

Cancer in Oklahoma Data Brief Series:

Cervical Cancer in Oklahoma

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Introduction

In 2019, Oklahoma had the 2nd highest age-adjusted cervical cancer incidence and the highest age-adjusted cervical cancer mortality rate in the United States (US).¹ In Oklahoma cervical cancer is one of the top 10 cancers for incidence and mortality for the female population of each major racial or ethnic group in Oklahoma except the non-Hispanic White population.¹

Cervical cancer is a cancer that occurs in the cells of the cervix, which is the lower part of the uterus that connects to the vagina.² About 99% of all cervical cancer cases are linked to infection with high-risk human papillomaviruses (HPV), an extremely common virus transmitted through sexual contact.² Due to the nature of the risk factors, cervical cancer can be limited by preventing HPV infection, and if detected at an early stage, is a highly survivable cancer.¹ The United States Preventive Services Task Force (USPSTF) recommends screening for cervical cancer every 3 years with cervical cytology in women aged 21 to 29 years. For women aged 30 to 65 years, the USPSTF recommends screening every 3 years with cervical cytology alone, every 5 years with high-risk human papillomavirus (hrHPV) testing alone, or every 5 years with hrHPV testing in combination with cytology (co-testing).³ The Grade A recommendation states that “there is high certainty that the net benefit is substantial”.³

The goal of this data brief is to describe cervical cancer incidence, mortality, and screening rates among women in Oklahoma. This brief concludes with a discussion of the significance of findings on clinical practice and public health policy.

Methods

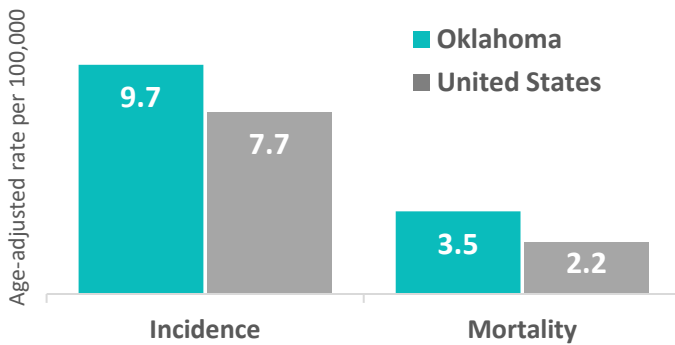
Data for cervical cancer incidence were obtained from the Oklahoma Central Cancer Registry (OCCR), the Centers for Disease Control’s (CDC) National Program of Cancer Registries (NPCR), and the NCI’s Surveillance, Epidemiology, and End Results (SEER) program. Cancer mortality data were from Oklahoma Vital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

This data brief defines cervical cancer cases using the International Classification of Disease for Oncology system (ICD-O-3, as the following cancer site: (C53). This includes cancers of the cervix uteri, but for simplicity the term “cervical cancer” is used in this brief. To ensure the stability of estimates and confidentiality, Oklahoma Central Cancer Registry and Oklahoma Vital Statistics rates were suppressed if fewer than 5 counts were reported in a specific category. All rates

have been age-adjusted to the 2000 US standard population. 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. Staging for this data brief used the SEER summary stage.⁴

All analyses are limited to women in Oklahoma and the US. In this data brief, Hispanic persons were categorized as being Hispanic regardless of race. All individuals in the sample were categorized into one of the following mutually exclusive ethnic and racial groups: Hispanic, Non-Hispanic (NH) White, NH Black/African American, NH American Indian/Alaska Native, and NH Asian and Pacific Islander. Rates for NH American Indians/Alaska Natives were linked to IHS administrative records. 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.

Figure 1: Cervical cancer incidence and mortality in Oklahoma and the US, 2015-2019

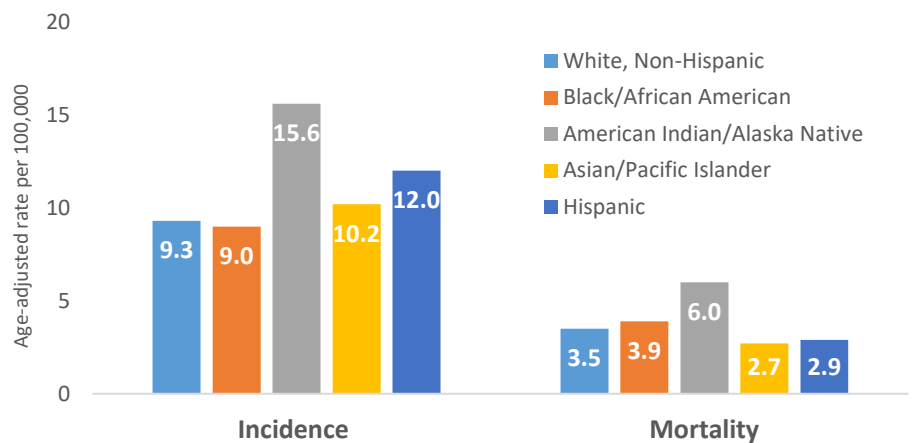


Source: SEER and CDC (NPCR and NVSS)

Results: Overall, there were 4,264,194 cancer cases diagnosed for women in the US between 2015 and 2019; among these new diagnoses 50,663 were among women in Oklahoma. During this time frame, there were 64,998 new cervical cancer cases in the US and 941 in Oklahoma. For mortality overall, there were 1,416,969 cancer deaths among women in the US between 2015 and 2019, with 18,979 of them in Oklahoma. During this time frame there were 20,860 cervical cancer deaths in the US and 367 deaths in Oklahoma. **Figure 1** shows overall age-adjusted cancer incidence and mortality rates for cervical cancer in Oklahoma and the US. As seen in the figure, Oklahoma has higher cervical cancer rates than the US for both incidence and mortality.

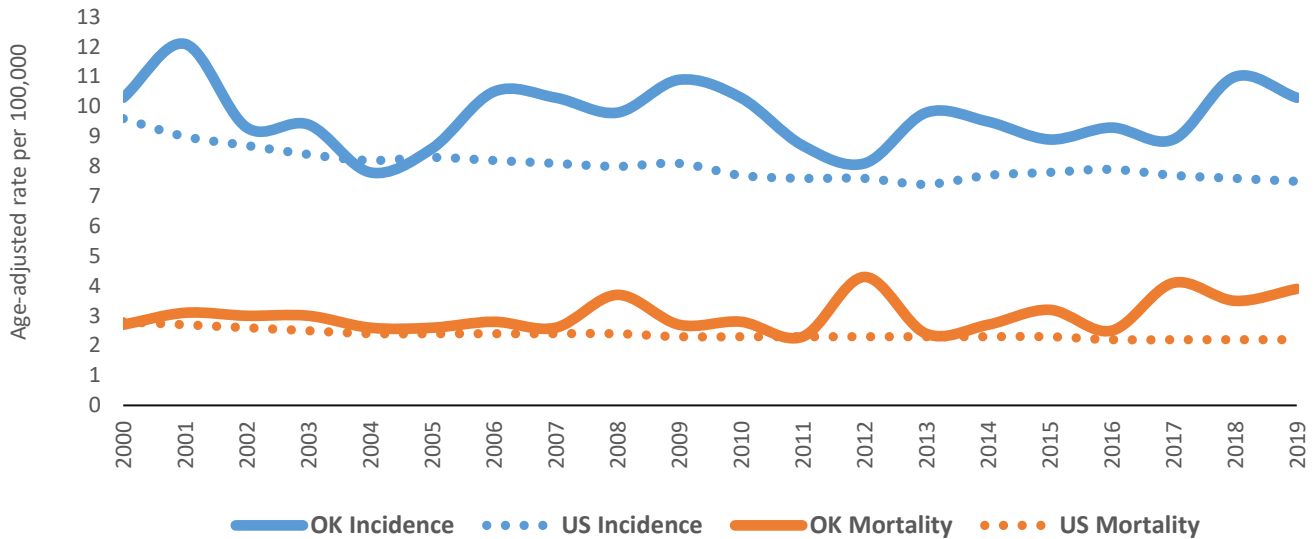
Figure 2 shows age-adjusted cervical cancer rates for incidence and mortality by race and ethnicity in Oklahoma. American Indians/Alaska Natives have the highest rates for both incidence and mortality in Oklahoma. The Hispanic population in Oklahoma has the second highest cervical cancer incidence rate, while the Black/African American population has the second highest cervical cancer mortality rate.

Figure 2: Cervical cancer incidence and mortality by race/ethnicity in Oklahoma, 2015-2019



Source: OCCR and Oklahoma Vital Statistics

Figure 3: Age-adjusted cervical cancer incidence and mortality by year in Oklahoma and the US, 2000-2019

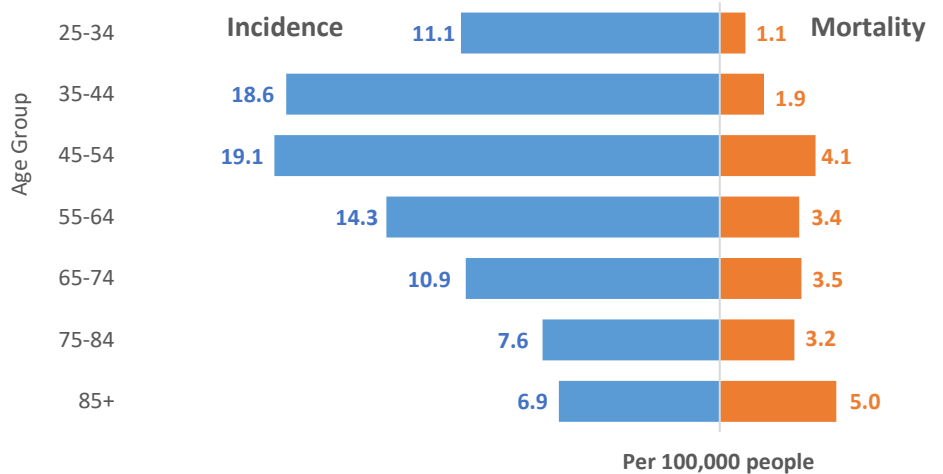


Source: SEER and CDC (NPCR and NVSS)

Figure 3 shows trends in cervical cancer incidence and mortality in Oklahoma and the US from 2000 to 2019. While there is an apparent decline in cervical cancer incidence in the US, incidence rates in Oklahoma have not decreased materially. For mortality, the US rate shows a gradual decline, while for Oklahoma, this rate is increasing.

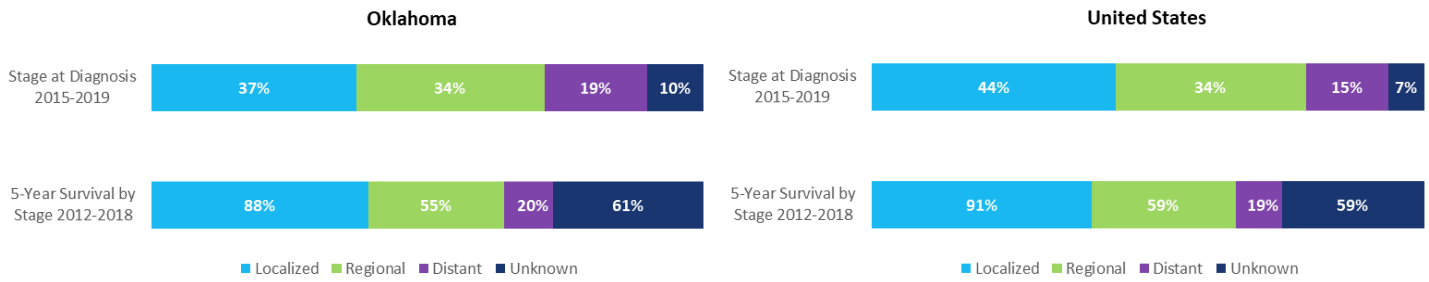
Figure 4: Cervical cancer age-adjusted incidence and mortality rates by age group, 2015-2019

Figure 4 shows cervical cancer incidence and mortality by 10-year age groups in Oklahoma from 2015 to 2019. The highest incidence rate is observed among women 45-54 years old, while the highest mortality rate is among women 85 years and older. Cervical cancer incidence increases with age, peaks at 45-54 years and then decreases. Mortality rates rise at age 45-54 years, and then remain high thereafter.



Source: OCCR and Oklahoma Vital Statistics

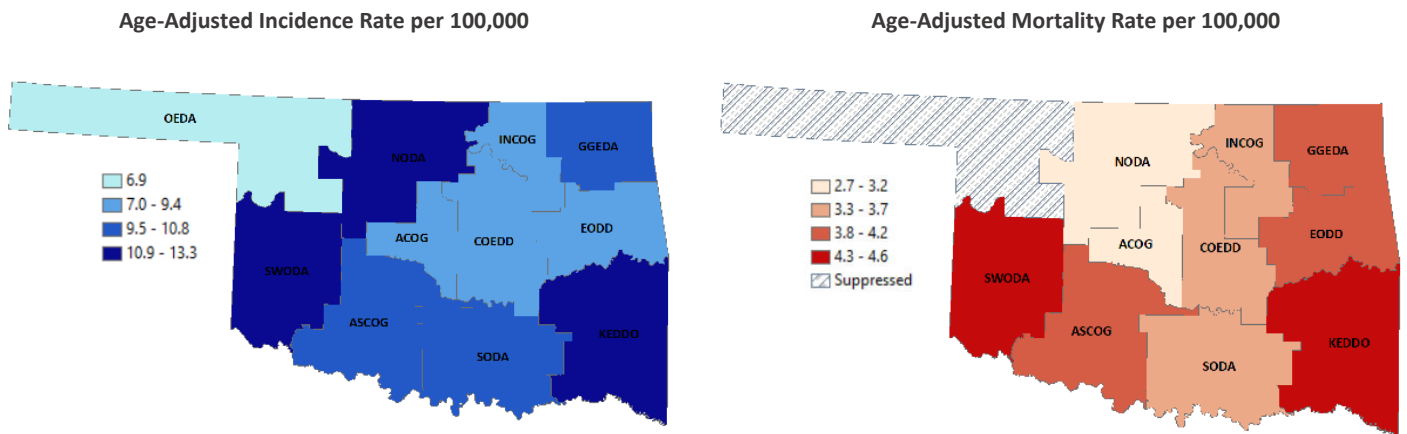
Figure 5: Cervical Cancer Percent Stage at Diagnosis compared to 5-Year Survival by Stage in Oklahoma and the US



Source: SEER and CDC (NPCR and NVSS)

Figure 5 presents the percent stage at diagnosis from 2015-2019 compared to the 5-year relative survival by stage from 2012-2018 for cervical cancer in Oklahoma and the US. The stage at diagnosis gives the percentage of cancers cases diagnosed at each stage, whereas the 5-year Relative Survival by stage provides the percentage of cancer cases surviving up to 5 years among those diagnosed at each stage. Most cervical cancers diagnosed in Oklahoma and the US are at the localized stage, notably, this stage has the highest survival rate. However, the proportion of individuals diagnosed at a localized stage is lower in Oklahoma than in the US, and the proportion of individuals diagnosed at distant stage or unknown stage is higher in Oklahoma than in the US.

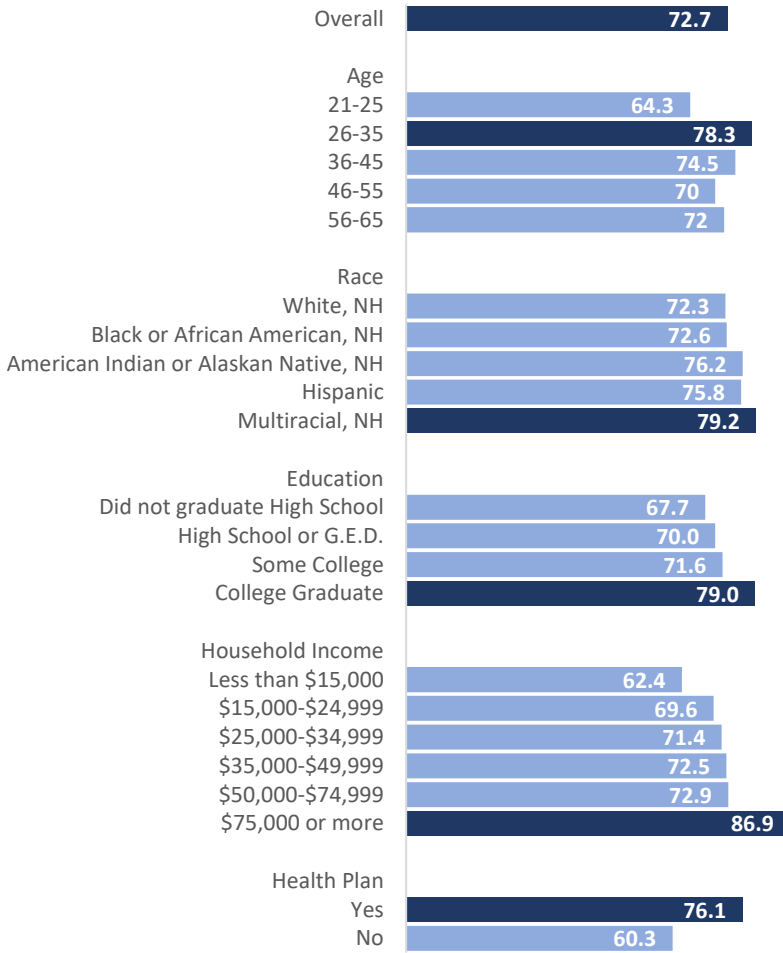
Figure 6: Age-adjusted cervical cancer incidence and mortality by sub-state planning districts in Oklahoma, 2015-2019



Source: OCCR and Oklahoma Vital Statistics

Figure 6 shows age-adjusted cervical cancer incidence and mortality rates by sub-state planning districts in Oklahoma. In the maps above, incidence rates are highest in the KEDDO, SWODA and NODA Planning Districts. Mortality rates are in the SWODA and KEDDO Planning Districts of Oklahoma. Additionally, mortality rates for all SSPD are higher than the overall US rate of 2.2 per 100,000. 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 7: Percentage of cervical cancer screening among women 21-65 in Oklahoma, 2020

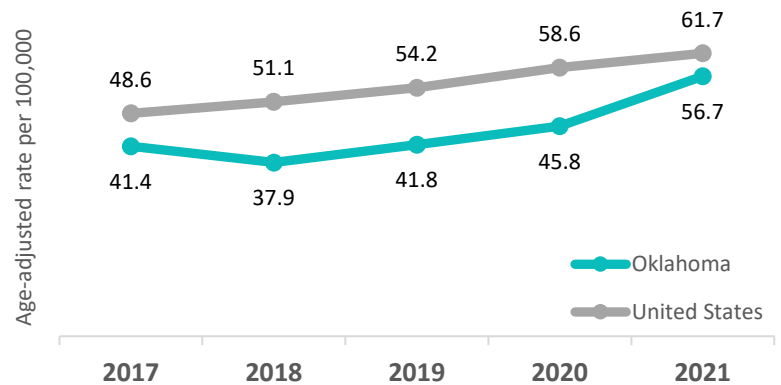


Source: BRFS

Figure 7 shows the percentages of women aged 21 to 65 years who had a pap test in the past three years by sociodemographic characteristics for Oklahoma in 2020. Overall, among women in Oklahoma ages 21-65, 72.7% had received a pap test in the past three years compared to 77.7% of women in the US (data not shown). Among 10-year age groups, women ages 26-35 had the highest percentage of receiving a pap test in the past three years. By race and ethnicity, multiracial women had the highest (79.2%) proportion of receiving a pap test, followed by American Indian or Alaska Native women (76.2%). As educational attainment increased so did the proportion of women who had a pap test: 67.7% for respondents who did not graduate high school, 70.0% for respondents who graduated high school, 71.6% for respondents who had some college, and 79.0% of respondents were college graduates. As income increased, the proportion of receiving a pap test also increased. Women whose household income was less than \$10,000 had the lowest proportion receiving a pap test in the past three years (62.4%) and those with a household income of \$75,000 or more had the highest proportion receiving a pap test (86.9%). Finally, for women who had health care coverage, 76.1% had received a pap test, compared to 60.3% for women without health care coverage.

Figure 8 shows the percentage of adolescents ages 13-17 who received all recommended doses of the human papillomavirus (HPV) vaccine from 2017 to 2021. Since 2018, HPV vaccination has been increasing yearly in Oklahoma (+50% from 2018 to 2021). When compared to the US, Oklahoma has had consistently lower HPV vaccination for every year, however the gap between Oklahoma and the US is narrowing (7.2% difference in 2018 vs 5.0% in 2021).

Figure 8: Up-to-date HPV vaccination rates in Oklahoma and the US, 2017-2021



Source: CDC, National Immunization Survey-Teen

Conclusions and Implications for Practice and Policy

Cervical cancer incidence and mortality rates have been improving slowly in the US over the past two decades. However, in Oklahoma, incidence and mortality rates have been increasing. Each of the major racial or ethnic groups in Oklahoma has a cervical cancer incidence rate that is higher than the overall incidence rate in the US, with rates being markedly elevated for American Indian/Alaska Native and Hispanic women. Also, each of the major racial or ethnic groups in Oklahoma has a cervical cancer mortality rate that is higher than the overall rate in the US, and the disparity in mortality is striking for American Indian/Alaska Native women. Women with lower levels of educational attainment, lower income levels, or who lack health insurance coverage are less likely to undergo screening and more likely to be diagnosed at a later and less treatable stage. Recommendations that could be used to reduce the disproportionate burden cervical cancer places on high-risk populations of women in Oklahoma are discussed below.

HPV vaccination substantially reduces rates of cervical cancer and other HPV-related cancers.⁵ HPV vaccination rates in Oklahoma are improving, but remain below the Healthy People 2030 goal of 80% of eligible adolescents completing the vaccine series.⁶ Evidence-based interventions to increase receipt of HPV vaccine include increasing access to HPV vaccination services, increasing community demand for vaccination, and implementing provider- or healthcare system-level interventions to increase vaccination.⁷

Timely receipt of evidence-based cervical cancer screening also reduces cervical cancer mortality.⁸ Efforts to increase cervical cancer screening are especially needed for several groups of women, including those who lack health insurance coverage, have lower educational attainment, or have income levels that may be too high for subsidized screening programs, but too low to be able to obtain health insurance coverage. Women whose household income was less than \$15,000 had the lowest proportion of receiving a Pap smear test in the past three years (62.4%). Because programs to increase health insurance coverage enable more women to be screened, Oklahoma's recent expansion of Medicaid through the Affordable Care Act in 2021 should help increase cervical cancer screening rates in low-income groups. Home self-collection testing that detects high-risk HPV is showing promise for increasing cervical cancer screening receipt⁹, and home self-test kits currently are undergoing review for FDA approval.

Many women with positive initial cervical cancer screening results do not receive timely follow-up diagnostic colposcopy.¹⁰ Fully funding existing and effective federal programs to increase both initial screening and diagnostic follow-up testing, such as the Breast and Cervical Cancer Early Detection Program (BCCEDP), would enable more low-income and uninsured women to be screened, as would increasing support provided by charitable organizations.

To address distance and other transportation barriers, assistance with transportation to/from cervical cancer screening and colposcopy services by providing direct mobile outreach to rural communities, such as is currently being done statewide for mammography, could be expanded to include cervical cancer screening and diagnostic follow-up testing.

Interventions to improve the quality of cervical cancer treatment are warranted. For example, clinical trials advance cancer treatment and persons participating in clinical trials have been shown to receive high-quality care.¹¹ Hence it is imperative that clinical trials enroll participants from diverse backgrounds, and funding for research should be directed in ways that ensure diversity among patients enrolled into cervical cancer clinical trials.

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

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