Cancer in Oklahoma Data Brief Series:

Prostate Cancer in Oklahoma

Janis E. Campbell, Ayesha B. Sambo, Stephanie F. Pharr, Lauri A. Hunsucker, Mark P. Doescher

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

Introduction

In 2018, prostate cancer was the most diagnosed cancer and the second leading cause of death from cancer among men in the United States (106.8 cases/100,000 and 7.8 deaths/100,000) and in Oklahoma (95.7 cases/100,000 and 8.4 deaths/100,000). Nationally, Oklahoma ranks 39th worst among all states in prostate cancer incidence and 13th worst in overall prostate cancer mortality.[1] Prostate cancer screening through prostate specific antigen (PSA) testing maintains a "C", recommending selectively offering the test, a recommendation from the United State Preventative Task Force (USPSTF).[2] The USPSTF suggestion for practice is "to offer or provide this service for selected patients depending on individual circumstances."[2]

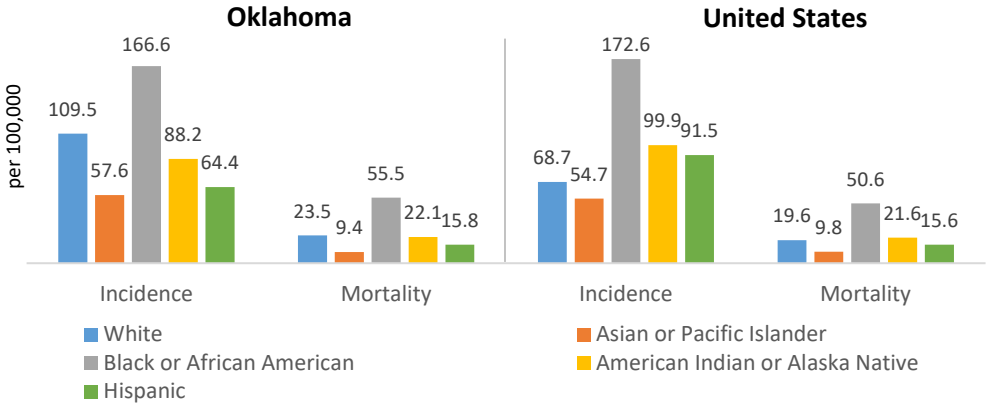
No recent reports have summarized cancer screening, incidence, and mortality rates for prostate cancer in Oklahoma. The goal of this data brief is to describe prostate screening, incidence, and mortality rates among men in the state. This brief concludes with a discussion of the significance of findings on clinical practice and public health policy.

Methods

Data for 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 about cancer screening was obtained from the Behavioral Risk Factor Surveillance System (BRFSS). For this study, Hispanic persons were classified as being Hispanic regardless of race. Those who identified as White, Black, African American, American Indian, Alaska Native, Asian, or Pacific Islander were classified as non-Hispanic, thus excluding individuals of these groups with Hispanic ethnicity. All data sources used in this brief were publicly available and provided de-identified data.

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. Only prostate cancer cases (ICD-0-03 C619) in men were analyzed. Cases were limited to invasive incident cancers. BRFSS estimates were suppressed for stability if the unweighted sample size was less than 50. Unknown values were excluded (except unknown stage), and 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 stage. ESRI ArcMap® (using the Moran's I tools) was used to determine the presence of significant clusters of incidence and mortality among counties in Oklahoma.

Figure 1: Age-adjusted prostate cancer incidence and mortality rates per 100,00 men by race in Oklahoma and the United States, 2014-2018



Results

Overall, there were 202,340 prostate cancer cases diagnosed between 2014 and 2018 in the US; 2,148 of those cases were in Oklahoma. The prostate cancer incidence rate in Oklahoma was 95.7 per 100,000 population (100k) compared to 106.8 per 100k for the US.

Figure 1 shows the prostate cancer rates per 100,000 population by race and ethnicity in Oklahoma and the United States. Black or African American men in Oklahoma and the United States have the highest incidence and mortality rates of any of the racial or ethnic groups by far. Compared to White men, Black or African American men in Oklahoma were 1.9 times more likely to be diagnosed with prostate cancer (166.6 per 100k Black or African American men; 88.2 per 100k White men) and 2.4 times more likely to die from prostate cancer (55.5 per 100k Black or African American men; 23.5 per 100k White men). While the incidence rate for Black or African American men in Oklahoma (166.6 per 100k) was slightly lower than for their US counterparts (172.6 per 100k), the mortality rate for Black or African American men in Oklahoma (55.5 per 100k) was higher than for Black or African American men in the US (50.6 per 100k). Among the major racial or ethnic groups, American Indian or Alaska Native men had the second highest incidence rates and third highest mortality rates. American Indian or Alaska Native men in Oklahoma were more likely to be diagnosed and more likely to die from prostate cancer compared to American Indian or Alaska Native men in the United States overall. In fact, American Indian or Alaska Native were about 60% more likely to be diagnosed and 20% more likely to die in Oklahoma than in the United States overall. White men had the third highest incidence rates and second highest mortality rates. Non-Hispanic White men in Oklahoma were less likely to be diagnosed but more likely to die from prostate cancer compared to White men in the United States overall. Hispanic men had the 4th highest incidence and mortality rates. Hispanic men in Oklahoma were 1.4 times less likely to be diagnosed than Hispanic men in the US (64.4 per 100k vs 91.5 per 100k), but they had a virtually identical mortality rate (15.8 per 100k vs 15.6 per 100k). Among the racial or ethnic groups examined, Asian or Pacific Islander men had the lowest incidence and mortality rates. Compared to Asian or Pacific Islander men in the United States, Asian or Pacific Islander men in Oklahoma were slightly more likely to be diagnosed.

Figure 2: Trend of prostate cancer incidence and mortality rates in Oklahoma and the United States, 1997-2018

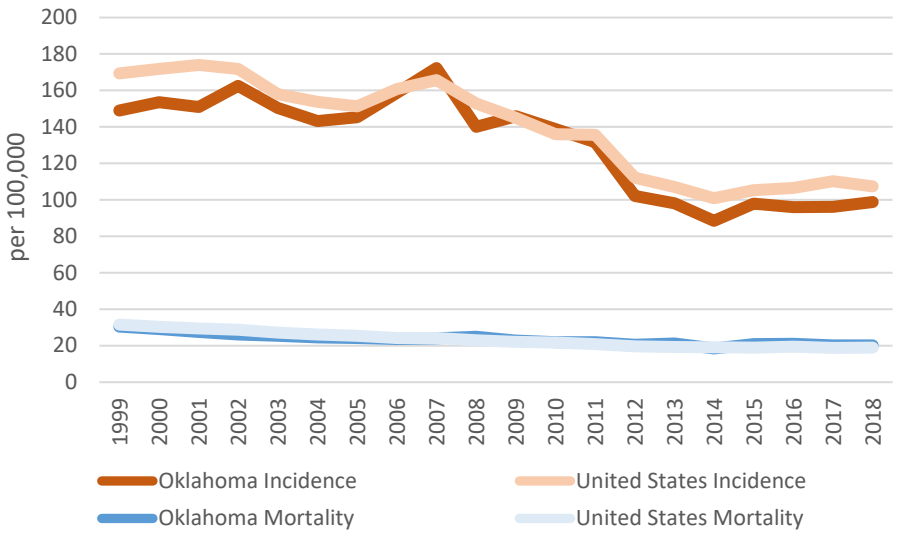


Figure 2 shows yearly trends of prostate cancer incidence and mortality for Oklahoma and the United States. Overall, Oklahoma mirrors the United States with a large drop in prostate cancer diagnoses beginning around 2007 and a much smaller decrease in mortality.

Figure 3 shows Oklahoma prostate cancer staging at diagnosis by race for 2014 through 2018. Most prostate cancers in Oklahoma are found during the local stage (68.1%). The error bars in Figure 3 show that there was no significant difference in stage at diagnosis by race or ethnicity.

Figure 3: Overall prostate cancer percent stage at diagnosis—Oklahoma 2014-2018

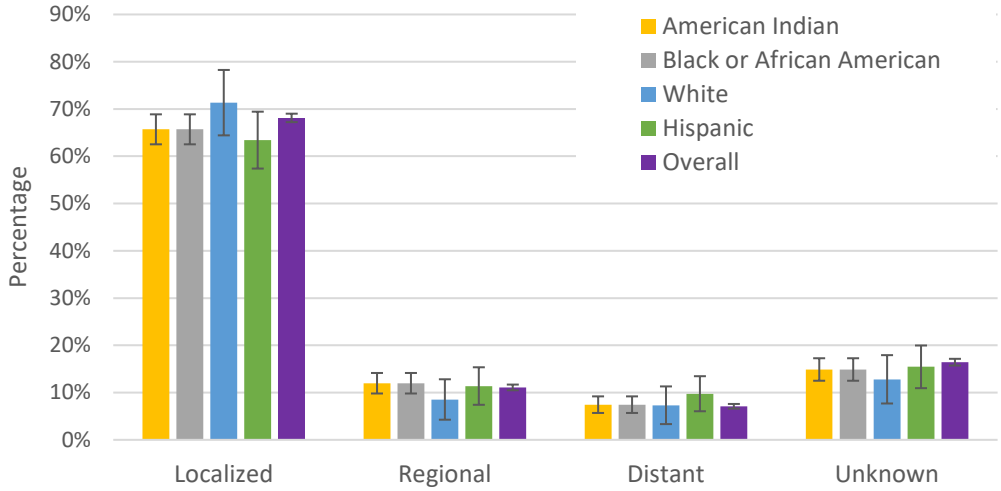
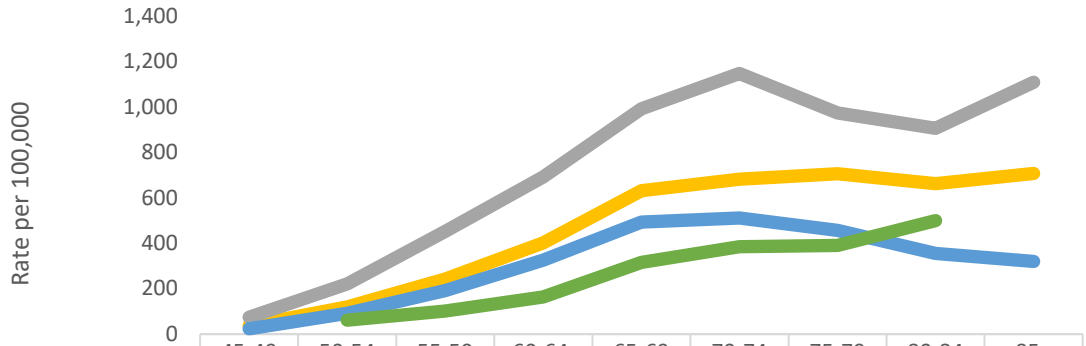


Figure 4 shows Oklahoma prostate cancer age-specific rates by race and age groups. It illustrates several interesting trends among racial or ethnic groups. First, the incidence rates all increase from very low for men in their late forties and early fifties, to peaks around their late sixties to early seventies, and then the rates plateau or fall; the exceptions are Hispanic men whose incidence rates peak in their late seventies to early eighties and Black or African American men whose incidence rates peaked again in their eighties. In Oklahoma, Black or African American men age 85 or older were much more likely to be diagnosed than men from the other racial or ethnic groups. Also, Black men in every age group are 2.2 to 2.6 times more likely to die from prostate cancer than non-Hispanic White men (data not shown). The findings also show that Hispanic men in their eighties experience higher rates of prostate cancer than Non-Hispanic White men in the same age group. Prostate cancer numbers for Hispanic men aged 49 and younger and aged 85 and older were too small to be shown.

Figure 4: Prostate cancer age-specific rate by race and age groups—Oklahoma 2013-2017



	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85+
American Indian or Alaska Native	36.9	119.8	242.3	402.2	631.4	681.6	706.2	662.0	707.0
Black or African American	74.4	221.9	452.4	691.8	991.5	1146.8	973.7	906.1	1108.3
White	23.6	91.2	192.1	325.6	493.1	511.0	455.9	355.5	320.1
Hispanic		61.5	101.8	164.1	315.9	384.5	390.6	499.5	

Asian and Pacific Island numbers too small to be shown

Figure 5 shows maps of the prostate cancer incidence and mortality rates by county for Oklahoma. Table 1 of Appendix 1 provides the underlying number of incident cases and age-adjusted incidence rates for each county in Oklahoma, while Table 2 of Appendix 1 provides the corresponding mortality data. Appendix 2 contains a county-level map of Oklahoma demonstrating statistically significant counties with "Hot Spots" or "Cold Spots" for prostate cancer incidence (p-value 0.007; Figure 1 in Appendix 2). "Hot spots" are defined as areas of high rates of cancer (red) compared to "Cold spots", defined as areas of lower rates of cancer (blue). There were no hot or cold spot clusters for prostate cancer mortality rates by county.

Figure 5: Overall age-adjusted prostate cancer incidence and mortality rate by county Oklahoma, 2014-2018

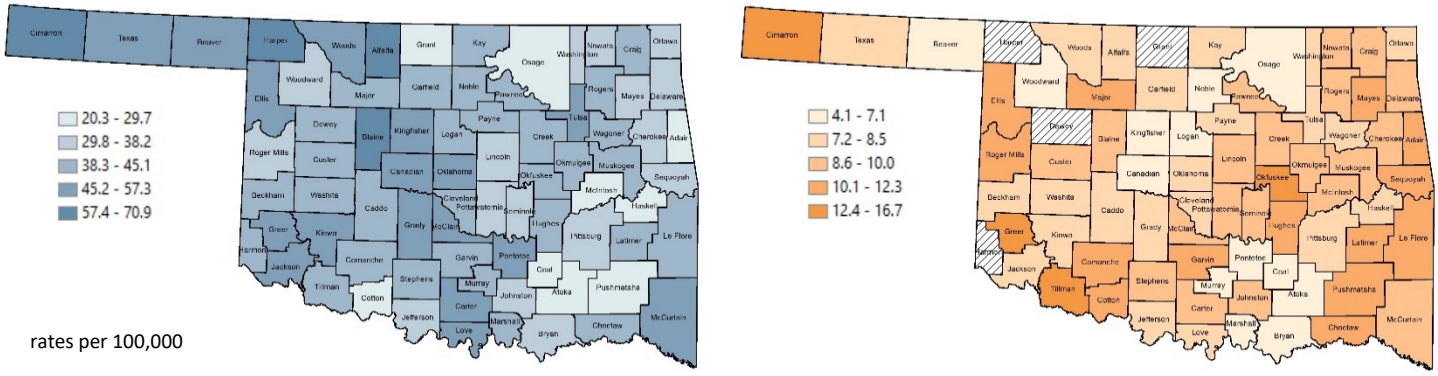
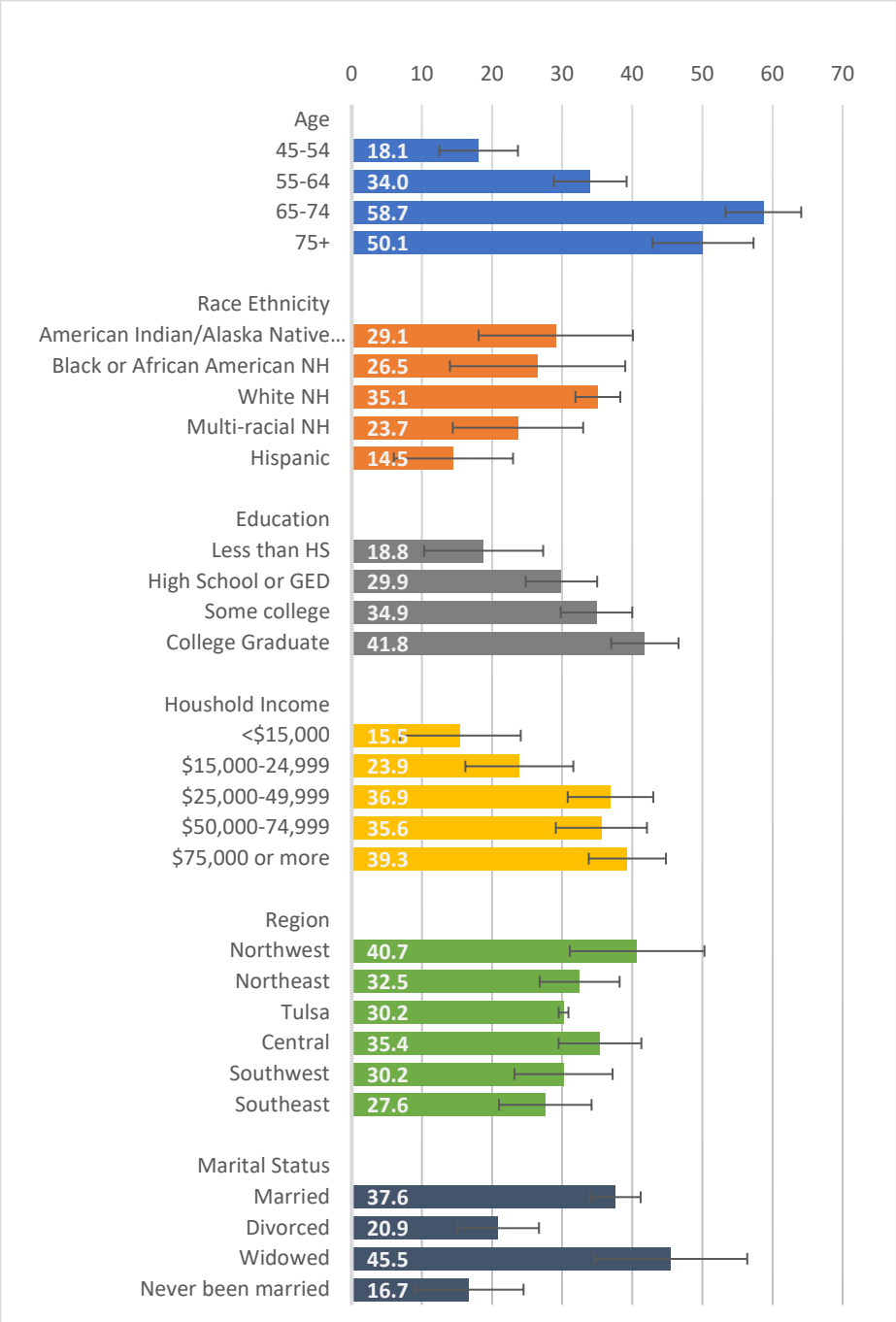


Figure 6 shows receipt of prostate cancer screening with PSA testing among men aged 40 and older within the past two years by social and demographic characteristics in Oklahoma in 2018. Only 32.8% (95% CI 30.0-35.5%) of men over the age of 40 received a prostate cancer screening between 2016 and 2018. The proportion of men reporting prostate cancer screening increased by age group through age 65-74 years. Although the point estimates for prostate cancer screening were lower for African American men, American Indian or Alaska Native men, and those who reported more than one race than for White men, these differences were not statistically significant. However, the proportion of Hispanic men who had been screened (14.5%) was significantly lower than for White men. Higher educational attainment, an important socio-economic factor, showed a positive association with prostate cancer screening. Almost 25% of men with a high school degree or GED reported having prostate cancer screening, whereas over 40% of college graduates reported having had this screening. Similarly, as income increased the likelihood of a PSA screen also increased, ranging from a low of 15.5% of men with incomes below $15,000 having been screened compared to 39.3% of men with incomes of 75,000 or higher having been screened. Prostate cancer screening by region did not show a statistically significant difference, but the rate in the Southeast portion of Oklahoma was the lowest at 27.6%. Finally, Figure 7 shows that men who were divorced or never married were significantly less likely than men who were married or widowed to have been screened for prostate cancer.

Conclusions and Implications for Practice and Policy

Prostate cancer is the most diagnosed cancer among men in Oklahoma. Thus, diagnosing and treating prostate cancer is critical for the health and economic productivity of Oklahoma. Findings form the basis for the following recommendations to increase awareness of prostate cancer and prostate cancer screening and reduce prostate cancer incidence and mortality. First, the residents of Oklahoma need to be aware of the importance of prostate cancer screening, diagnosis, and treatment. Notably, prostate cancer screening rates in Oklahoma are low overall and characterized by large socio-demographic disparities in the rate of screening. Many patients present with late-stage disease. Statewide efforts, such as media campaigns, to increase awareness of prostate cancer symptoms and prostate cancer screening could help reduce the burden of prostate cancer in Oklahoma.

Figure 6: Percentage of men who had a PSA performed in the past two years Oklahoma 2018



Health care professionals in Oklahoma need to work with men on shared and informed decision-making concerning prostate cancer screening. Statewide efforts to educate health care professionals about how to engage in discussions with their patients about prostate cancer screening and prostate cancer symptoms are warranted.

Efforts to ensure that all Oklahoma men with prostate cancer have access to the newest treatments, such as immunotherapy, are necessary. This means reducing financial, travel, and other barriers to health care.

Also, there is a pressing need to develop and implement interventions to help ensure the early detection of prostate cancer in groups at increased risk for developing prostate cancer, particularly Black or African American men. For example, PSA testing coupled with additional testing for biomarkers, prostate imaging, or other modalities may be essential to improve the detection of early-stage cancer in this population. Moreover, research is needed to identify the most efficacious treatments for prostate cancer for high-risk groups, including Black or African

American men. Funding also should be increased to help ensure diversity among patients enrolled in cancer clinical trials, as this helps to improve cancer outcomes. Additionally, funding is needed for basic science research to better understand why many cancers, including prostate cancer, are particularly lethal among Black or African American patients and, in Oklahoma, American Indian patients.

Finally, efforts to improve the consistency of prostate cancer screening guidelines issued by national groups would help clinicians and patients make informed choices about screening. These and additional actions are needed if, as a state, we are truly serious about achieving the ambitious, but worthy, goal of eliminating prostate cancer in Oklahoma.

Screening resources:

American Cancer Society. American Cancer Society recommendations for prostate cancer early detection. 2021 https://www.cancer.org/cancer/prostate-cancer/detection-diagnosis-staging/acs-recommendations

United States Preventive Services Task Force, Grossman DC, Curry SJ, et al. Screening for Prostate Cancer: US Preventive Services Task Force Recommendation Statement. *JAMA*. May 8 2018;319(18):1901-1913. doi:10.1001/jama.2018.3710

Data Sources:

Centers for Disease Control and Prevention (CDC). Behavioral Risk Factor Surveillance System Survey Data. Atlanta, Georgia: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, 2018.

Oklahoma State Department of Health (OSDH), Center for Health Statistics, Health Care Information, Vital Statistics, on Oklahoma Statistics on Health Available for Everyone (OK2SHARE). https://www.health.state.ok.us/stats/Registries/cancer/Final/mortality.shtml

Oklahoma State Department of Health (OSDH), Disease, Prevention, & Preparedness Service, Chronic Disease Service, Oklahoma Central Cancer Registry (OCCR), on Oklahoma Statistics on Health Available for Everyone (OK2SHARE). https://www.health.state.ok.us/stats/Registries/cancer/Final/Statistics.shtml

Surveillance, Epidemiology, and End Results (SEER) Program (www.seer.cancer.gov) SEER*Stat Database: U.S. Population (1990-2018). National Cancer Institute, DCCPS, Surveillance Research Program, Surveillance Systems Branch, released April 2020.

References:

1. US Department of Health and Human Services, Centers for Disease Control and Prevention and National Cancer Institute, www.cdc.gov/cancer/dataviz. Accessed September 29, 2021.
2. United States Preventive Services Task Force, Grossman DC, Curry SJ, et al. Screening for Prostate Cancer: US Preventive Services Task Force Recommendation Statement. *JAMA*. May 8 2018;319(18):1901-1913. doi:10.1001/jama.2018.3710

Suggested Citation: Campbell JE, Sambo AB, Hunsucker LA, Pharr SF and Doescher MP. Cancer in Oklahoma Data Brief Series: Prostate Cancer in Oklahoman. Community Outreach and Engagement, Stephenson Cancer Center, OU Health. 2021 Nov; 1(2).

For more information, please contact: Community Outreach and Engagement, Stephenson Cancer Center, OU Health.