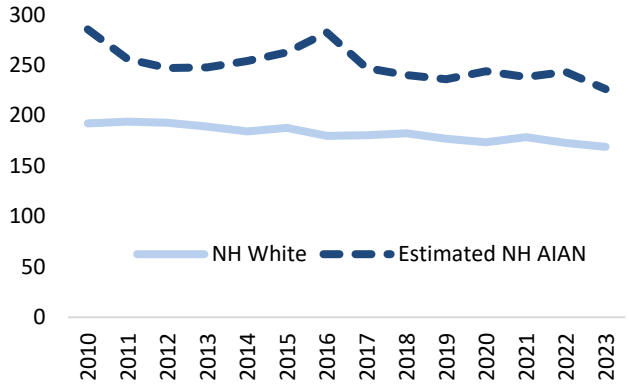
Figure 4 shows the yearly age-adjusted incidence trends for the US and Oklahoma NH AIAN and NH White populations.
The NH AIAN population in the US overall and in Oklahoma shows increasing cancer incidence rates (AAPC 0.66, p-value=<0.0001 and AAPC 0.47, p-value=0.005, respectively). This compares with the US and Oklahoma NH White rates, which are decreasing (AAPC -0.32, p-value < 0.0001; AAPC -0.30, p-value = 0.002, respectively).

Figure 4: Shows yearly trends of overall NH AIAN and NH White Cancer Incidence for Oklahoma and the US, (1999 - 2022)



Source: CDC WONDER

Figure 5: Shows yearly trends of overall NH AIAN and NH White Cancer age-adjusted estimated mortality for Oklahoma (2010 - 2023)

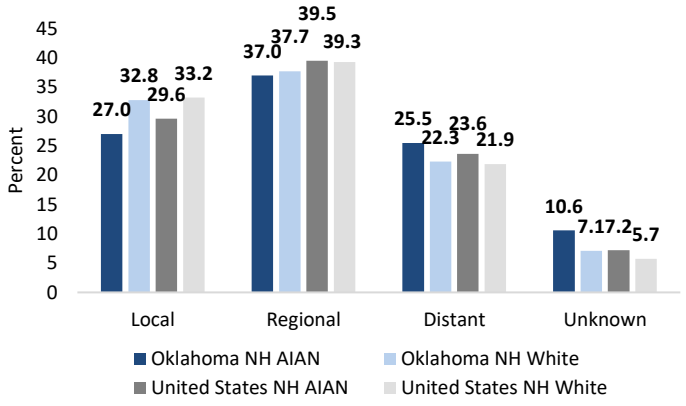


Source: OK2SHARE

Figure 5 shows the age-adjusted mortality rates for the NH AIAN and NH White populations in Oklahoma since 2010, along with estimated NH AIAN rates assuming a 29% increase. Both NH AIAN (AAPC -1.05, p-value=0.011) and NH White (AAPC -1.00, p-value<0.0001) populations are decreasing.

Figure 6 shows that among the groups presented, the NH AIAN population in Oklahoma was the least likely to be diagnosed at a local stage (where survival is highest) and the most likely to be diagnosed at a distant stage, where survival is lowest (**Figure 6**). Additionally NH AIAN population in Oklahoma was the most likely to be diagnosed at an unknown stage, which is also associated with low survival rates.

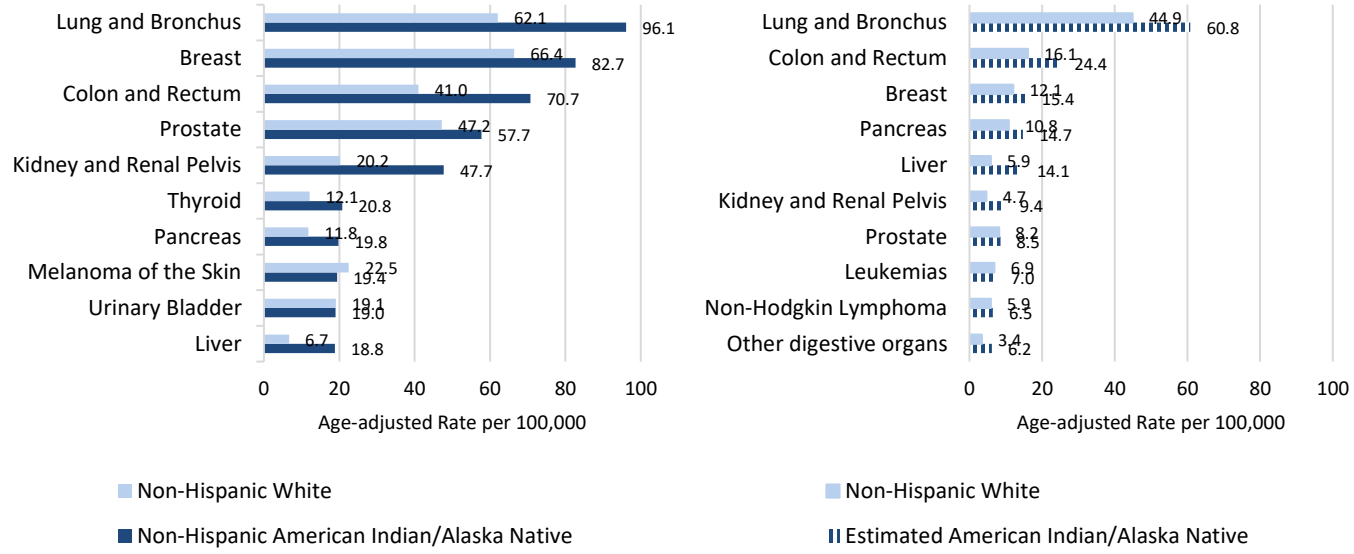
Figure 6: Stage at diagnosis, for NH AIAN and NH Whites in Oklahoma and the United States



Source: CDC Cancer Data Visualization

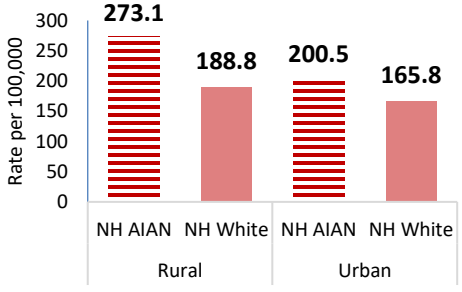
Figure 7 ranks the top ten cancers by incidence (2018-2022) and estimated mortality (2019-2023) for the NH AIAN population in Oklahoma, and compares these rates with those for the NH White population. The NH AIAN population in Oklahoma has higher rates than the NH White population for all top 10 cancers, except melanoma and urinary bladder, for incidence. The top ten cancers for which the incidence rate is notably higher for the NH AIAN population than for the NH White population are cancers of the liver and bile duct (2.8 times), kidney and renal pelvis (2.4 times), colon and rectum (1.7 times), and lung and bronchus (1.5 times). For mortality, all ten cancer sites were higher among NH AIAN compared to NH White populations. The top ten cancer types for which the estimated mortality rate is notably higher for the NH AIAN population than for the NH White population are cancers of the liver and bile duct (2.4 times), kidney and renal pelvis (2.0 times), colon and rectum (1.5 times), and lung and bronchus (1.4 times).

Figure 7: Top Ten Cancers for Age-adjusted Incidence (2018-2022) and Estimated Mortality (2019-2023) for the Non-Hispanic American Indian/Alaska Native and Non-Hispanic White Populations in Oklahoma



Source: OK2SHARE

Figure 8: Age-Adjusted Overall Estimated Cancer Mortality (2019-2023) for NH AIAN and NH White population by Urban Rural Status, Oklahoma

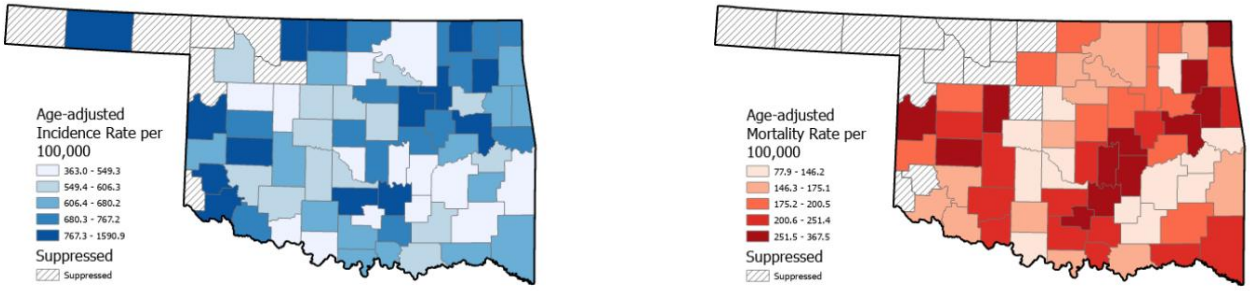


Source: OK2SHARE

Figure 8 shows the age-adjusted estimated mortality rates for NH AIAN and NH White populations among urban and rural Oklahoman counties. Rural Oklahomans had a higher mortality rate. Additionally, estimated NH AIAN populations had a higher mortality rate compared to NH Whites in both rural and urban areas.

Figure 9 maps the overall age-adjusted cancer incidence and mortality for the AI/AN population by county in Oklahoma. This figure shows that all-cause mortality rates for the NH AI/AN population are highest in the northeastern quadrant of the state. For more detailed rates, refer to Appendix 1 for incidence and mortality tables of the underlying number of cases and deaths, crude and age-adjusted rates, and rate differences between the NH AIAN and NH White populations for each county in Oklahoma.

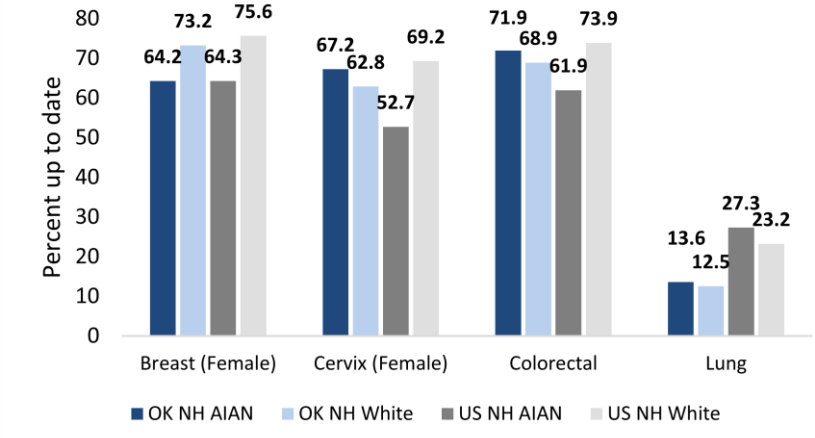
Figure 9: Overall Age-adjusted Cancer Incidence (2013-2022) and Mortality (2014-2023) Rates for the American Indian Population by County, Oklahoma



Source: OK2SHARE

Figure 10 shows that for breast cancer screening, NH AIAN women in Oklahoma (81.8%) were less likely than NH White women in Oklahoma and the US, but virtually identical to AIAN women in the US. For cervical cancer screening, NH AIAN women were more likely to be up to date than NH White women in Oklahoma. For colorectal cancer screening, NH AIAN individuals in Oklahoma were more likely than the NH White population and the NH AIAN population, but slightly less likely than the NH White population in the US overall. NH AIAN populations were more likely than the NH White population in Oklahoma, but significantly lower than the NH AIAN or NH White population in the US.

Figure 10: Cancer Screening for the American Indian and Non-Hispanic White Populations in Oklahoma and the United States, 2024



Source: BRFSS

BRFSS Cancer Screening Definitions:

Breast: Women aged 40-74 years who have received a mammogram in the past 2 years.

Cervical: Women who have not had a hysterectomy aged 21–29 are up to date if they report a Pap test in the past 3 years. Women aged 30–65 are up to date if they report a Pap test in the past 3 years OR an HPV test (alone or with Pap) in the past 5 years.

Colorectal: Adults aged 45-75 years who have fully met the USPSTF recommendation (blood stool test in the past year, and/or sigmoidoscopy in the past 5 years, and/or colonoscopy in the past 10 years, and/or stool DNA test within the past 3 years, and/or virtual colonoscopy within the past 5 years).

Lung: Adults aged 50-80 with at least 20 pack-year history and either currently smoking or quit within the last 15 years.

Conclusions and Implications for Practice and Policy

In Oklahoma, the NH AIAN population has higher overall and cause-specific cancer incidence and mortality rates than the NH White population. Concerted efforts to improve surveillance, healthcare financing, screening, and research could substantially ameliorate the unacceptably high cancer rates for the NH AIAN population in Oklahoma.

Cancer surveillance relies on access to accurate, timely data. IHS-linked data have been used to improve the accuracy of cancer data for AIAN populations. Still, recent, national IHS-linked mortality data (e.g., within the past 5 years) have not been released by the Centers for Disease Control and Prevention. Moreover, national- and state-level efforts to increase

the accuracy of racial classification of cancer registry data is warranted. For this report, we had reliable IHS-linked incidence data, but for mortality rates, we relied on dated estimates from previous work. The CDC should be encouraged to release up-to-date IHS-linked mortality data to rectify this situation.

To improve cancer outcomes and mitigate disparities, as shown by the higher late-stage cancer diagnoses among NH AIAN populations shown in this brief, programs to increase demand for and receipt of evidence-based cancer screening services are needed. Access to cervical and breast cancer screenings could be preserved or even increased by continuing to fund and support initiatives such as the National Breast and Cervical Cancer Early Detection Program (NBCEDP), and the Native American Breast and Cervical Cancer Treatment Technical Amendment Act, which is specifically directed to AI/AN women who are eligible for health services provided by the IHS or by a tribal organization.[9] Similarly, establishing programs to increase evidence-based cancer screening for lung, colorectal, and prostate cancer merits consideration. This disparity in late-stage and unknown-stage cases also suggests the need for early entry into cancer treatment services. It suggests the need for this in rural locations where cancer incidence rates are highest.

Clinical trials advance cancer treatment, which is why it is imperative that clinical trials enroll participants from diverse backgrounds. Funding for research should be directed to ensure diversity among patients enrolled in cancer clinical trials. Also, funding should support research that aims to improve understanding of why some cancers, such as liver, kidney, and colorectal cancers, are particularly lethal among NH AI/AN patients. Funding is warranted to support implementation science studies to increase the receipt of evidence-based cancer screening and to improve cancer care treatment in settings that serve AIAN patients. These and additional actions are needed to achieve the ambitious yet worthy goal of eliminating cancer disparities among the AIAN population in Oklahoma.

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For more information, please contact: Community Outreach and Engagement, Stephenson Cancer Center, OU Health.
Email: SCC-surveillance@ouhsc.edu