Cancer in Oklahoma Data Brief Series:

Colorectal Cancer in Oklahoma

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

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

Introduction

Colon and rectal cancers (CRC), often considered together, were the third most diagnosed cancer among men and women and the third leading cause of death from cancer in the United States (US) with a 2014-2018 age-adjusted incidence rate (AAIR) of 38.1 cases per 100,000 and an age-adjusted mortality rate (AAMR) of 13.7 deaths per 100,000. In Oklahoma, these rates were 41.2 and 16.7 per 100,000, respectively. Oklahoma ranked 14th worst among states and the District of Columbus (DC) in CRC incidence and third worst in overall CRC mortality.[1] CRC screening through approved methods (e.g. high-sensitivity guaiac fecal occult blood test (FOBT) or fecal immunochemical test (FIT) every year; stool DNA-FIT every 1 to 3 years; computed tomography colonography every 5 years; flexible sigmoidoscopy alone every 5 years; flexible sigmoidoscopy every 10 years plus annual FIT; or colonoscopy screening every 10 years) is recommended for adults aged 45 to 75 years, and selectively recommended for adults aged 76 to 85 years based on overall health status, prior screening history, and patient preference.[2] In fact, CRC itself can be prevented through polyp removal during a colonoscopy. This brief focuses on cancer incidence, mortality, and screening rates for CRC in Oklahoma, and 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) through OK2SHARE and the Centers for Disease Control's (CDC) National Program of Cancer Registries (NPCR), accessed through CDC WONDER. CRC cancer mortality data were accessed from the Oklahoma Vital Statistics and the CDC's National Vital Statistics System (NVSS) through OK2SHARE and CDC WONDER, respectively. Information about CRC screening (FOBT in last year and/or flexible sigmoidoscopy in last 5 years and FOBT in last 3 years and/or colonoscopy in last 10 years) was obtained from the Behavioral Risk Factor Surveillance System (BRFSS) accessed through CDC BRFSS. All data sources used in this brief were publicly available.

In this brief, Hispanic persons were classified as being Hispanic regardless of race. All individuals in the sample were classified 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 (AI/AN), or NH Asian or Pacific Islander.

This data brief defines CRC as the following cancer sites: colon (ICD-0-3 C18.0-18.9), rectosigmoid (ICD-0-3 C19.9), and rectal (ICD-0-3 C20.9). Anus and anal canal (ICD-0-3 C21.0-21.8) and skin (ICD-0-3 C44.5) cancers were excluded. To ensure the stability of estimates and confidentiality, rates were suppressed if fewer than 16 counts were reported in a specific category, and all except age-specific 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 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.

Results

Overall, there were 719,002 cases of CRC diagnosed between 2014 and 2018 in the US. Of these cancers, 9,146 cases were in Oklahoma. For mortality in the US, there were 261,043 CRC deaths between 2014 and 2018. Of these cancer deaths, 3,771 deaths were in Oklahoma. The CRC incidence rate in US was 38.1 per 100,000 population compared to 41.2 for the OK. During this timeframe, the CRC death rate for the US was 13.7 compared to 16.7 for OK.

Figure 1: Age-adjusted colorectal cancers by sex US and Oklahoma, 2014-2018
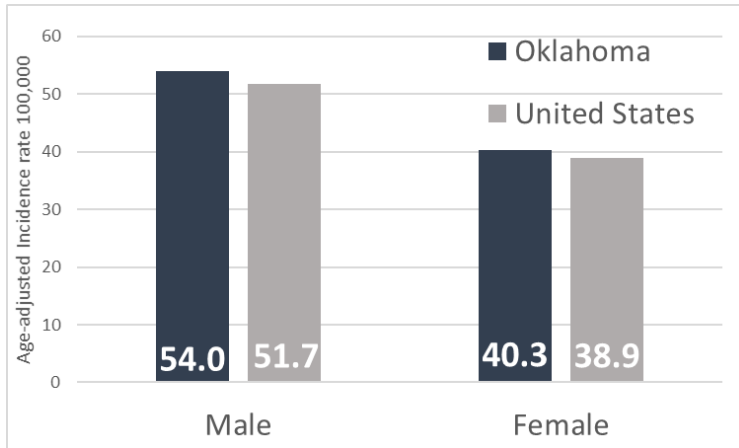
CRC rates are higher in Oklahoma compared to the US for both males and females. Also, males in the US and Oklahoma have higher rates of colorectal cancer than females. (**Figure 1**). CRC incidence and mortality rates increase with age (**Figure 2**). However, examination of colon and rectal separately reveals that most colon deaths occur at an older age than most rectal cancer deaths (**Appendix 1).** In other words, cancer incidence and mortality rates for both cancers increase until around age 50 after which the rectal cancer rate stabilizes, while the colon cancer rate continues to increase. **Figure 3** shows that in Oklahoma, the NH AI/AN incidence rate (65.7 colorectal cases per 100,000 population) was higher than for the other ethnic and racial populations in the state: NH Black or African American (42.6); NH White (39.3); NH Asian (35.0); and Hispanic (33.9). This figure also shows a slightly different CRC incidence rate pattern by ethnic and racial population for the US compared to Oklahoma: NH Black or African American (43.9); NH AI/AN, (40.8); NH White (38.0); Hispanic (33.6) and NH Asian (29.8). The NH AI/AN population was 70% more likely to be diagnosed with CRC and 30% more likely to die from it compared to the NH White population in Oklahoma. The NH Black or African American population was 8% more likely to be diagnosed with CRC, but 30% more likely to die from it compared to NH Whites in Oklahoma. Compared to the US NH Black or African American population, the NH Black or African American population in Oklahoma had a slightly lower incidence rate (43.9 for the US compared to 42.6 for Oklahoma), but had a 15% higher CRC mortality rate (**Figure 3**).

Figure 2: Overall Colorectal cancer incidence and mortality by age groups, Oklahoma 2014-2018
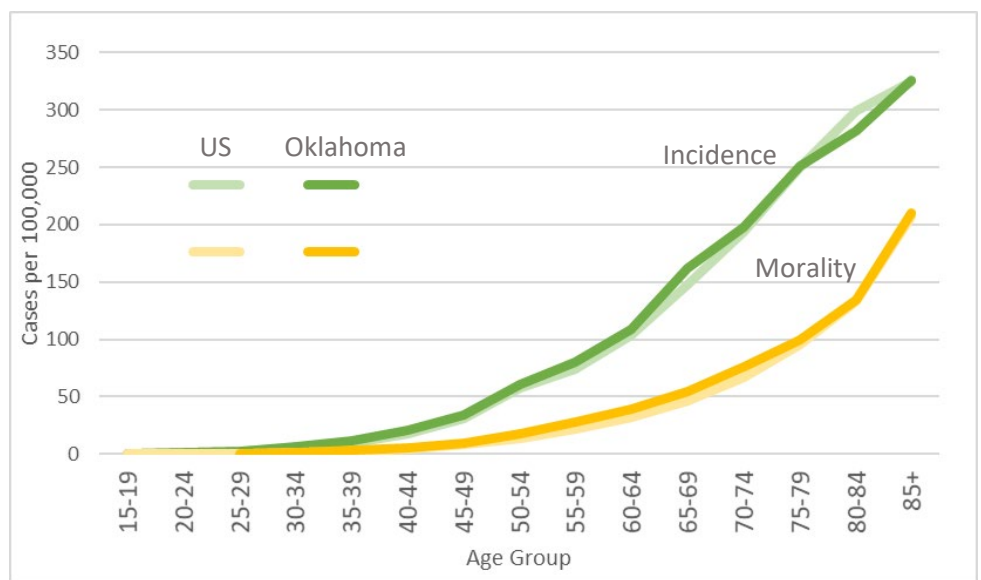
Figure 3: Colorectal cancer incidence and mortality by race and ethnicity in Oklahoma and the US, 2014-2018
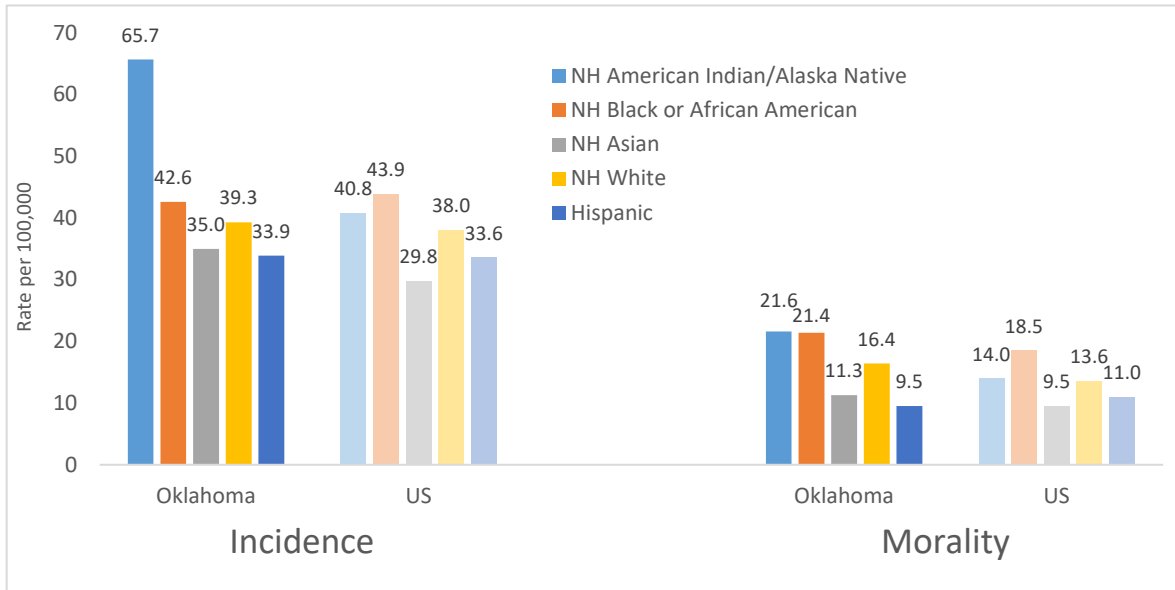

Table 1 shows Oklahoma CRC staging at diagnosis by ethnicity and race for 2014 through 2018. Among racial and ethnic groups, the NH AI/AN population (27.0%) was least likely to have CRC diagnosed at the local stage compared to the NH White population (34.1%). Additionally, the NH Black or African American population (27.2%) was the most likely to have CRC diagnosed at a distant stage compared to the NH White population (20.0%).

Table 1: Colorectal cancer percent stage at diagnosis Oklahoma, 2014-2018

|	NH White % (95% CI)	NH Black or African American % (95% CI)	NH American Indian or Alaska Native % (95% CI)	NH Other % (95% CI)	Hispanic % (95% CI)
In Situ	2.3% (1.9-2.6)	2.5% (1.3-3.8)	2.0% (1.0-2.9)		
Localized	**34.1% (33.0-35.1**)	31.8% (28.1-35.6)	**27.0% (23.8-30.1)**	31.9% (25.7-38.2)	30.1% (25.2-35.1)
Regional	32.3% (31.2-33.3)	27.6% (24.0-31.2)	33.9% (30.5-37.2)	30.0% (23.9-36.2)	28.0% (23.2-32.8)
Distant	**20.0% (19.1-20.9)**	**27.2% (23.7-30.8)**	23.4% (20.4-26.4)	25.8% (19.9-31.7)	21.4% (17.0-25.8)
Unknown	11.4% (10.7-12.1)	10.8% (8.3-13.3)	13.8% (11.4-16.2)	12.2% (7.8-16.6)	11.4% (8.0-14.9)

Figure 4: Colorectal cancer incidence and mortality by year Oklahoma and the US, 2014-2018
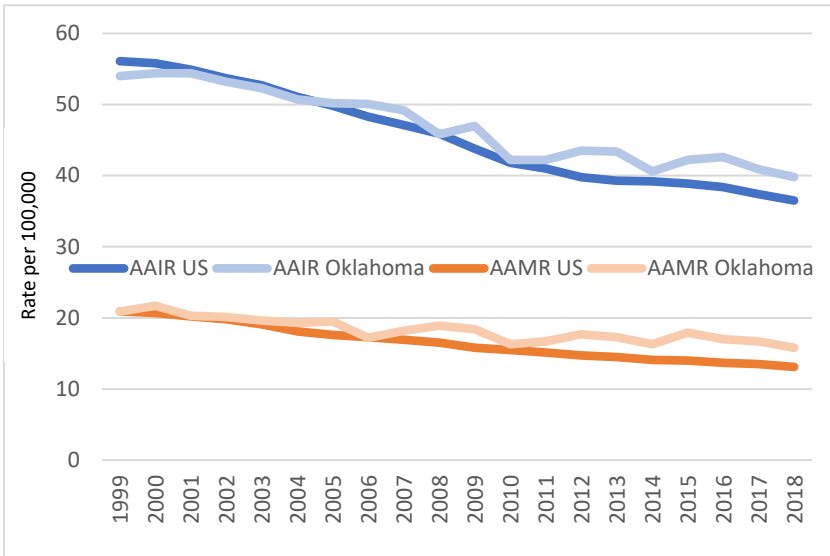
Overall, Oklahoma mirrors the US with a steady decrease in CRC incidence and mortality up to around 2008 at which time Oklahoma rates did not decrease as rapidly as the US ones, with larger gaps occurring over the last five years (**Figure 4**).

Figure 5 shows maps of the (a) incidence and (b) mortality rates by county for Oklahoma. While there are no clusters of incident CRC, substantial rural and urban differences exist. Persons residing in rural (non-metropolitan) counties were significantly more likely to be diagnosed with CRC (44.3) than their counterparts residing in metropolitan counties (40.9). Also, persons living in rural counties were significantly more likely to die from CRC (18.2 vs 15.5 respectively; data not shown).
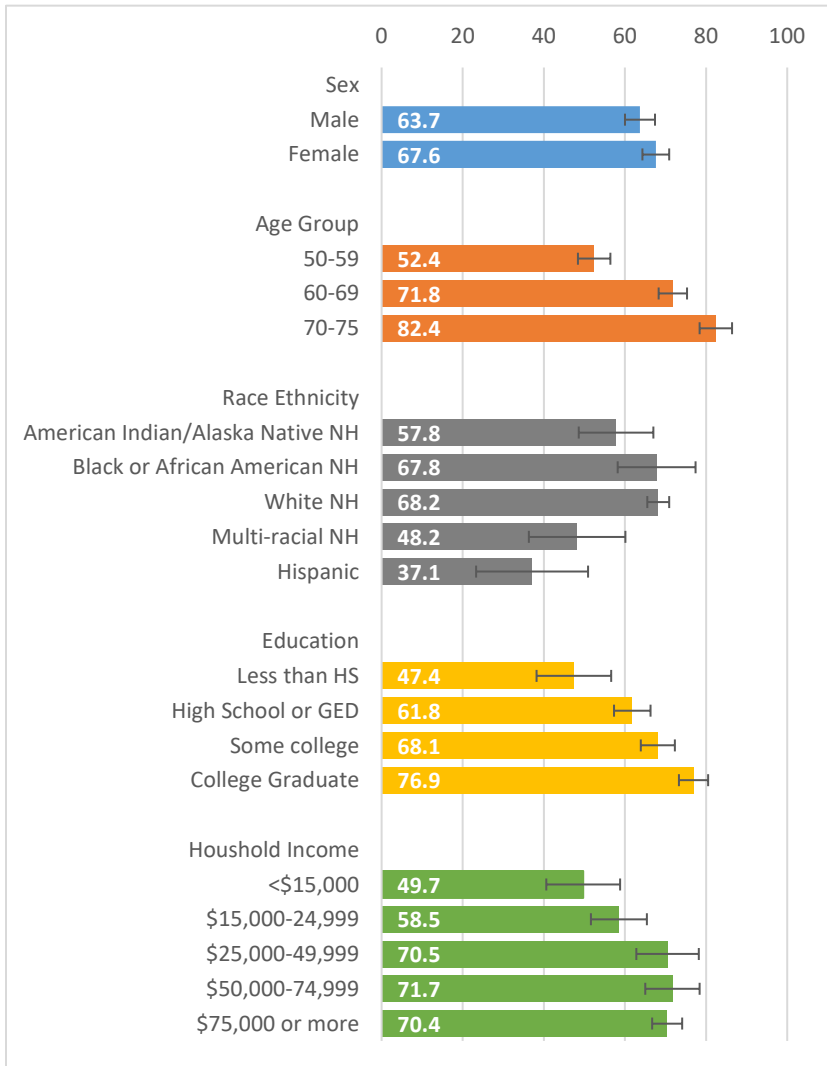
Figure 5: Overall age-adjusted Colorectal cancer incidence and mortality rate by county Oklahoma, 2014-2018

a)   **Incidence**   b)   **Mortality**
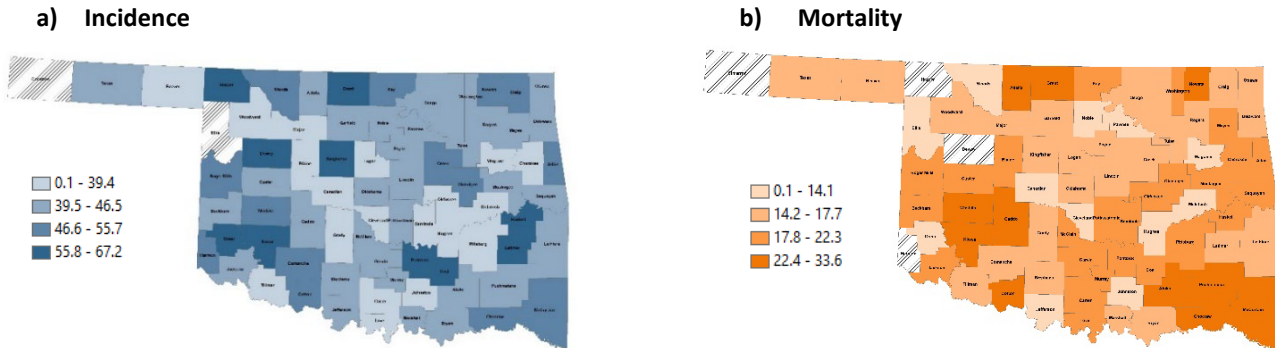
Rates per 100,000

Figure 6 shows the percentages of adults aged 50 to 75 years in Oklahoma who met the USPSTF CRC screening guideline by social and demographic characteristics in 2020. Overall, among Oklahomans aged 50-75, 66% received a CRC screening test within the recommended time intervals, 7% received a CRC screening test but not within the recommended time intervals, and 27% had never received a CRC test (**Figure 6**). The corresponding figures for the US were, 74%, 7%, and 18.2% respectively. Compared to the CRC screening proportion for NH White respondents (68%), the proportions were roughly the same for Black or African American respondents (68%), 10% lower for NH AI/AN respondents (58%), 20% lower for those who reported one or more racial groups (48%), and over 30% lower for Hispanic respondents (37%). As educational attainment increased, CRC screening rates increased, ranging from under 50% for respondents with less than a high school degree or GED to over 75% for those who were college graduates.

Figure 6: Percentage of Oklahoma adults ages 50-75 years satisfying the USPSTF CRC screening guideline, 2020

Category	Value
Sex	
Male	63.7
Female	67.6
Age Group	
50-59	52.4
60-69	71.8
70-75	82.4
Race Ethnicity	
American Indian/Alaska Native NH	57.8
Black or African American NH	67.8
White NH	68.2
Multi-racial NH	48.2
Hispanic	37.1
Education	
Less than HS	47.4
High School or GED	61.8
Some college	68.1
College Graduate	76.9
Household Income	
<$15,000	49.7
$15,000-24,999	58.5
$25,000-49,999	70.5
$50,000-74,999	71.7
$75,000 or more	70.4

Similarly, as income increased the likelihood of CRC screening also increased, ranging from roughly 50% for respondents with incomes below $15,000 to 70% for those with incomes of $75,000 or higher.

Conclusions and Implications for Practice and Policy

CRC is the third most diagnosed cancer among Oklahoma men (following lung and prostate) and women (following lung and breast) and is the third leading cause of death among men (following lung and prostate) and women (following lung and breast). Oklahomans who are male, NH AI/AN, NH Black or African American, and older were more likely to be diagnosed with and die from CRC. Diagnosing and treating CRC is critical for the health and economic productivity of Oklahoma.

Findings in this data brief inform the following recommendations. First, interventions are needed to increase Oklahomans' awareness of the importance of CRC screening, diagnosis, and treatment. Activities to increase awareness need to reach individuals who are at greatest risk of developing colorectal cancer, including men, NH AI/AN persons, NH Black or African American persons, persons living in rural locations, and those who have low educational attainment or income levels. Statewide efforts, such as media campaigns and community health education activities, could increase awareness of CRC symptoms and screening. Second, increased access to screening would help increase screening rates. This could occur through programs to increase health insurance coverage, standing orders for CRC screening at healthcare clinics (i.e., uncoupling screening from the physician visit, such as offering screening when patients present for laboratory tests or nurse visits, and providing screening outside of the doctor's office, including at mass vaccine events, community events, or through mobile van outreach). Third, interventions that improve clinician or clinic performance on screening can help increase rates. This could be accomplished through feedback on CRC screening rates in a health record and academic detailing about CRC symptoms and the most current screening guidelines. Fourth, efforts must ensure that all Oklahomans with CRC have access to the newest treatments. This means reducing barriers to treatment such as financial, travel, and other barriers to health care. Research is needed to identify the most efficacious CRC treatments for high-risk groups and to identify ways in which CRC screening rates can be increased in these groups. Funding also should be increased to help ensure diversity among patients enrolled in cancer clinical trials, as this helps to improve cancer outcomes.

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, 2020.

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 2021.

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 February 14, 2022.

2. Haghighat S, Sussman DA, Deshpande A. US Preventive Services Task Force Recommendation Statement on Screening for Colorectal Cancer. JAMA. 2021;326(13):1328. doi:10.1001/jama.2021.13466

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