Cancer in Oklahoma Data Brief Series:

Ovarian Cancer in Oklahoma - 2025

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Introduction

Ovarian cancer remains one of the most lethal gynecologic malignancies, second to endometrial/uterine cancer in the United States (US) and globally. Despite representing a small proportion of overall cancer cases (1.2% in 2022), it accounts for a disproportionate number of deaths (2.1% in 2022) due to late-stage diagnosis and limited, ineffective screening options. According to 2022 estimates, 20,648 new ovarian cancer cases were diagnosed in the US, ranking it 5th in 2023 among the top causes of age-adjusted cancer-related mortality rates among women (12,883).

Prevention has become the preferred strategy to reduce incidence and mortality over the past 10 years, utilizing opportunistic salpingectomy, removal of the fimbria of the fallopian tube after the completion of childbearing, where the cells of origin of the cancer originate. Early detection of ovarian cancer includes transvaginal ultrasound and CA 125 and HE4, when a woman has symptoms. This is challenging because symptoms are often vague and nonspecific, leading to diagnosis at advanced stages when treatment options are limited, and prognosis is poor. Factors such as age, family history, genetic mutations (including BRCA1 and BRCA2), and certain reproductive factors contribute to increased risk. While survival rates improve significantly when the disease is identified early, only a quarter (23.7%) of cases are diagnosed at localized stages, underscoring the need for improved public and physician awareness, early detection strategies, and access to care. Efforts are needed to increase education of the public and providers that a woman with abdominal complaints, such as abdominal distention, urinary frequency and pressure, bloating, pain, early satiety, or decreased appetite, should undergo a transvaginal ultrasound, pelvic exam, and CA 125 tumor marker. Delays in diagnosis of 3-12 months may occur due to misdiagnosis as gallbladder or gastrointestinal problems.

This data brief provides an overview of the current burden of ovarian cancer, highlighting trends in incidence, mortality, and survival across different demographic and geographic groups in Oklahoma and the United States (US). Understanding these patterns is critical for identifying disparities, informing public health strategies, and guiding interventions to prevent, detect early, and improve treatment outcomes. Since 2014, ovarian cancer is combined to include the fallopian tube, ovarian, and peritoneal carcinoma, since high-grade serous cancer, the most lethal cell type, has been classified as any of these, and tubo-ovarian cancer captures the current reality.

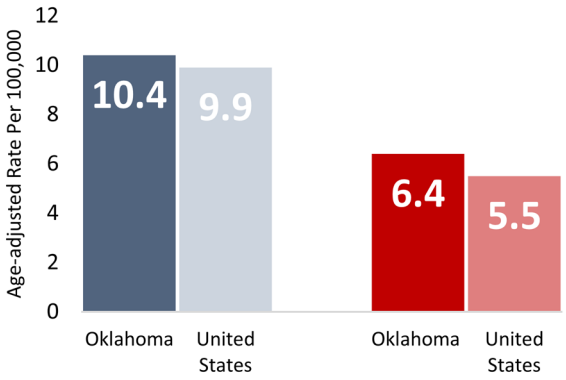
Methods

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 United States Cancer Statistics. Cancer mortality data were obtained from Oklahoma Vital Statistics and the CDC's National Vital Statistics System (NVSS). For this brief, Hispanic persons were classified as being Hispanic regardless of race. Those who identified as White, African American or Black, American Indian or Alaska Native, and Asian or Pacific Islander were classified as non-Hispanic (NH), thus excluding individuals of these groups with Hispanic ethnicity. All data sources used in this brief were publicly available. Rates were age-adjusted to the 2000 US standard population. In this report, we used the most recent available data for each specific analysis variable. For incident cases, the period was 2018 to 2022; for mortality, it was 2019 to 2023.

In this brief, Ovarian Epithelial, Fallopian Tube, and Primary Peritoneal Cancer (Ovarian) cases are all the same disease and were classified using the International Classification of Diseases for Oncology (ICD-0-03), C56.0-56.9, which is limited to invasive cancers and excludes borderline cases beginning in 2001. Temporal patterns were assessed using the Average Annual Percent Change (AAPC) measure, calculated via Joinpoint regression.[1] For all analyses, unknown values were excluded, and resulting percentages were weighted averages estimated from the sample and population sizes, except for stage at diagnosis. All incidence and mortality rates are reported per 100,000 population. Staging for this data brief used the SEER summary stage.

Ovarian cancers are relatively rare; thus, we used the substate planning districts (SSPD) for geographic representation. SSPDs are voluntary associations of local governments formed under Oklahoma law that address problems and planning needs that transcend the boundaries of individual local governments, such as counties, cities, and towns. See Appendix 1 for counties in each SSPD. 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, rural refers to counties in RUCC 4-9, and urban refers to counties in RUCC 1-3.

Figure 1: Age-adjusted ovarian cancer incidence (2018-2022) and mortality (2019-2023) in Oklahoma and the US



Source: CDC Cancer Data Visualization

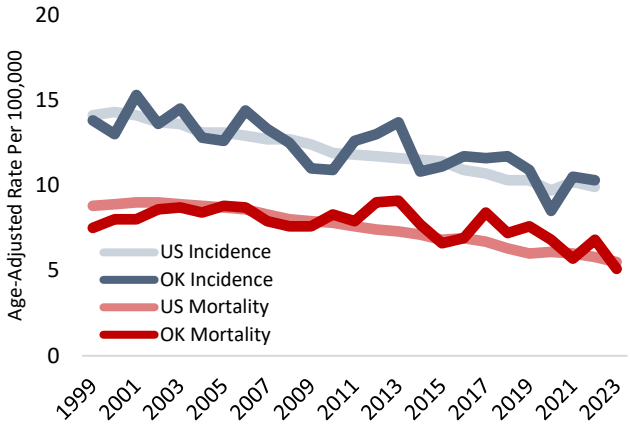
Figure 2 shows the decrease in cancer incidence rates from 1999 to 2022. Oklahoma had a lower rate of decline (AAPC -1.5, p-value < 0.001) compared to the US overall (AAPC -1.7, p-value < 0.001) (**Figure 2**). For ovarian cancer mortality, Oklahoma experienced a much lower rate of decline at -1.2 (p-value < 0.0006) compared to the US, which had a rate of decrease of -2.1 (p-value < 0.0001).

For both the US and Oklahoma, ovarian cancer incidence and mortality rates rise dramatically until the 80-84 age group, but then decrease at 85 and older (**Figure 3**). Unfortunately, from age 80 on, the rate for ovarian cancer mortality is higher than for incidence.

Results

From 2018 to 2022, 102,777 new cases of ovarian cancer were diagnosed and reported among women in the US, and 1,208 of them were among Oklahoma women. From 2019 to 2023, 66,410 women died of this cancer in the US, and 815 Oklahoma women died of ovarian cancer. The 2018 to 2022 age-adjusted ovarian cancer incidence rate in the US was 10.0 per 100,000 population compared to 10.4 for Oklahoma (Figure 1). From 2019 to 2023, the female age-adjusted ovarian cancer mortality rate was 5.5 per 100,000 compared to 6.4 per 100,000 for Oklahoma. Oklahoma ranked 11th highest (tied with Pennsylvania and New Hampshire) amongst states, the District of Columbia, and Puerto Rico in the US. Oklahoma also had the 5th-highest age-adjusted ovarian cancer mortality rate in the US.

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



Source: CDC Wonder

Figure 3: Ovarian cancer incidence (2018-2022) and mortality (2019-2023) by age group, Oklahoma and the US

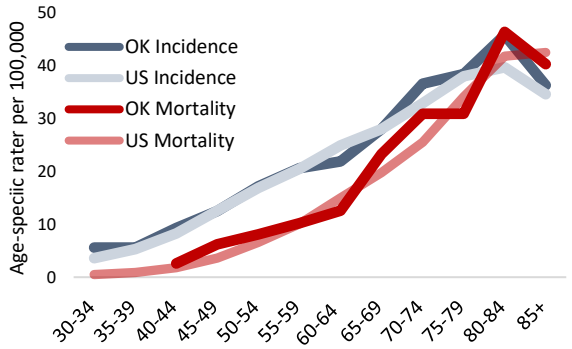
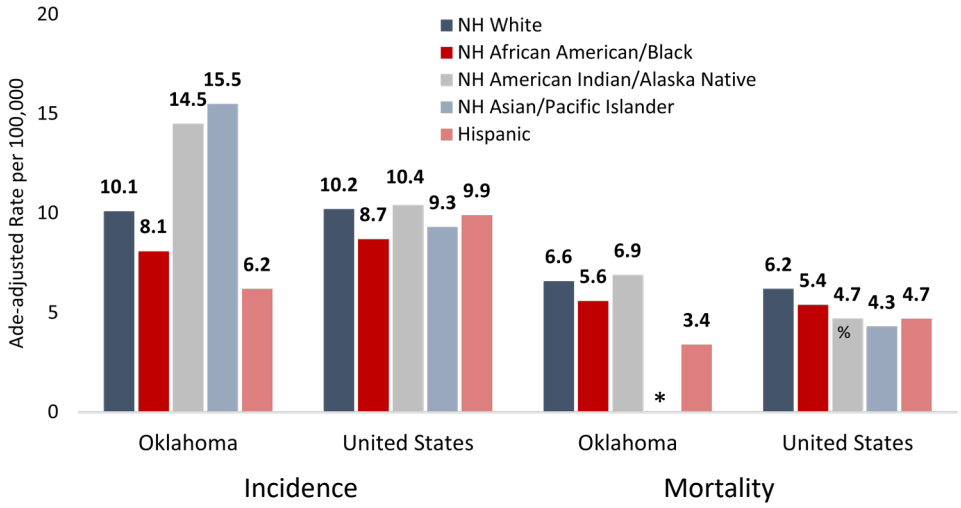


Figure 4 shows the age-adjusted ovarian cancer incidence (2018-2022) and mortality (2019-2023) rates per 100,000 women for Oklahoma and the US for major racial and ethnic groups. Compared to the NH White women, ovarian cancer incidence was higher for the NH American Indian/Alaska Native (AI/AN) and NH Asian and Pacific Islander women in Oklahoma, with NH Black and Hispanic women having lower rates. Please note that while the rates reported here are striking for NH AI/AN women, the mortality rates presented for this group in Oklahoma are likely to be underestimated. Analyses that used data in prior years linking Indian Health Service data to the national death index showed even higher mortality for this group. However, the Indian Health Service-linked mortality data for the years presented here have not been released. We estimate a 29% increase when adjusting for misclassification in Oklahoma.[2]

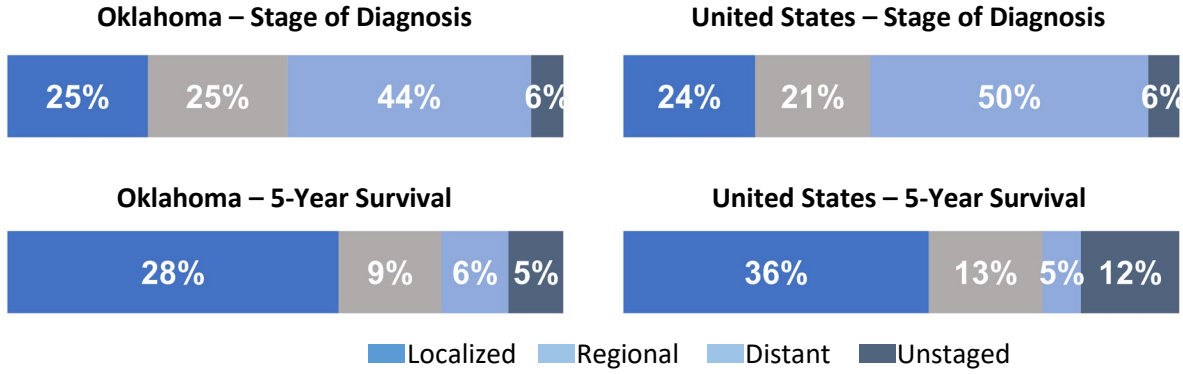
Figure 4: Ovarian cancer incidence (2018-2022) and mortality (2019-2023)[#] by race, Oklahoma and the United States



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

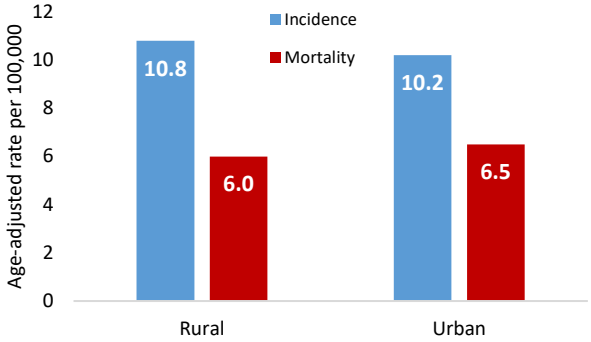
Figure 5 shows the percentage stage at diagnosis and the percentage living five years after diagnosis with ovarian cancer by stage at diagnosis in Oklahoma and the US from 2018 to 2022. Women in Oklahoma were more likely to be diagnosed at localized and generalized stages, but less likely to be diagnosed at distant stages, compared to those in the US. The percentage of unknown stages was comparable. Oklahoma women were less likely than US women overall to survive for 5 years, at 46.5% compared to 51.2%. Women at all stages except distant were less likely to survive in Oklahoma than in the US overall.

Figure 5: Ovarian cancer diagnosis and percentage 5-year relative survival by stage in Oklahoma and the United States 2018-2022



Source: CDC Cancer Data Visualization

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

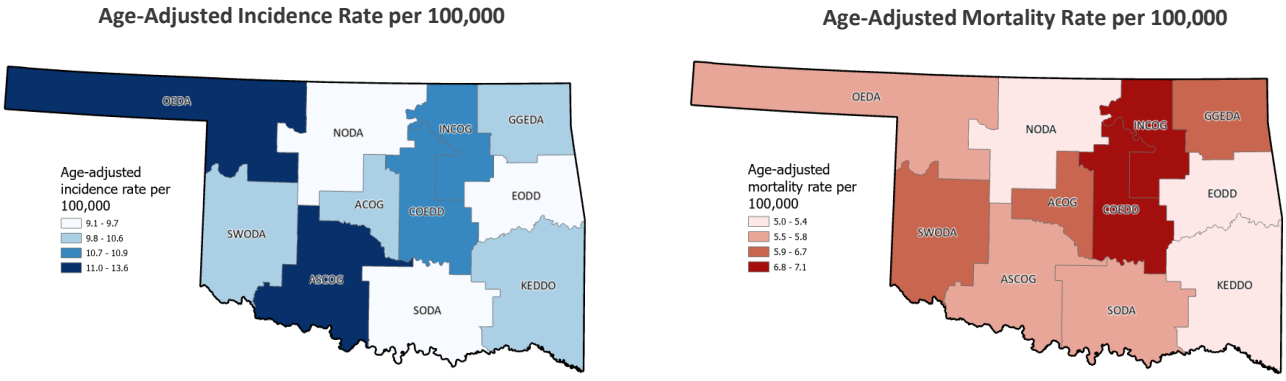


Source: OK2SHARE

Figure 6 shows the age-adjusted incidence and mortality rates by rural and urban status. Notably, urban women experienced a slightly lower incidence rate and a higher mortality rate.

Figure 7 presents maps of age-adjusted ovarian cancer incidence and mortality rates by sub-state planning regions in Oklahoma. Higher incidence rates were observed in two of the western districts. Higher mortality rates are observed in the central northeastern districts. See **Appendix 1** for the underlying number of cancer cases, deaths, and age-adjusted incidence and mortality rates for each county in Oklahoma.

Figure 7: Age-Adjusted Ovarian Cancer Incidence (2018-2022) and Mortality (2019-2023) by Sub-State Planning Districts in Oklahoma



Source: OK2SHARE

Conclusions and Implications for Practice and Policy

Ovarian cancer remains a leading cause of cancer death in women, despite recent decreases in its incidence by 1-2% per year and improvements in cancer treatments. Causes of the gradual decreasing incidence in the general population include oral contraception use, breastfeeding, opportunistic salpingectomy, and a decrease in hormone replacement therapy to treat menopausal symptoms. [3] Survival rates are also improving, which can be further enhanced through education about symptoms, transvaginal ultrasound, CA 125, and HE4 for early detection and improved treatments.

To reduce mortality further, there has been a campaign to have women obtain bilateral salpingectomy (removal of fallopian tubes) after the completion of childbearing for permanent contraception, instead of bilateral tubal ligation.[4] There is also a movement to have surgeons remove fallopian tubes whenever a woman who has completed childbearing is having abdominal surgery, called opportunistic salpingectomy. These advances are based on the recent knowledge that the actual cells of origin of ovarian cancer arise from the malignant transformation of the fallopian tube fimbrae (or fimbria).

There is also a call to increase knowledge about family history and obtaining genetic testing by cascading testing of relatives of women with breast and ovarian cancer, as carriers of BRCA 1 or 2 mutations account for 10-15% of ovarian cancers. Women who are identified as carriers of these mutations should also refer their relatives for genetic testing – a

process called cascade testing. The knowledge of mutation carrier status allows those at risk to have risk-reducing surgery before age 40 years, to remove fallopian tubes and ovaries, thereby preventing 85-90% of cancers. Mastectomy is also offered to mutation carriers, as BRCA 1 and 2 are also major causes of breast cancer.

We also need public awareness of the importance of transvaginal ultrasound, pelvic exam, HE4, and CA 125 in women with abdominal complaints. Early diagnosis improves survival, and all women with suspected ovarian cancer should have immediate referral to a high-volume cancer center with gynecologic oncologists. There is a need to ensure that all Oklahomans diagnosed with ovarian cancer have access to the newest treatments. This can be accomplished by providing funds to help patients address the financial challenges of treatment, as well as funds to defray the costs of traveling for care, including transportation and lodging expenses. The American Cancer Society Hope Lodge provides no cost food and lodging for cancer patients and women who participate in clinical trials tend to have the most favorable outcomes. Efforts to increase awareness of and participation in clinical trials, particularly among high-risk groups, will ultimately lead to improved ovarian cancer outcomes.

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Data Sources:

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