

Cancer in Oklahoma Data Brief Series:

Cancer among the American Indian Population in Oklahoma

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Introduction

Nationally, from 2014-2018, 33 states had a higher all-cause cancer incidence rate than Oklahoma. However, in terms of all-cause cancer mortality, only 3 states had higher rates than Oklahoma.¹ Given this troubling gap between Oklahoma's incidence and mortality ranking, examination of cancer incidence and mortality rates among the state's high-risk populations is warranted. In particular, historically disadvantaged and minority populations in the United States (US), often shoulder a disproportionate burden of cancer compared to the Non-Hispanic White (NHW) 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 in combination with another race². In 2020, an estimated 3,727,135 AI/AN residents lived in the US (1.1% of the total population), and in combination with another race, the AI/AN population in the US was estimated to be 9,666,058 (2.9%). In Oklahoma, there were an estimated 332,791 AI/AN residents in 2020 (8.4%), and in combination with another race, the state's AI/AN population was estimated to be 633,831 (16.0%).²

When reporting cancer for American Indians and/or Alaska Natives, racial misclassification is often an issue³. 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 Additionally, some data are further restricted to IHS Purchased/Referred Care Delivery Areas (PRCDA), which are counties that contain federally-recognized tribal lands or that are adjacent to tribal lands. Race classification for the AI/AN population is more accurate in PRCDA counties.⁶

This data brief presents information on overall and cause-specific cancer incidence and mortality 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 findings on 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 Oklahoma Vital Statistics. 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.

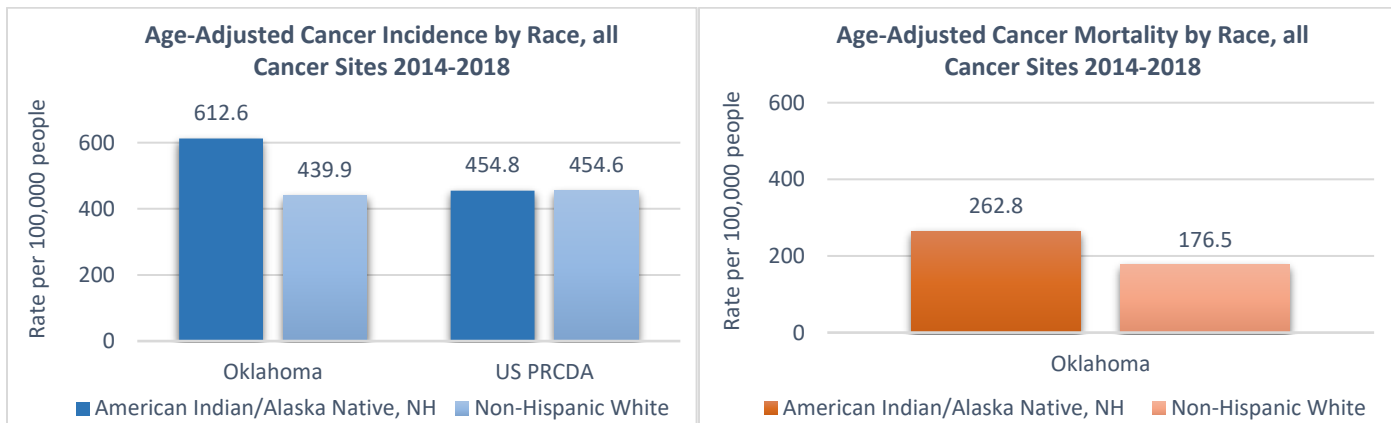
To ensure the stability of estimates and confidentiality, CDC and SEER rates were suppressed if fewer than 16 counts were reported in a specific category and all rates were age adjusted to the 2000 US standard population. CDC and SEER data is limited to invasive incident cancers, except bladder cancer, which also includes *in situ* cancers. 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 were excluded, and resulting percentages were weighted averages estimated from the sample and population sizes.

In this data brief, the US AI/AN population in PRCDA counties, the US NHW and Oklahoma NHW populations serve as comparison groups for the AI/AN population of Oklahoma. In 2020, a total of 685 counties in the US were PRCDA, including all 77 counties of Oklahoma.

With the exception of figures 6 and 7, all cancer data in the figures are IHS linked for both the AI/AN and NHW populations, and are restricted to PRCDA counties. Additionally, in all figures, except for figures 1 and 6, the AI/AN race category is not mutually exclusive of Hispanic origin. Analyses characterizing the US, included the 50 states and the District of Columbia (DC), and excluded US territories.

Results: Overall, there were 51,165 cancer cases diagnosed between 2014 and 2018 in the US for the AI/AN population. 9,852 of those cases were in Oklahoma. Also, between 2014 and 2018 there were 16,880 cancer deaths in the US among the AI/AN population; 2,995 of those deaths were in Oklahoma.

Figure 1: Overall Age-adjusted Cancer Incidence and Mortality Rates for the American Indian and Non-Hispanic White Populations in Oklahoma and US PRCDA, 2014-2018



Source: SEER and CDC (NPCR), Oklahoma Vital Statistics

Figure 1 shows overall age-adjusted incidence and mortality rates for non-Hispanic (NH) AI/AN and NHW populations living in IHS PRCDA counties in Oklahoma and the US. Because no recent national PRCDA restricted IHS-linked mortality data are available, the mortality section concentrates solely on Oklahoma. For overall cancer incidence and mortality, the AI/AN population in Oklahoma has a higher age-adjusted cancer incidence and mortality rate than the NHW population (1.4 times higher for incidence and 1.5 times higher for mortality). For US PRCDA counties, the age-adjusted incidence rates for AI/ANs and NHWs are nearly the same.

Figure 2: Overall Crude Cancer Incidence and Mortality Rates for the American Indian and Non-Hispanic White Populations in Oklahoma by Age, 2014-2018

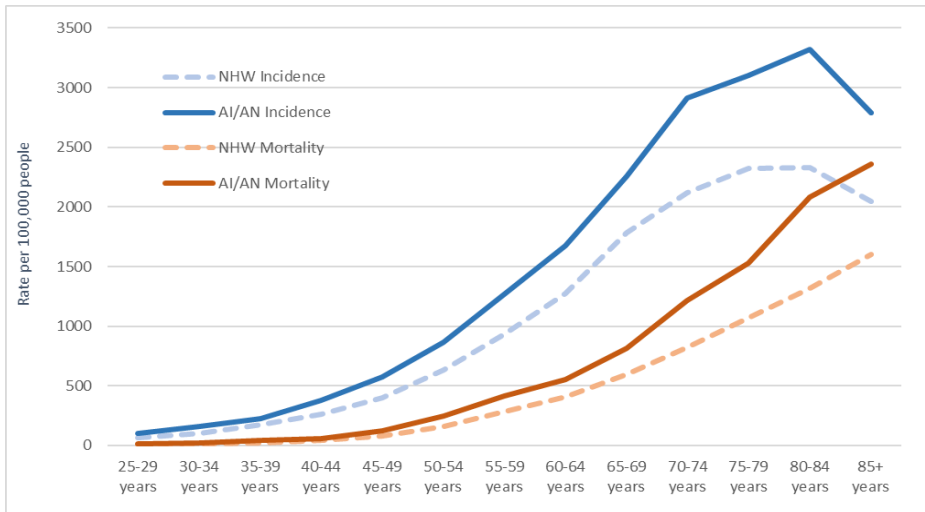
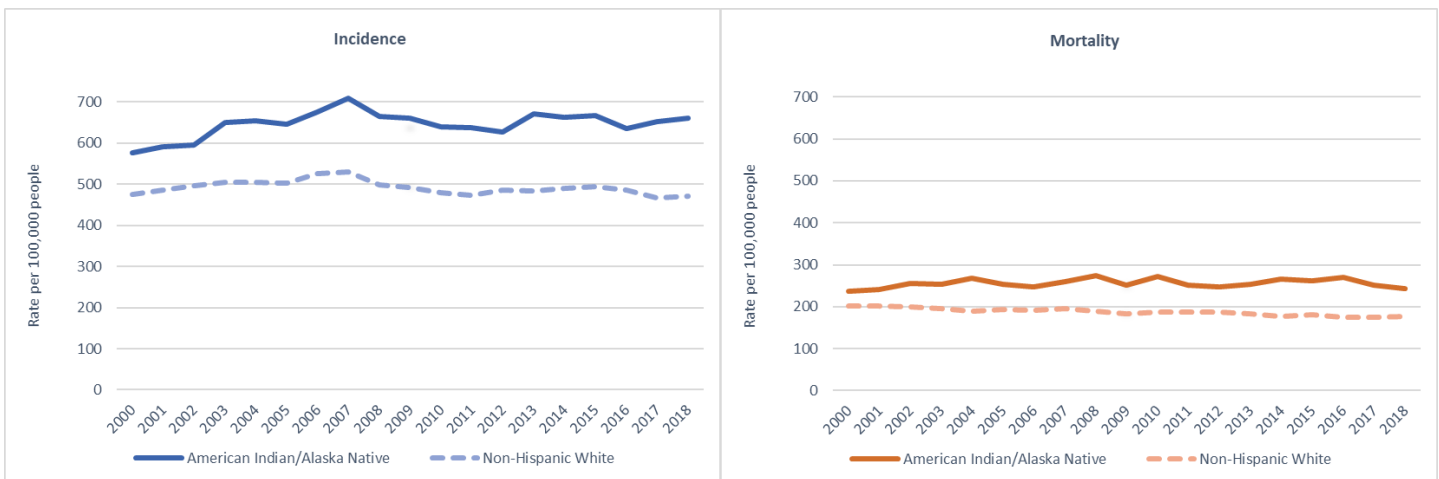


Figure 2 shows age-specific cancer incidence and mortality rates for the AI/AN and NHW populations in Oklahoma. Rates for the AI/AN population were higher than rates for the NHW population for all age groups, for both incidence and mortality. For both AI/AN and NHW, overall cancer incidence gradually increases until 79 years, then begins to decrease. Overall cancer mortality, gradually increases with age for both AI/AN and NHW.

Source: OCCR and Oklahoma Vital Statistics

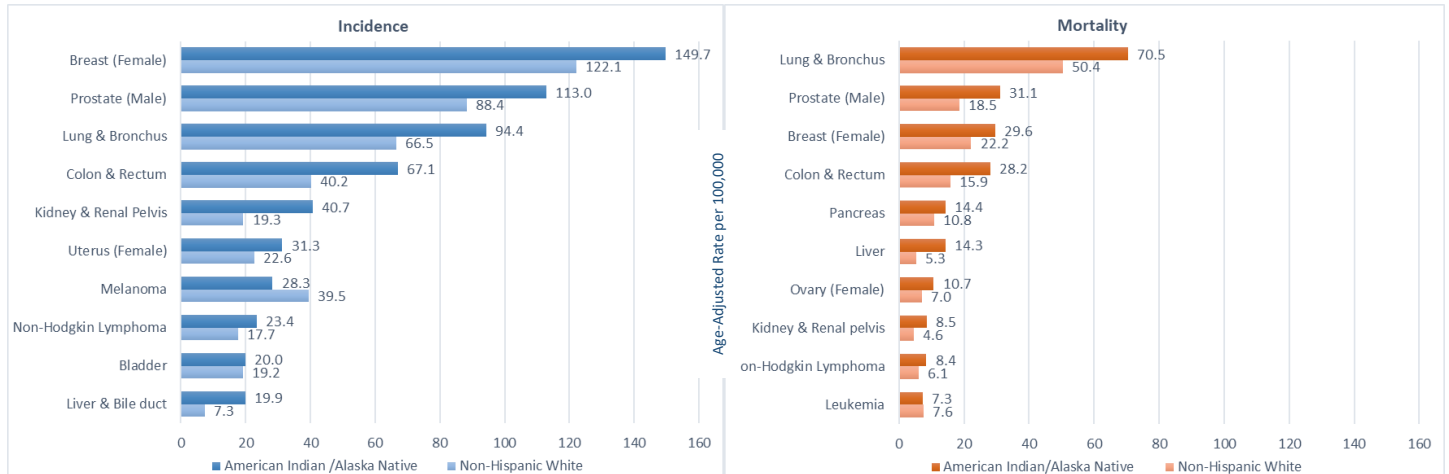
Figure 3: Trend of Overall Age-Adjusted Cancer Incidence and Mortality Rates for the American Indian and Non-Hispanic White Populations in Oklahoma, 2000-2018



Source: OCCR and Oklahoma Vital Statistics

Figure 3 shows trends of overall cancer incidence and mortality for the AI/AN and NHW populations in Oklahoma. Incidence and mortality rates for the AI/AN population were consistently higher than the corresponding NHW population rates at each point in time. Over this time frame, cancer incidence rates increased for the AI/AN population (+14%, 2000 to 2018), but remained nearly the same for the NHW population (-1%, 2000 to 2018). Cancer mortality rates for the AI/AN population increased slightly (+4%, 2000 to 2018), but decreased for the NHW population (-14%, 2000 to 2018).

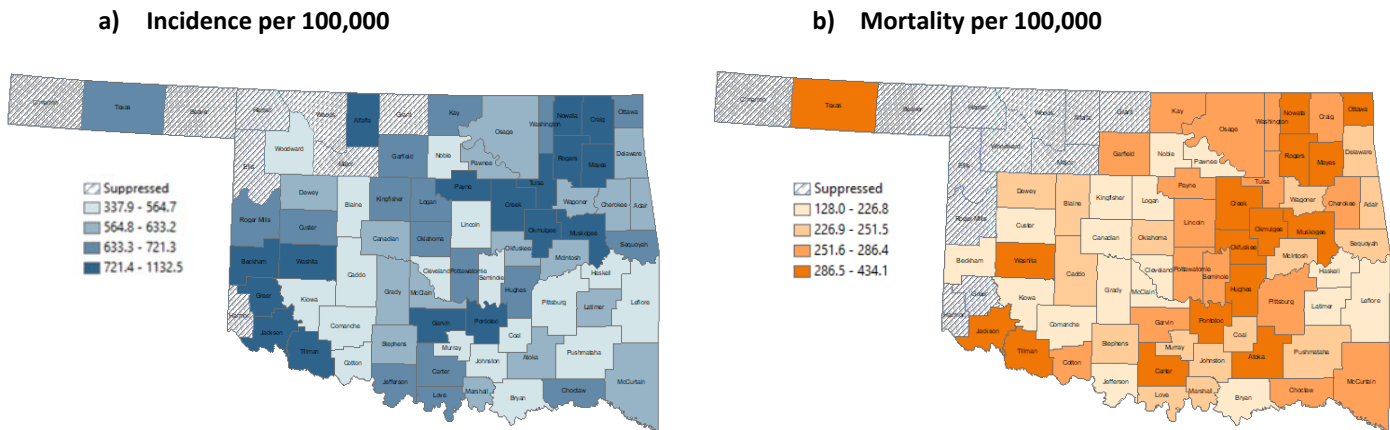
Figure 4: Top 10 Cancers for Incidence and Mortality for the American Indian Population in Oklahoma, 2014-2018



Source: OCCR and Oklahoma Vital Statistics

Figure 4 ranks the top 10 cancers for incidence and mortality for the AI/AN population in Oklahoma, and compares rates for these cancers to the corresponding rates for the NHW population. Notably, the top 4 cancers for incidence match the top 4 cancers for mortality, and these cancers have much higher rates than the others. The AI/AN population in Oklahoma has higher rates than the NHW population for all top 10 cancers, except melanoma for incidence and leukemia for mortality. The top 10 cancers for which the incidence rate is notably higher for the AI/AN population than for the NHW population are cancers of the liver and bile duct (2.7 times), kidney and renal pelvis (2.1 times), colon and rectum (1.7 times), lung and bronchus (1.4 times), and uterus (1.4 times). Top 10 cancer types for which the mortality rate is notably higher for the AI/AN population than for the NHW population are cancers of the liver and bile duct (2.7 times), kidney and renal pelvis (1.9 times), colon and rectum (1.8 times), prostate (1.7 times), ovary (1.5 times), lung and bronchus (1.4 times), and non-Hodgkin lymphoma (1.4 times).

Figure 5: Overall Age-adjusted Cancer Incidence and Mortality Rates for the American Indian Population by Oklahoma County, 2009-2018



Source: OCCR and Oklahoma Vital Statistics

Figure 5 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 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 AI/AN and NHW populations for each county in Oklahoma.

Figure 6: Cancer Screening for the American Indian and Non-Hispanic White Populations in Oklahoma and the United States, 2020

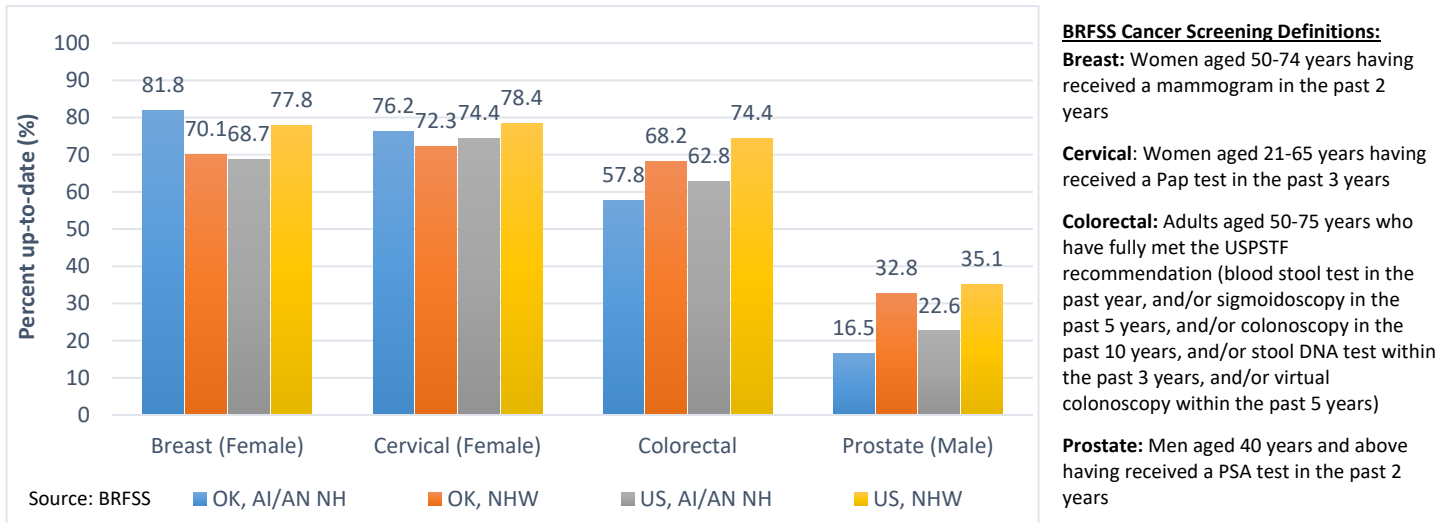


Figure 6 shows that for breast cancer screening, AI/AN women in Oklahoma (81.8%) were the most likely to be up-to-date of the four groups presented in the figure. For cervical cancer screening, AI/AN women were more likely to be up-to-date than NHW women in Oklahoma. The figure also shows that for colorectal cancer screening, AI/AN individuals in Oklahoma were the least likely of the four groups to be up-to-date. This reflects the finding that in Oklahoma AI/AN men were much less likely to be screened for colorectal cancer than AI/AN women (47.6% men; 69.2% women). AI/AN men in Oklahoma are also the least likely of the 4 groups to have had prostate cancer screening.

Figure 7: Up-to-date HPV Vaccination for the American Indian and White Populations ages 13-17 in Oklahoma and the United States, 2019

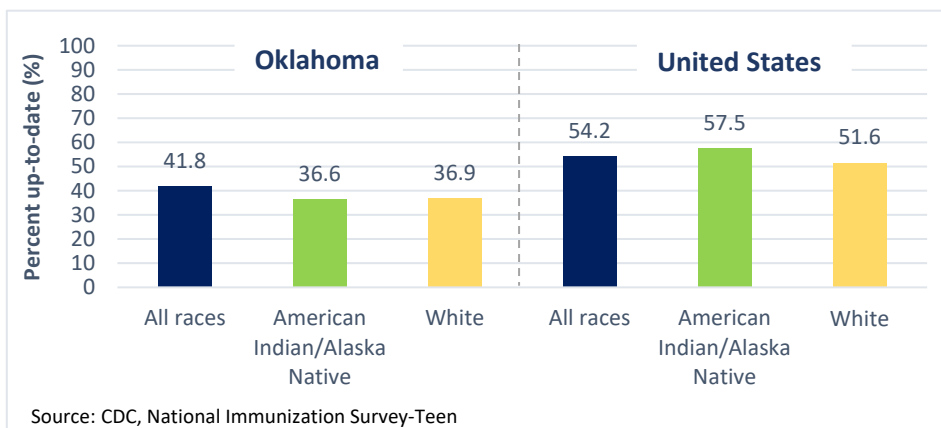


Figure 7 shows the percentage of adolescents ages 13-17 who received all recommended doses of the human papillomavirus (HPV) vaccine in 2019. Oklahoma adolescents of all races or ethnicities had lower HPV vaccination rates than their counterparts in the US. Similarly, compared to AI/AN adolescents in the US, AI/AN adolescents in Oklahoma were much less likely to

be up-to-date with HPV vaccination. In Oklahoma, the proportions of AI/AN adolescents and NHW adolescents who were up-to-date on HPV vaccination were similar.

Conclusions and Implications for Practice and Policy

In Oklahoma, the AI/AN population has alarmingly higher overall and cause-specific cancer incidence and mortality rates than the NHW population. Concerted efforts to improve surveillance, healthcare financing, screening, and research could substantially ameliorate the unacceptably high cancer rates for the NA population in Oklahoma, as well as other NA populations nationwide.

Surveillance. Cancer surveillance relies on having access to accurate and timely data. IHS PRCDAs county-linked data have been used to increase the accuracy of cancer data for AI/AN populations, but recent (e.g., within the past five years) national PRCDAs restricted IHS-linked mortality data have not been released. Moreover, IHS PRCDAs counties do not represent the entire nation. National- and state-level efforts to increase the accuracy of racial classification of cancer registry data are warranted.

Healthcare financing. Programs to reduce or eliminate financial barriers to screening services and high-quality cancer care services are warranted. Financial concerns cause many individuals with symptoms to delay health care, which can be devastating in terms of cancer outcomes.⁷ Importantly, the expansion in 2021 of Medicaid coverage in Oklahoma for individuals between the ages of 19-64 through the Affordable Care Act has helped reduce financial barriers to cancer-related care for many low-income individuals in the state. However, several states with large AI/AN populations have not expanded Medicaid coverage.

Cancer screening. To improve cancer outcomes and mitigate disparities, 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.⁸ Similarly, establishing programs to increase evidence-based cancer screening for lung, colorectal, and prostate cancer merit consideration.

Cancer Clinical Care and Research. 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 in ways that ensure diversity among patients enrolled into cancer clinical trials. Also, funding should support research that aims to improve understanding of why some cancers, such as liver, kidney, colorectal, and prostate cancers are particularly lethal among AI/AN patients. Funding is warranted to support implementation science studies to increase receipt of evidence-based cancer screening, and to improve cancer care treatment in settings that serve AI/AN patients.

National- and state-level efforts are to be recognized, however, these and additional actions are needed in order to achieve the ambitious, but worthy, goal of eliminating cancer disparities among the AI/AN population of Oklahoma.

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Suggested Citation: Sambo AB, Rhoades AD, Campbell JE, Hunsucker LA, Pharr SF, and Doescher MP. Cancer in Oklahoma Data Brief Series: Cancer among the American Indian Population in Oklahoma. Community Outreach and Engagement, Stephenson Cancer Center, OU Health. 2022 June; 2(3).

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