Cancer in Oklahoma Data Brief Series: Cervical Cancer in Oklahoma – Update 2025

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Introduction

In 2019-2023, Oklahoma had the 2nd 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. 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), which follows the US Preventive Services Task Force recommendations. For this brief, we defined having cervical screening as 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. All data sources used in this brief were publicly available and provided de-identified data.

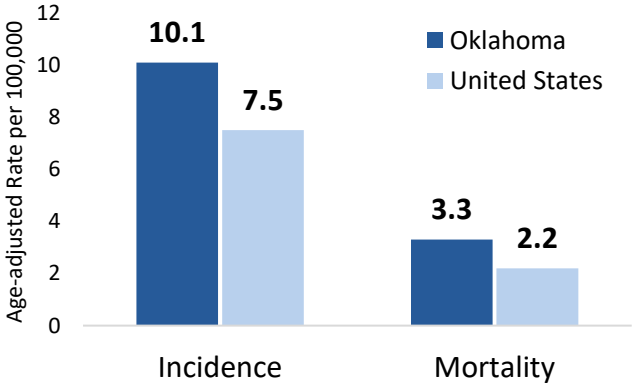
This data brief defines cervical cancer cases using the International Classification of Diseases for Oncology system (ICD-O-3), with the following cancer site: (C53). This includes cancers of the cervix uteri, but for simplicity, the term "cervical cancer" is used in this brief. All rates have been age-adjusted 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 the resulting percentages were weighted averages estimated from the sample and population sizes except for staging. 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 classified 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 (AIAN); and NH Asian and Pacific Islander. Incidence rates for NH American Indians/Alaska Natives were linked to IHS administrative records. However, the mortality rates presented for NH AI/AN people were not linked and are likely to be underestimated. Analyses that used data from prior years linking Indian Health Service data to the national death index revealed higher mortality for this group. However, the Indian Health Service-linked mortality data for the years presented here have not been released. Based on previous work, we estimate about a 29% increase when adjusting for misclassification in Oklahoma.[4] Temporal patterns were assessed using Average Annual Percent Change (AAPC) in rate determination by Joinpoint regression analysis.[5]

We used the 2023 Rural-Urban Continuum Codes (RUCC), which classify U.S. counties into three metropolitan and six non-metropolitan categories based on population size, degree of urbanization, and proximity to metropolitan areas. In this brief, urban refers to counties in RUCC 1-3, and rural refers to counties in RUCC 4-9. 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 age-adjusted incidence (2018-2022) and mortality (2019-2023) in Oklahoma and the US



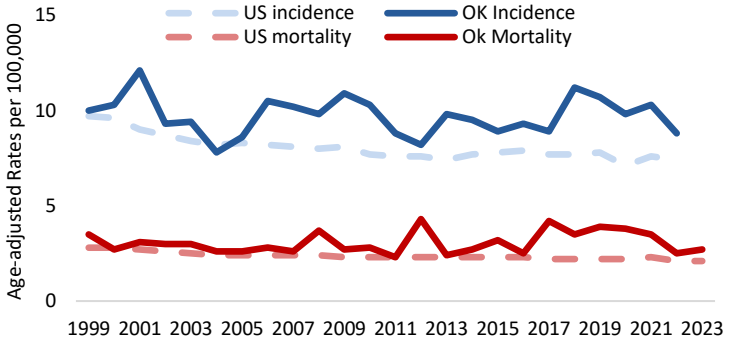
Source: CDC Cancer Data Visualization

Results

Between 2018 and 2022, there were 65,094 new cervical cancer cases in the US and 984 in Oklahoma. From 2019 to 2023, there were 21,003 cervical cancer deaths in the US and 354 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 trends in cervical cancer incidence from 1999 to 2022 and mortality in Oklahoma and the US from 1999 to 2023. While there is a decline (AAPC -0.93, p-value <.0001) in cervical cancer incidence in the US, incidence rates in Oklahoma have not significantly decreased (AAPC -0.10, p-value=0.75). For mortality, the US rate shows a gradual decline (AAPC -0.95, p-value <.0001), whereas in Oklahoma it is increasing (AAPC 0.64, p-value=0.32) though not significantly.

Figure 2: Age-adjusted cervical cancer incidence and mortality by year in Oklahoma and the US, 1999-2023

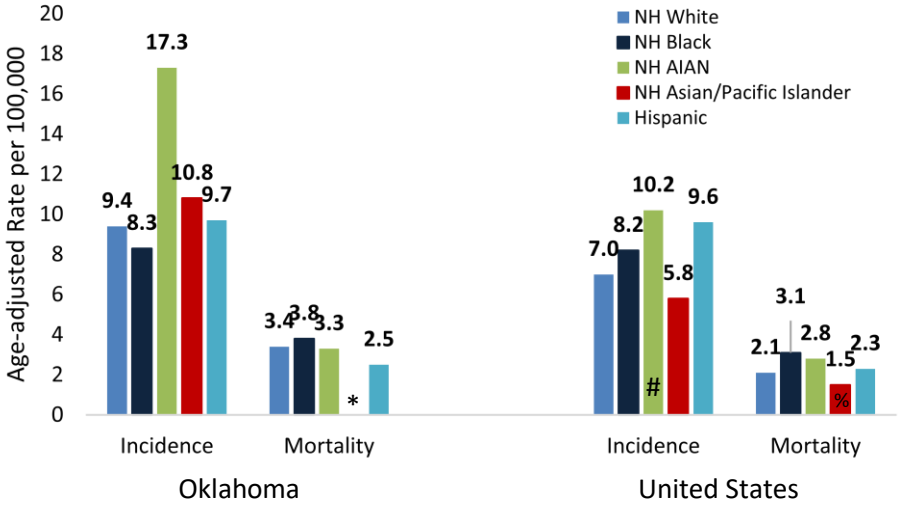


Source: CDC Wonder

Figure 3 shows age-adjusted cervical cancer rates for

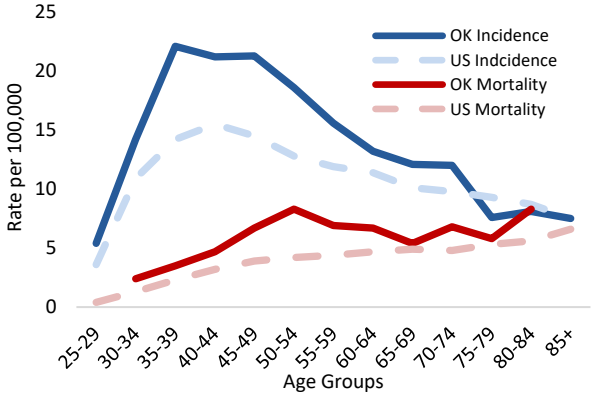
incidence and mortality by race and ethnicity in Oklahoma. NH American Indians/Alaska Natives have the highest incidence rates in Oklahoma. The NH Asian/Pacific Islander population in Oklahoma has the second-highest cervical cancer incidence rate, while the NH White population has the second-highest cervical cancer mortality rate. It is important to note that the mortality rates presented for NH American Indian or Alaskan Native persons in Oklahoma are likely to be underestimated. Analyses that used data from prior years linking Indian Health Service data to the national death index revealed higher mortality for this group. However, the Indian Health Service-linked mortality data for the years presented here have not been released. We estimate about a 29% increase when adjusting for misclassification in Oklahoma.[4]

Figure 3: Cervical cancer age-adjusted incidence (2018-2022) and mortality (2019-2023) by race and ethnicity in Oklahoma



Source: CDC Cancer Data Visualization; * Suppressed; # Estimates suggest a 29% high rate of AIAN mortality not accounted for in this chart; % Asian only.

Figure 4: Cervical cancer age-specific incidence (2018-2022) and mortality (2019-2023) rates by age group

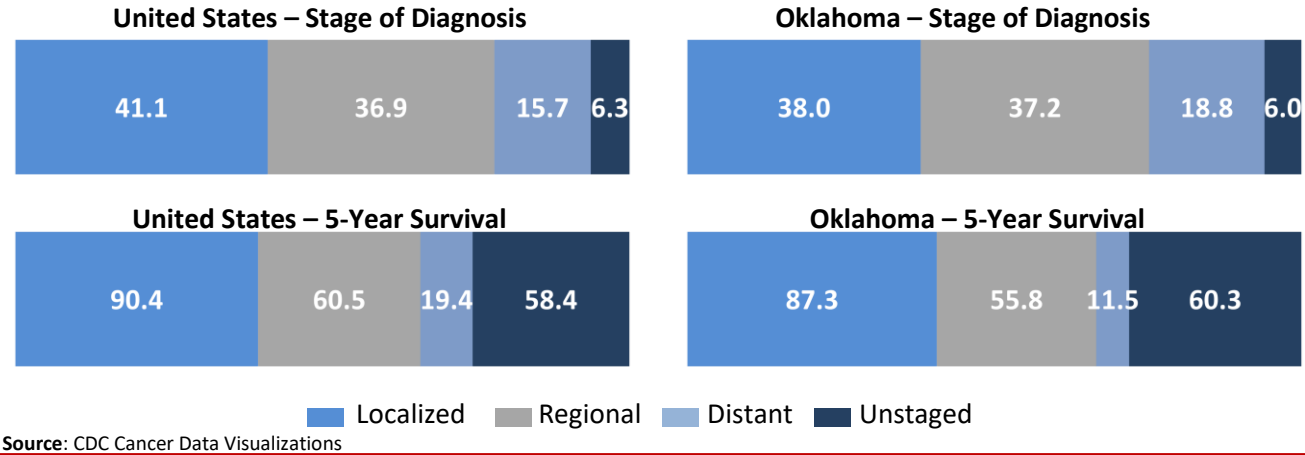


Source: CDC Data Wonder

Figure 4 shows cervical cancer incidence and mortality by age groups in Oklahoma and the US. The highest incidence rate is observed among women 35-39 years old, while the highest mortality rate is among the oldest age groups. In general, cervical cancer incidence increases with age, peaks in earlier years, and then decreases. Mortality rates rise steadily.

Figure 5 presents the percent stage at diagnosis from 2018-2022 and the 5-year relative survival by stage from 2018-2022 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-

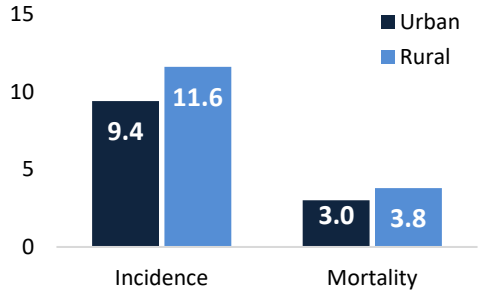
Figure 5: Cervical Cancer Percent Stage at Diagnosis and 5-Year Survival by Stage in Oklahoma and the US



Source: CDC Cancer Data Visualizations

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 a distant stage is higher in Oklahoma than in the US.

Figure 6: Age-Adjusted Cervical Cancer Incidence (2018-2022) and Mortality (2019-2023) by Urban-Rural Oklahoma

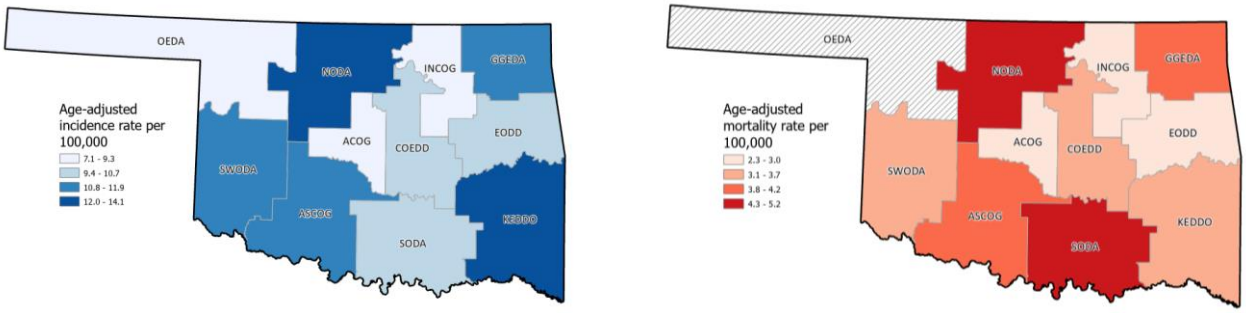


Source: OK2SHARE

Figure 6 shows the age-adjusted incidence and mortality rates for cervical cancer in urban and rural areas. Rural areas show slightly higher rates of both incidence and mortality.

Figure 7 shows age-adjusted cervical cancer incidence and mortality rates by sub-state planning districts in Oklahoma. In the maps, rates are scattered throughout Oklahoma. Still, the lowest rates of both incidence and mortality appear in the Association of Central Oklahoma Governments (ACOG) and Indian Nations Council of Governments (INCOG) areas, which include the urban areas of Oklahoma City and Tulsa. 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: Age-adjusted cervical cancer incidence (2018-2022) and mortality (2019-2023) by sub-state planning districts in Oklahoma

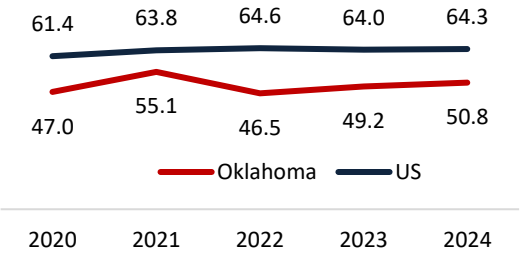


Source: OK2SHARE

Figure 8 shows the percentage of adolescents ages 13- 17 who received all recommended doses of the human papillomavirus (HPV) vaccine from 2022 to 2024. Oklahoma's vaccination rate increased in 2021 and then dropped in 2022. Compared to the US, Oklahoma has consistently had lower rates.

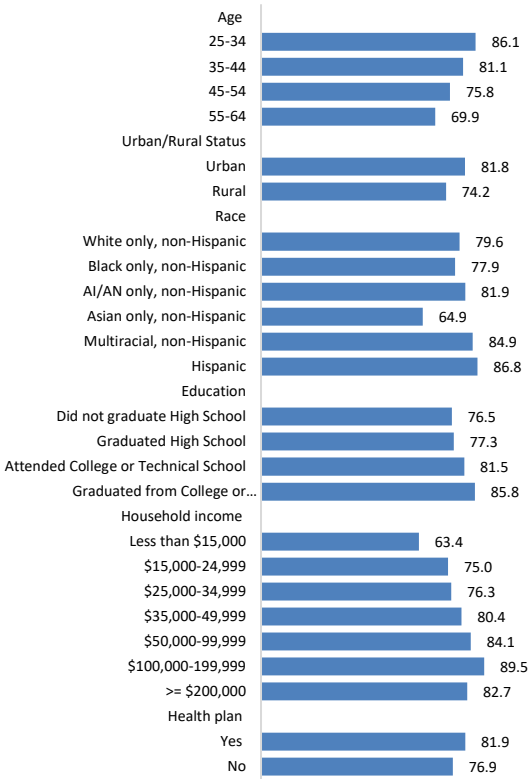
Figure 9 shows the percentages of women aged 21-65 with an intact cervix who have had a Pap test in the last 3 years, and of women aged 30-65 who have had an HPV test in the last 5 years. Overall, among women in Oklahoma ages 21-65, 80.9% had received a screen compared to 78.8% of women in the US (data not shown). Younger women were more likely to be screened than those in older age groups. Rural women were less likely than urban

Figure 8: Up-to-date HPV vaccination rates in Oklahoma and the US, 2020-2024



Source: CDC, National Immunization Survey-Teen

Figure 9: Percentage of cervical cancer screening among women 21-65 in Oklahoma, 2024



Source: Behavioral Risk Factor Surveillance System

women to have undergone screening. By race and ethnicity, NH Asian women had the lowest rate of screening. As educational attainment increased, so did the proportion of women who underwent screening. As income increased, the proportion of people who received cervical cancer screening also increased. Women with household incomes below $15,000 had the lowest proportion who received screening tests. Finally, women with health care coverage were more likely to have undergone a screening test than those without coverage. It is important to note that these screening rates cannot be compared with those from previous years, because the questions from 2020 and prior, and 2022 and 2023, are different.

Conclusions and Implications for Practice and Policy

Cervical cancer incidence and mortality have improved nationally over the past two decades, but Oklahoma has not seen similar progress. Incidence has remained stable, and mortality has increased, with all major racial and ethnic groups experiencing higher rates than the U.S. overall, especially NH American Indian/Alaska Native and Hispanic women. Mortality disparities are particularly pronounced for NH American Indian/Alaska Native women. Women with lower education, lower income, or no health insurance are less likely to be screened and more likely to be diagnosed at later, less treatable stages. The recommendations below outline strategies to reduce this disproportionate burden among high-risk women in Oklahoma.

HPV vaccination substantially reduces rates of cervical cancer and other HPV-related cancers.[6] HPV vaccination rates in Oklahoma are improving, but remain well below the Healthy People 2030 goal of 80% of eligible adolescents completing the vaccine series.[7] Evidence-based interventions to increase HPV vaccination rates include expanding access to vaccination services, increasing community demand for vaccination, and implementing provider- or healthcare system-level interventions.[8]

Timely receipt of evidence-based cervical cancer screening also reduces cervical cancer mortality.[9] 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 with household income below $15,000 had the lowest proportion of Pap smear tests in the past 3 years (57.1%). 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 likely contributed to increased cervical cancer screening rates. However, federal reconciliation law H.R. 1, officially titled "One Big Beautiful Bill Act," contains Medicaid provisions that the Congressional Budget Office says will raise the number of uninsured nationally, with estimates on the order of 92,000–128,000 Oklahomans potentially losing coverage or facing reduced access under the bill's work, verification, and funding-limit provisions.[10, 11]

The FDA recently (May 2025) approved the first at-home self-collection cervical cancer screening that detects high-risk HPV. The test is a highly effective alternative to a clinician-collected sample and may be ideal for some women.

Many women with positive initial cervical cancer screening results do not receive timely follow-up diagnostic colposcopy.[12] 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 could be expanded by providing direct mobile outreach to rural communities, as is currently being done

statewide for mammography. Interventions to improve the quality of cervical cancer treatment are warranted. For example, clinical trials advance cancer treatment, and participants have been shown to receive high-quality care.[13] Hence, clinical trials must enroll participants from diverse backgrounds, and research funding should be directed to ensure diversity among patients enrolled in cervical cancer clinical trials, including higher-risk rural populations.

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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