CANCER BURDEN

IN THE STATE OF OKLAHOMA

2024

OKLAHOMA
State Department
of Health

Contents

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Overview

PURPOSE

Cancer burden is defined as cancer diagnoses and the deaths, disabilities, and suffering caused by cancer.[1] This report provides an in-depth analysis of the burden of cancer in Oklahoma. It analyzes the overall cancer burden, top five major cancer sites (breast, lung and bronchus, prostate, colorectal, and kidney and renal pelvis) as well as cervical cancer, and includes demographic variables and stage at diagnosis information. The purpose of the report is to assist health professionals, researchers, clinicians, students, and staff of cancer control organizations and community groups who are working to reduce the burden of cancer throughout Oklahoma.

Understanding the cancer burden in Oklahoma is vital for a variety of reasons, including to report cancer trends in the state; to educate the public; to provide information for planning and evaluation of cancer prevention and control activities throughout the state; and to demonstrate the importance of collecting population-based surveillance data.

BACKGROUND & INTRODUCTION

According to the American Cancer Society's *Cancer Facts & Figures 2022*, cancer is the second most common cause of death in the U.S., exceeded only by heart disease.[1] This is true in Oklahoma as well. In Oklahoma, there were 22,001 new cancer cases (including in situ) diagnosed in 2021. For the combined years of 2017 to 2021, the age-adjusted incidence rate was 460.6 new cases per 100,000 Oklahomans. In 2022, there were over 8,270 deaths due to cancer which accounted for 20% of all deaths in the state[2]. For the combined years of 2018 to 2022, the age-adjusted mortality rate was 173.2 deaths per 100,000 Oklahomans due to cancer.[3]

Oklahoma has over four million residents with a unique racial and ethnic population. There are considerable variations in cancer incidence and mortality between racial and ethnic groups. The reasons for these differences in both incidence and mortality rates are complex and vary for different cancer sites. Contributory factors include variations in cancer screening rates, prevalence of risk factors (modifiable and non-modifiable), and access to health insurance and healthcare services. More than four in ten new cancer diagnoses and cancer deaths are linked to modifiable risk factors and could be prevented.[4]

Risk factors such as a person's age, race, ethnicity, sex, genetics, and family history are non-modifiable. Those with certain non-modifiable risk factors may be at increased risk of a specific cancer type. For example, black men are at an increased risk of prostate cancer compared to other racial groups. In Oklahoma, women comprise over 99% of breast cancer cases compared to less than 1% in men. Older individuals have higher rates of cancer than young people. Additionally, those with an inherited genetic disorder such as Lynch Syndrome or a strong family history of colorectal cancer are at increased risk of the disease.[5] While these risk factors may not be modifiable, actions such as routine and early preventative screenings may help lower the risk of disease and improve long-term outcomes if cancer is caught in the early stages.

BEHAVIORAL RISK FACTORS

Behavioral risk factors are modifiable lifestyle choices that can have a detrimental effect on health outcomes. A notable negative health outcome that has been associated with poor lifestyle choices is cancer diagnosis. Diet, physical activity, alcohol consumption and tobacco use are some of the most-studied risk factors for cancer.[4,5] The Behavioral Risk Factor Surveillance System (BRFSS) is a nationwide health survey that collects data on self-reported lifestyle choices, demographics, disease, illness, cancer screenings, and more. Oklahoma BRFSS data has been an integral part of determining the health of the state to lead interventions, policy development and, ultimately, change.

ALCOHOL CONSUMPTION

Increased alcohol consumption has been linked to negative health outcomes including cancer and other chronic health conditions. Oklahoma ranked below the United States average for binge and heavy drinking in 2023.[6]

13.7% **OKLAHOMA ADULTS**
Reported **binge drinking** in 2023 **vs. 15.2% of adults in the US.**[8,9]

4.8% **OKLAHOMA ADULTS**
Reported **heavy drinking** in 2023 **vs. 6.1% of adults in the US.**[8,9]

DIETARY CHOICES

Diet is one of the most modifiable behavioral risk factors[10], yet most Oklahomans generally do not eat fruits and/or vegetables more than one time per day. Unhealthy dietary choices have been linked to cancer, obesity, diabetes, and more.[7]

79.3% **OKLAHOMA ADULTS**

Consumed vegetables less than one time per day in 2021 **vs. 80.3% of adults in the US.**[8,9]
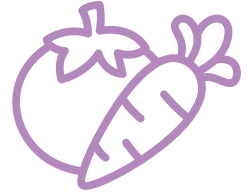
51.3% **OKLAHOMA ADULTS**

Consumed fruit less than one time per day in 2021 **vs. 59.2% of adults in the US.**[8,9]
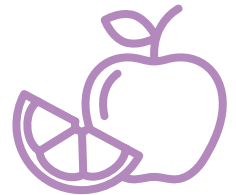
CARDIOVASCULAR HEALTH

Physical activity and tobacco use have opposite effects on the cardiovascular system. Physical activity is a protective factor against illness and disease, whereas smoking is a risk factor for many negative health outcomes.[7] In 2023, Oklahomans engaged in less exercise and smoked more cigarettes compared to the U.S. average.[8,9]

69% **OKLAHOMA ADULTS**

Participated in any **physical activity** during the past month in 2023 **vs. 75.8% of adults in the US.**[8,9]
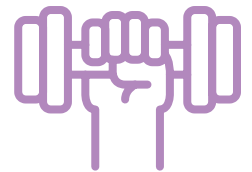
15.8% **OKLAHOMA ADULTS**

Smoked every day in 2023 **vs. 12.1% of adults in the US.**[8,9]

CANCER SCREENINGS

Some types of cancers have preventative screening tests available that detect cancer in its early stages. Preventative cancer screenings are potentially life-saving tests that can detect abnormal c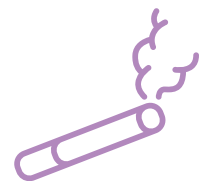ells before symptoms appear. Early detection of pre-cancerous and cancerous cells gives the diagnosed individual the best chance at preventing cancer, achieving remission, and/or living a cancer-free life. The BRFSS collects data on self-reported screenings for several of these, including colorectal, prostate, breast, lung, and cervical cancers. For information on the Oklahoma Comprehensive Cancer Network's efforts to improve screening rates and modifiable risk factors, visit the Oklahoma State Cancer Plan.

BREAST CANCER SCREENINGS

The most common breast cancer screening test is a mammogram. Screening via MRI may be necessary for those at high risk or with dense breast tissue.[11]

66.7% OKLAHOMA FEMALES

Age 40+ received a mammogram in the past 2 years vs. 71.5% of females in the US.[8,9]
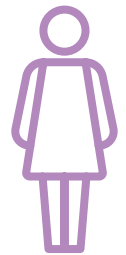
PROSTATE CANCER SCREENINGS

While there are not currently any standard screening tests for prostate cancer, digital rectal exams and prostate-specific antigen (PSA) tests are recommended to detect abnormalities and potential prostate cancer.[12]

28.7% OKLAHOMA MALES

Age 40+ received a PSA (prostate specific antigen) test in the past 3 years vs. 31.8% of males in the US.[8,9]

CERVICAL CANCER SCREENINGS

Human Papillomavirus (HPV) and Papanicolaou (pap) tests are recommended for females to screen for abnormal cells on the cervix that may cause cancer.[13]
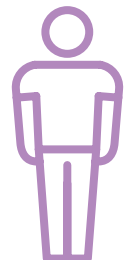
72.7% OKLAHOMA FEMALES

Aged 21-65 received a pap test in the past 2 years vs. 77.7% of females in the US.[8,9]
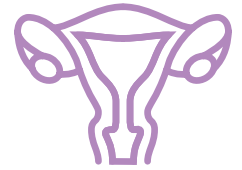
COLORECTAL CANCER SCREENINGS

Colorectal cancer is one of the most preventable cancers when screenings are routinely completed. This can be done by sigmoidoscopy, colonoscopy, and stool tests.[14]

65.8% OKLAHOMA ADULTS

Aged 50-75 years were being up-to-date with colorectal cancer screening vs. 74.3% of adults in the US.[8,9]
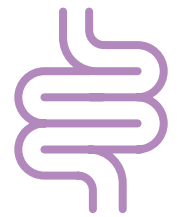
LUNG CANCER SCREENINGS

Low-dose computed tomography (LDCT) scans are used to screen for lung cancer in current and former smokers. The U.S. Preventive Services Task Force (Task Force) recommends yearly lung cancer screening with LDCT for people who:

- Have a 20 pack-year or more smoking history, and
- Smoke now or have quit within the past 15 years, and
- Are between 50 and 80 years old.

A pack-year is smoking an average of one pack of cigarettes per day for one year. For example, a person could have a 20 pack-year history by smoking one pack a day for 20 years or two packs a day for 10 years.[15]
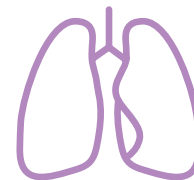
15.9%

OKLAHOMA ADULTS

had a CT or CAT scan in 2022 to check for lung cancer vs. 18.8% of adults in the US.[8,9]

Nationally,

2 in 5 people

will be diagnosed with cancer in their lifetime.

106,973 new cancer diagnoses.

In 2022, cancer was the

2nd leading cause of death.

41,654 cancer deaths.

Cancer in Oklahoma

INCIDENCE

There were 106,973 new cancer cases diagnosed in Oklahoma from 2017 to 2021. During this period, the most frequently diagnosed cancer was breast cancer (65.6 new cases per 100,000 population), which represented 13.9% of all cancer incidence, followed by lung and bronchus (63.3, 14.4%), prostate (61.7, 11.4%), colorectal (42.3, 9.0%) and kidney and renal pelvis (21.3, 4.6%).

As shown in Figures 1 and 2, men and women are susceptible to different cancers. The most diagnosed cancer in men was prostate while for females it was breast cancer, followed by lung and colorectal as the second and third most common cancers for both. The fourth and fifth most common cancers for men were urinary bladder and melanoma compared to uterine and thyroid cancers for women.

MORTALITY

There were 41,723 cancer deaths in Oklahoma from 2018 to 2022 (figures show the years 2017 to 2021 for comparability to incidence rates). Lung and bronchus cancer had the highest mortality rate for both men and women (53.3 and 38.0 deaths per 100,000 population, respectively), followed by prostate (19.9 deaths per 100,000 male population), breast (22.2 deaths per 100,000 female population), colorectal (16.3 deaths per 100,000 population), pancreas (11.1 deaths per 100,000 population) and liver (7.5 deaths per 100,000 population).

Figure 1

COMMON CANCERS IN MEN

2017 - 2021, Oklahoma

Cancer	Incidence	Mortality
Prostate	104.0	19.6
Lung and Bronchus	72.1	55.3
Colorectal	47.6	19.2
Urinary Bladder	31.9	7.6
Melanoma of the Skin	27.2	3.7
Kidney and Renal Pelvis	27.0	6.8
Oral Cavity and Pharynx	20.8	4.8
Non-Hodgkin Lymphoma	20.1	7.6
Leukemia	17.2	9.5
Pancreas	14.0	12.7

Age-Adjusted Rate (per 100,000 men)

■ Incidence   ☐ Mortality
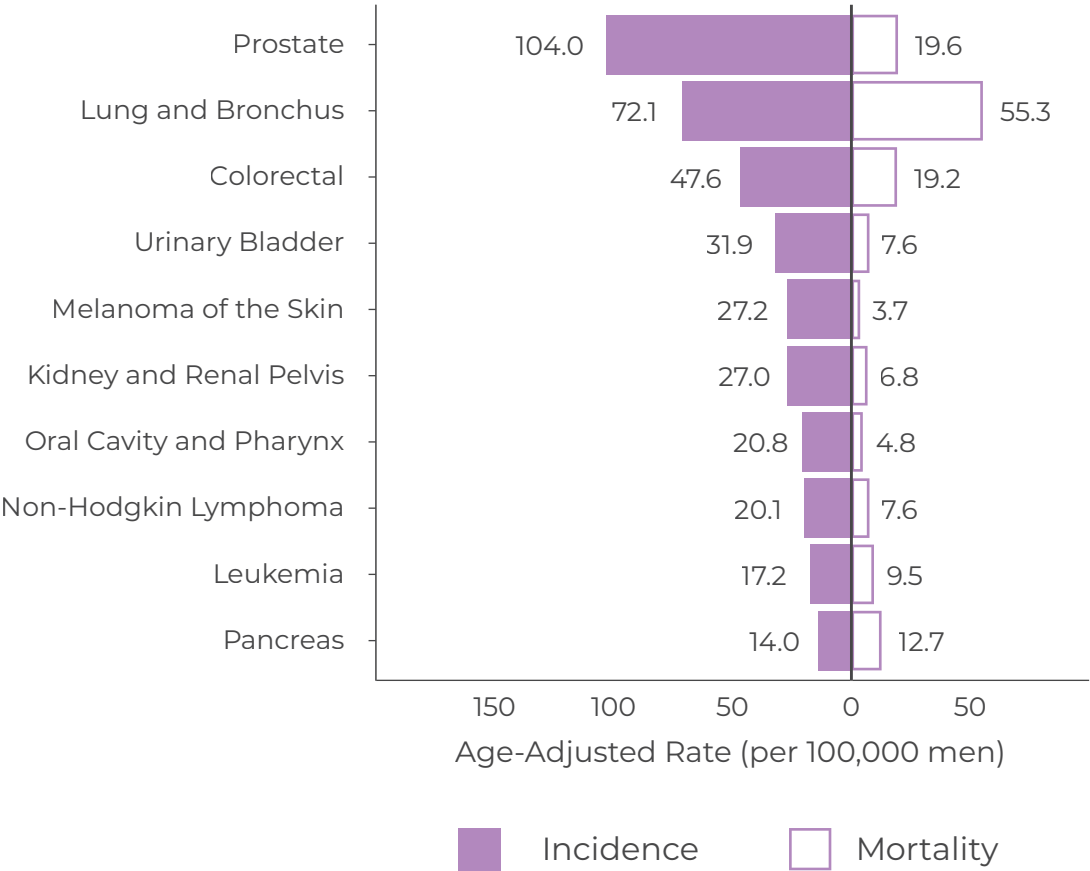
Figure 2

COMMON CANCERS IN WOMEN

2017 - 2021, Oklahoma

Cancer	Incidence	Mortality
Breast	145.5	22.5
Lung and Bronchus	56.8	37.9
Colorectal	37.7	13.6
Corpus and Uterus, NOS	25.0	4.8
Thyroid	18.3	0.5
Melanoma of the Skin	16.4	1.5
Kidney and Renal Pelvis	16.3	3.1
Non-Hodgkin Lymphoma	15.0	4.5
Pancreas	11.0	9.6
Ovary	10.5	7.0

Age-Adjusted Rate (per 100,000 women)

■ Incidence   ☐ Mortality
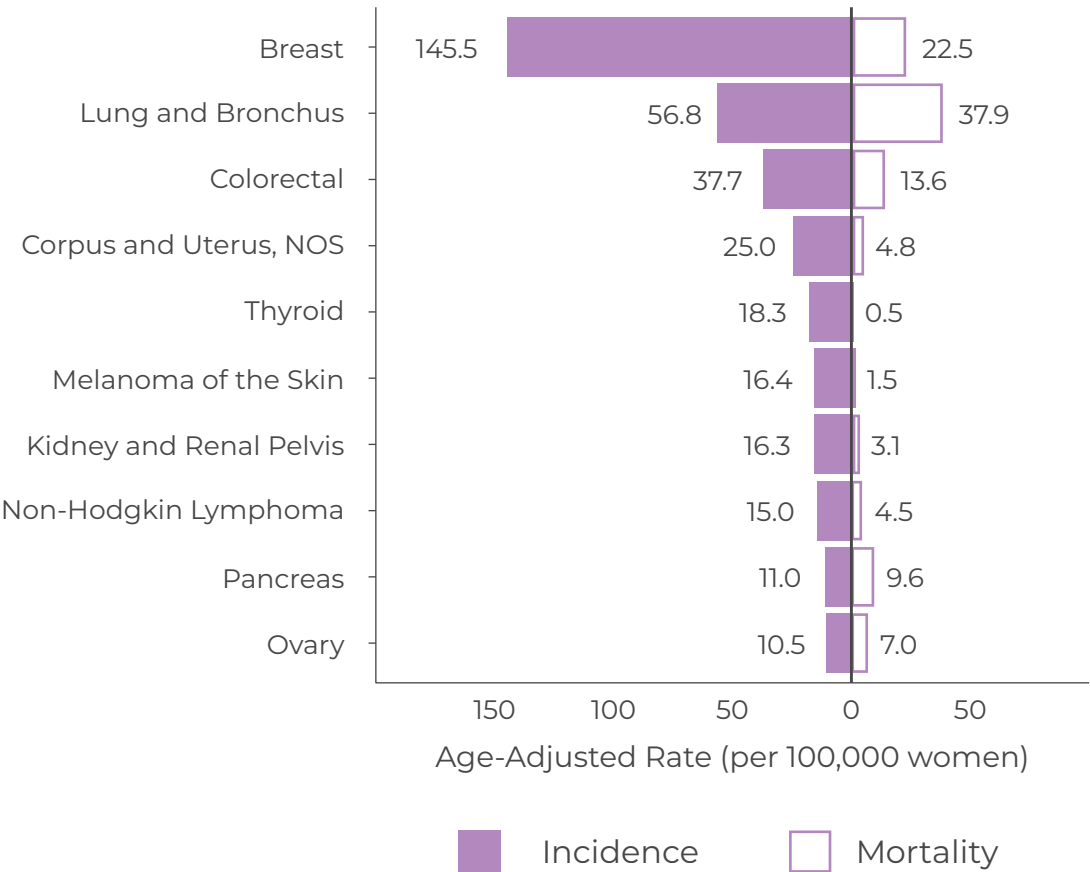
CANCER TRENDS OVER TIME

Overall, both age-adjusted cancer incidence and mortality rates have decreased in Oklahoma over the last 20 years (Figure 3). In recent years, the U.S. mortality rate has had a more pronounced decrease resulting in a widening gap between Oklahoma and the national average. From 2000-2004, the difference between Oklahoma's mortality rate and that of the U.S. was, on average, 4.3%, which increased to an average difference of 17.2% by 2018 to 2022.

Figure 3
ALL CANCERS COMBINED

2000 - 2021, Oklahoma

Figure 4
CANCER INCIDENCE RATE BY AGE GROUP
ALL CANCERS COMBINED

2000 - 2021, Oklahoma

Oklahoma has a similar overall age-adjusted incidence rate (Figure 5) for all cancers combined to the U.S. but has a 19.6% higher mortality rate (Figure 6).

Figure 5
OKLAHOMA VS U.S. CANCER INCIDENCE RATE
Percent Difference in Age-Adjusted Rate
2017-2021

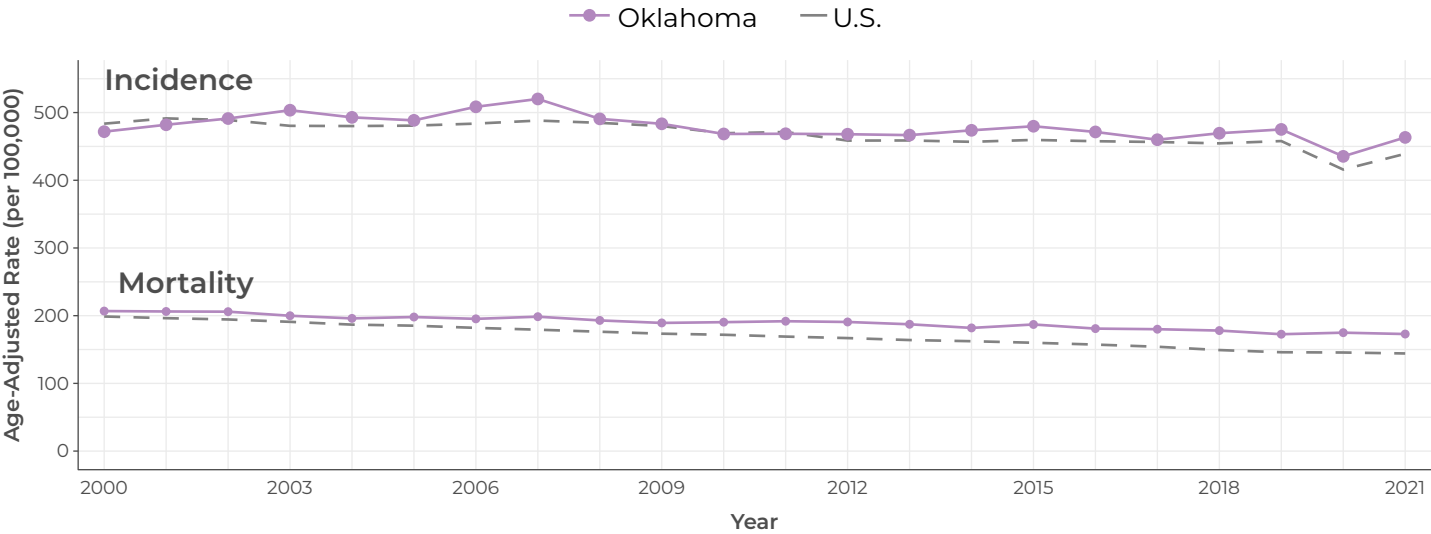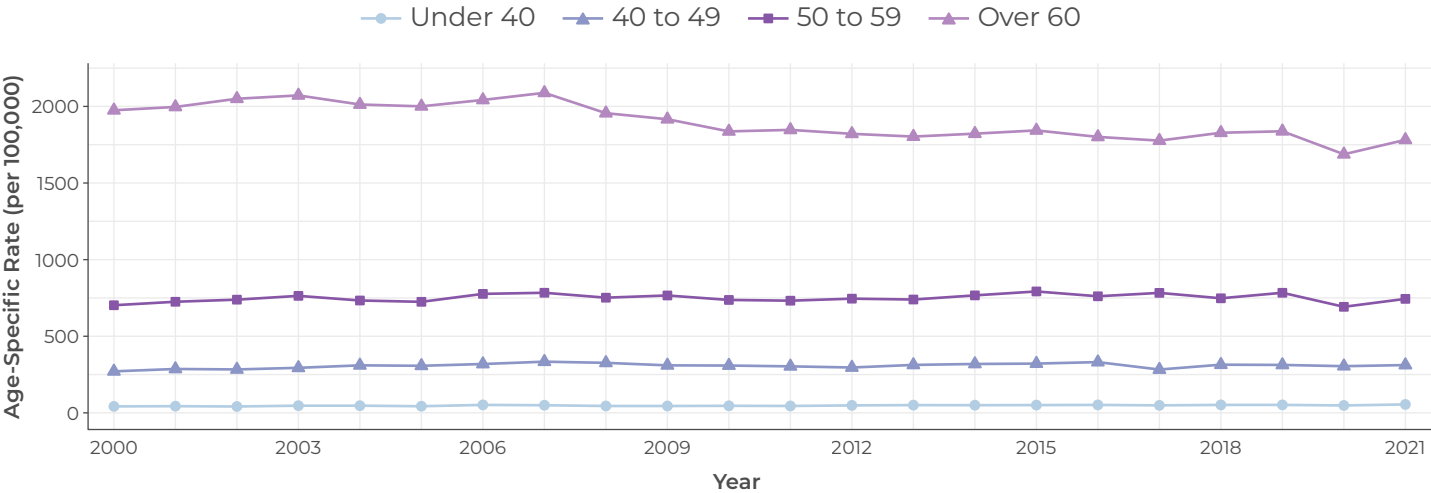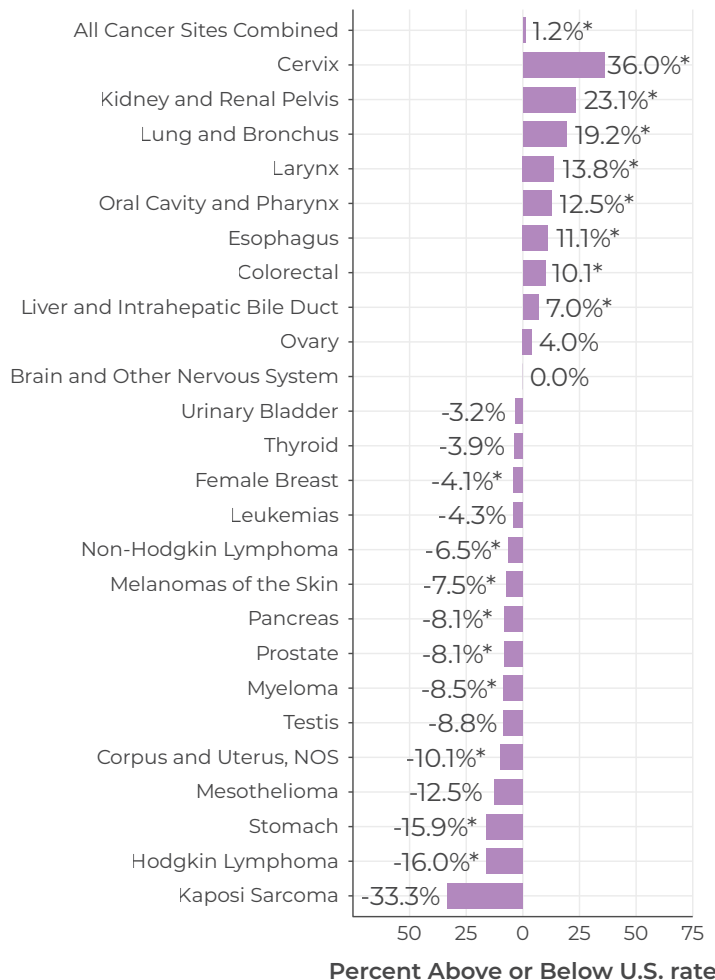| Cancer Site	Percent
All Cancer Sites Combined	1.2%*
Cervix	36.0%*
Kidney and Renal Pelvis	23.1%*
Lung and Bronchus	19.2%*
Larynx	13.8%*
Oral Cavity and Pharynx	12.5%*
Esophagus	11.1%*
Colorectal	10.1*
Liver and Intrahepatic Bile Duct	7.0%*
Ovary	4.0%
Brain and Other Nervous System	0.0%
Urinary Bladder	-3.2%
Thyroid	-3.9%
Female Breast	-4.1%*
Leukemias	-4.3%
Non-Hodgkin Lymphoma	-6.5%*
Melanomas of the Skin	-7.5%*
Pancreas	-8.1%*
Prostate	-8.1%*
Myeloma	-8.5%*
Testis	-8.8%
Corpus and Uterus, NOS	-10.1%*
Mesothelioma	-12.5%
Stomach	-15.9%*
Hodgkin Lymphoma	-16.0%*
Kaposi Sarcoma	-33.3%

Percent Above or Below U.S. rate

Figure 6
OKLAHOMA VS U.S. CANCER MORTALITY RATE
Percent Difference in Age-Adjusted Rate
2018-2022

Cancer Site	Percent
All Cancer Sites Combined	19.6%*
Cervix	59.1%*
Kidney and Renal Pelvis	41.2%*
Lung and Bronchus	39.0%*
Testis	33.3%
Colorectal	25.1%*
Melanomas of the Skin	20.0%*
Oral Cavity and Pharynx	19.2%*
Esophagus	18.9%*
Non-Hodgkin Lymphoma	18.4%*
Leukemias	17.2%*
Urinary Bladder	17.1%*
Female Breast	15.6%*
Liver and Intrahepatic Bile Duct	13.6%*
Brain and Other Nervous System	13.6%*
Ovary	13.3%*
Myeloma	13.3%*
Larynx	11.1%
Prostate	7.4%*
Pancreas	0.9%
Thyroid	0.0%
Stomach	0.0%
Hodgkin Lymphoma	0.0%
Corpus and Uterus, NOS	-5.8%
Mesothelioma	-16.7%

Percent Above or Below U.S. rate

Disparities exist in cancer incidence and mortality between racial and ethnic groups, as show in Figures 7 and 8, the differences between the groups have changed over time.

Figure 7

ALL CANCERS COMBINED

Incidence Rates by Race and Ethnicity in Oklahoma

* Bridged 4 Category Race
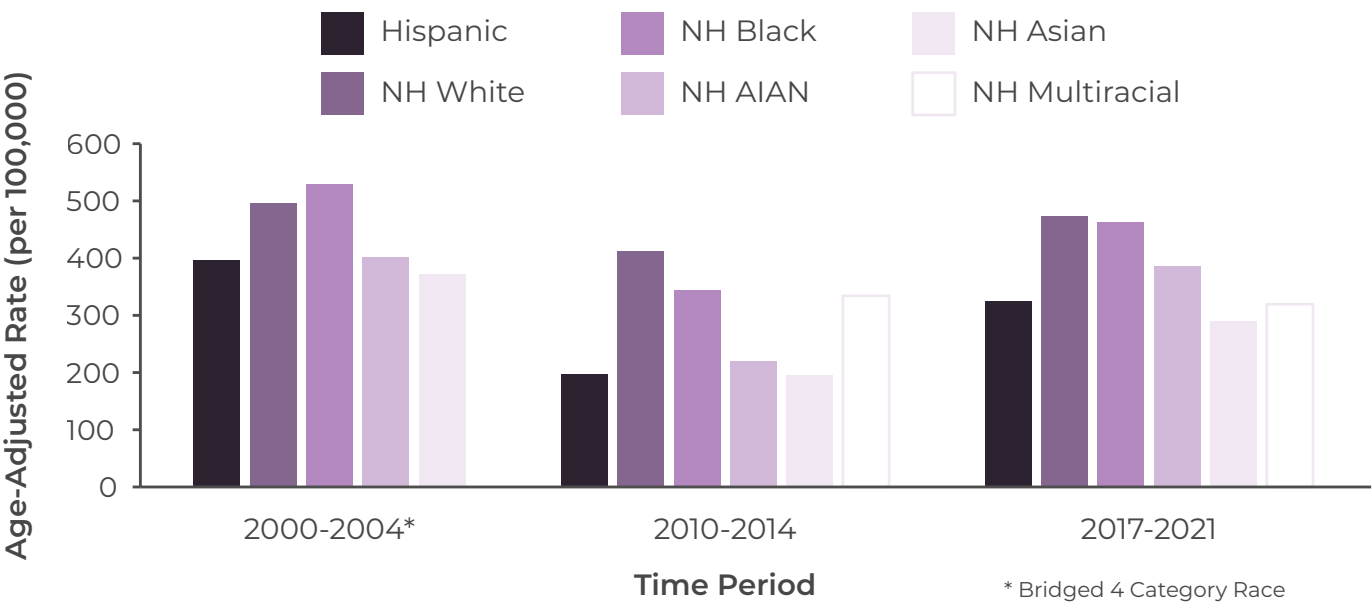
Figure 8

ALL CANCERS COMBINED

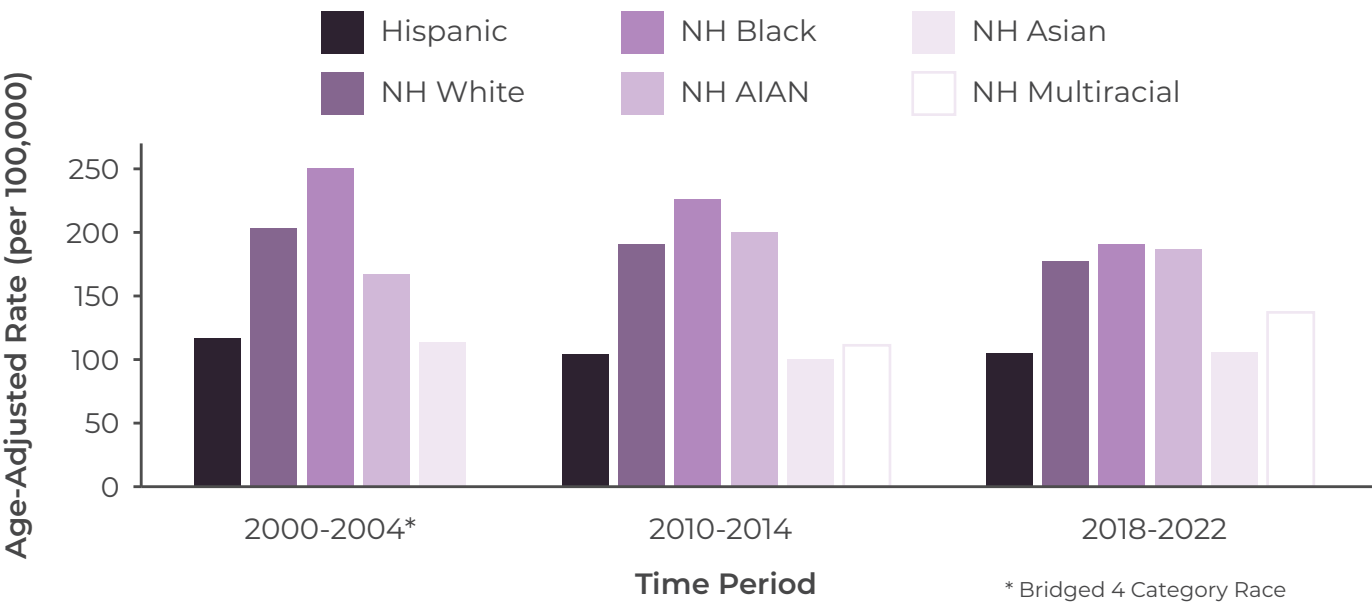Mortality Rates by Race and Ethnicity in Oklahoma


* Bridged 4 Category Race

STAGE AT DIAGNOSIS

Cancers diagnosed at the localized stage before they have spread to other tissues and organs have better treatment and survival outcomes overall. Health organizations and groups such as the U.S. Preventative Services Task Force have advocated for more preventative and early cancer screenings to increase the rate of early-stage diagnoses and increase survivorship.

In Oklahoma, more than two in five cancers diagnosed (41.2%) from 2017-2021 were at the localized stage, which is slightly lower than the national percentage of 46.1% diagnosed at the localized stage (Figure 9). Nearly two in three cancers (61.2%) in Oklahoma are diagnosed at the localized and regional stages.

Figure 9
STAGE AT DIAGNOSIS
All Cancers Combined
2017 - 2021, Oklahoma
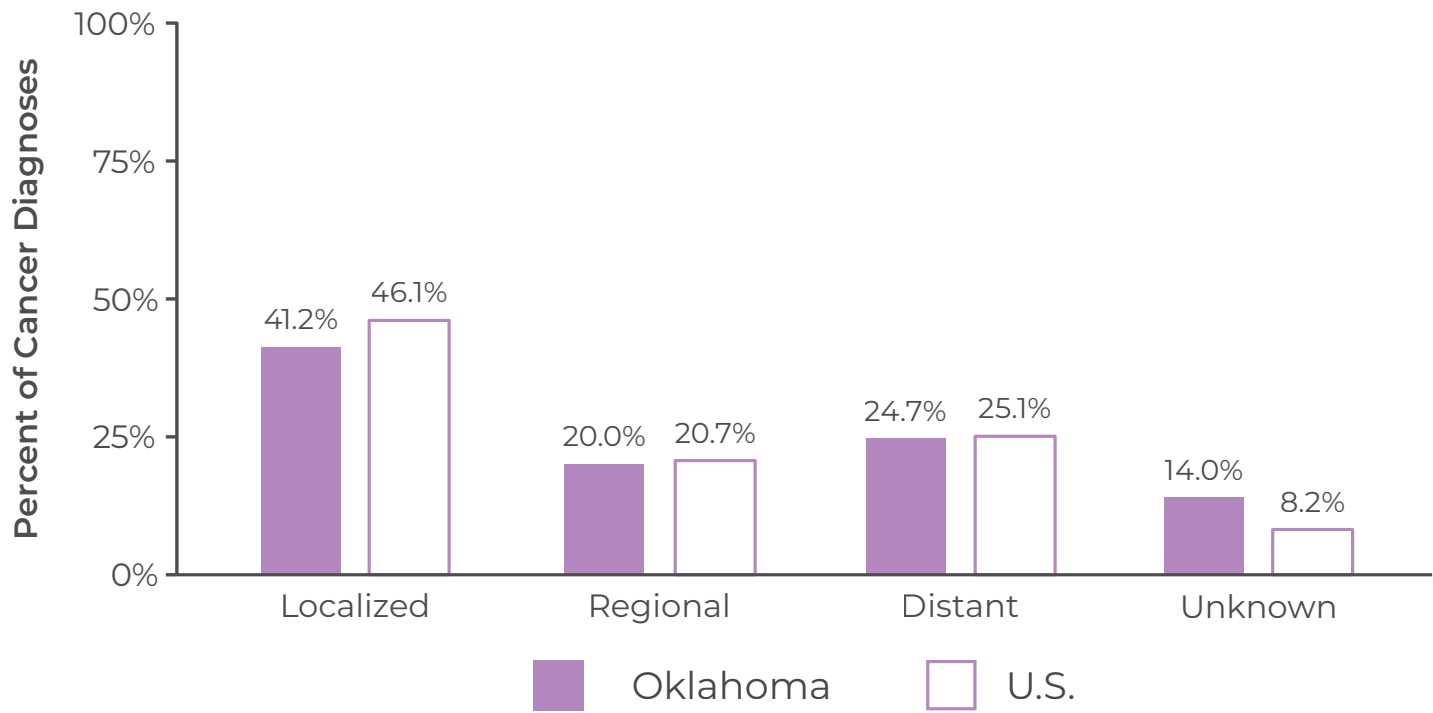
17,278 newly diagnosed cases.

2nd highest mortality rate for women

responsible for 14.5% of female cancer deaths.

Black, Non-Hispanic women experience a

51% higher mortality rate

than the U.S. rate.

2 in 3 women aged 40+

reported having a mammogram in the last two years.

Breast Cancer

INCIDENCE

There were 17,278 Oklahomans diagnosed with breast cancer from 2017 to 2021, more than any other cancer type. Of these diagnoses, 99.2% were in women and 14.2% were in situ. Breast cancer cases, including in situ, represented 16.5% of all cancers diagnosed in Oklahoma. The age-adjusted incidence rate for female breast cancer (excluding in situ) for the entire five-year period was 124.5 newly diagnosed cases per 100,000 women, which was akin to the previous five-year period (125.0 per 100,000 from 2013-2017) and slightly below the 2017 to 2021 U.S. rate of 129.8.

MORTALITY

In Oklahoma, from 2018 to 2022, there were 2,802 women and 33 men who died from breast cancer. The age-adjusted mortality rate among women was 22.2 per 100,000 women in the population, which was about the same as the previous five-year period (22.4 per 100,000 from 2013-2017) and slightly above the 2018 to 2022 U.S. rate of 19.2.

Female breast cancer mortality rates have been slowly decreasing over the last 20 years both in Oklahoma and the U.S. The lowest annual mortality rate was 29.6 in 2022, while the highest was 26.8 in 2002. Overall, mortality rates have decreased 12.6% in Oklahoma since the 2000-2004 time period (Figure 10).

Figure 10

OKLAHOMA VS. U.S. BREAST CANCER RATES

Incidence and Mortality Rates

2000-2021
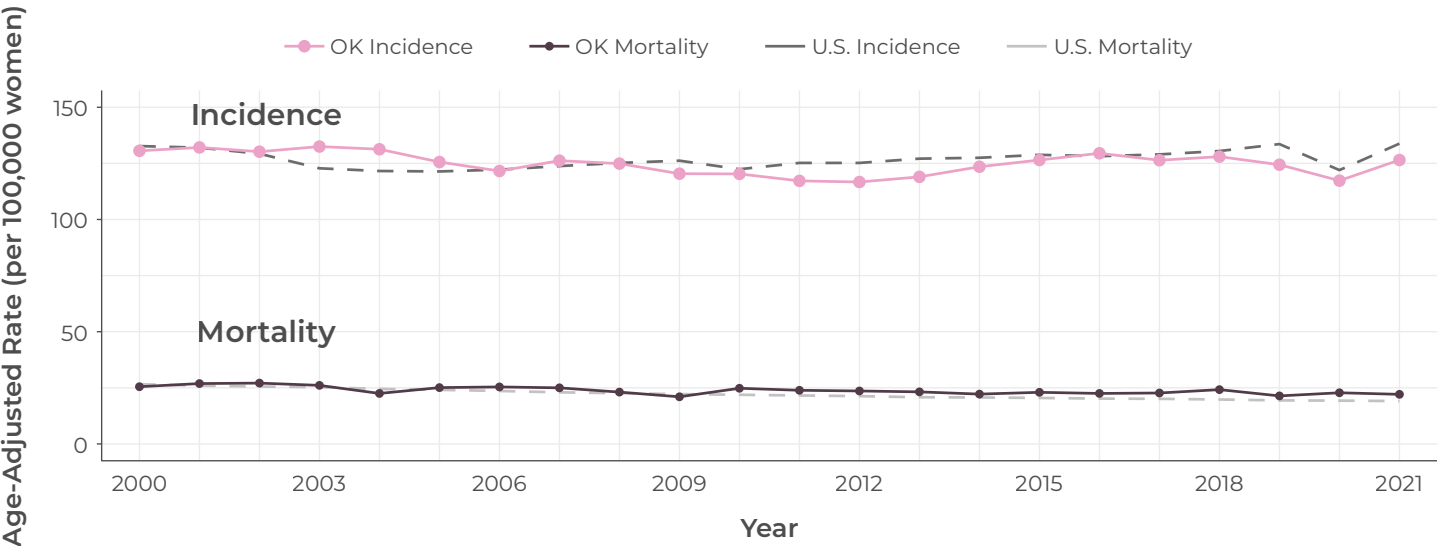
## WHO GETS BREAST CANCER IN OKLAHOMA?

As shown in Figure 11, there are disparities in breast cancer diagnosis between racial and ethnic groups in Oklahoma. From 2017 to 2021, Non-Hispanic (NH) American Indian and Alaska Native (AIAN) women had the highest age-adjusted incidence of breast cancer in Oklahoma at 149.5 per 100,000 population, followed by NH Black (132.3), NH White (123.3), and NH Asian/Pacific Islander (96.9). The lowest incidence of breast cancer was among Hispanic women (91.3). NH Black women had a 3.2 times higher age-adjusted incidence of breast cancer (133.9) than NH Multiracial women (42.2).

Non-Hispanic Black women had the highest age-adjusted mortality rate from breast cancer in Oklahoma (29.6 deaths per 100,000 women) from 2018 to 2022, followed by NH White (22.6 deaths), NH AIAN (21.8 deaths), NH Asian women (9.9 deaths), and Hispanic women (14.6 deaths). Mortality rates among all races have declined since 2000 (29% decrease for NH Black women; 22% decrease for NH AIAN women; 2% decrease for NH White women). Non-Hispanic Black women had a three times higher age-adjusted mortality rate (5.8) than NH Asian women (29.8 deaths per 100,000 women) for the combined years of 2018 to 2022.
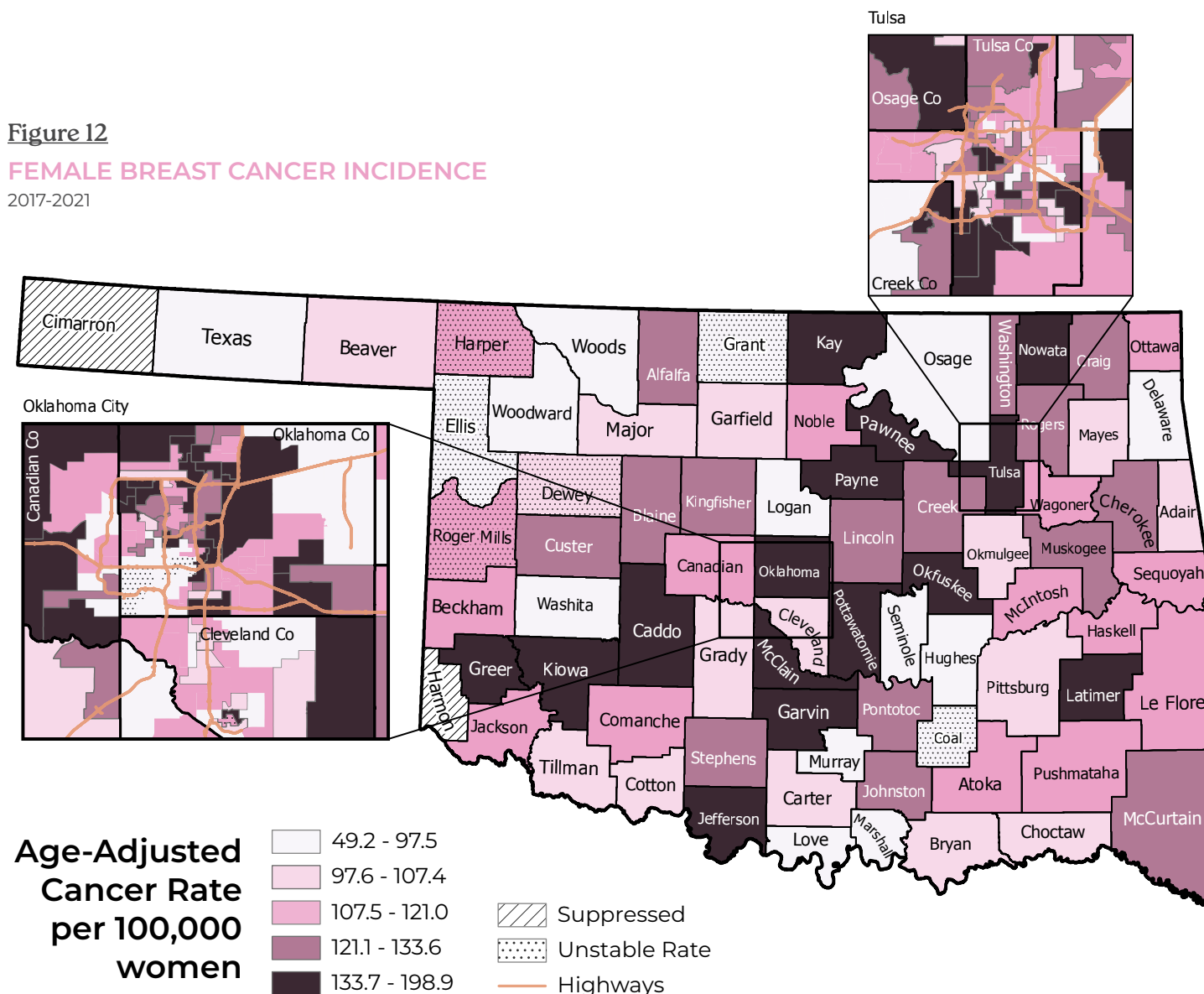
Figure 11
BREAST CANCER RATES BY RACE AND ETHNICITY AMONG WOMEN
2017 - 2021, Oklahoma

LOCATION
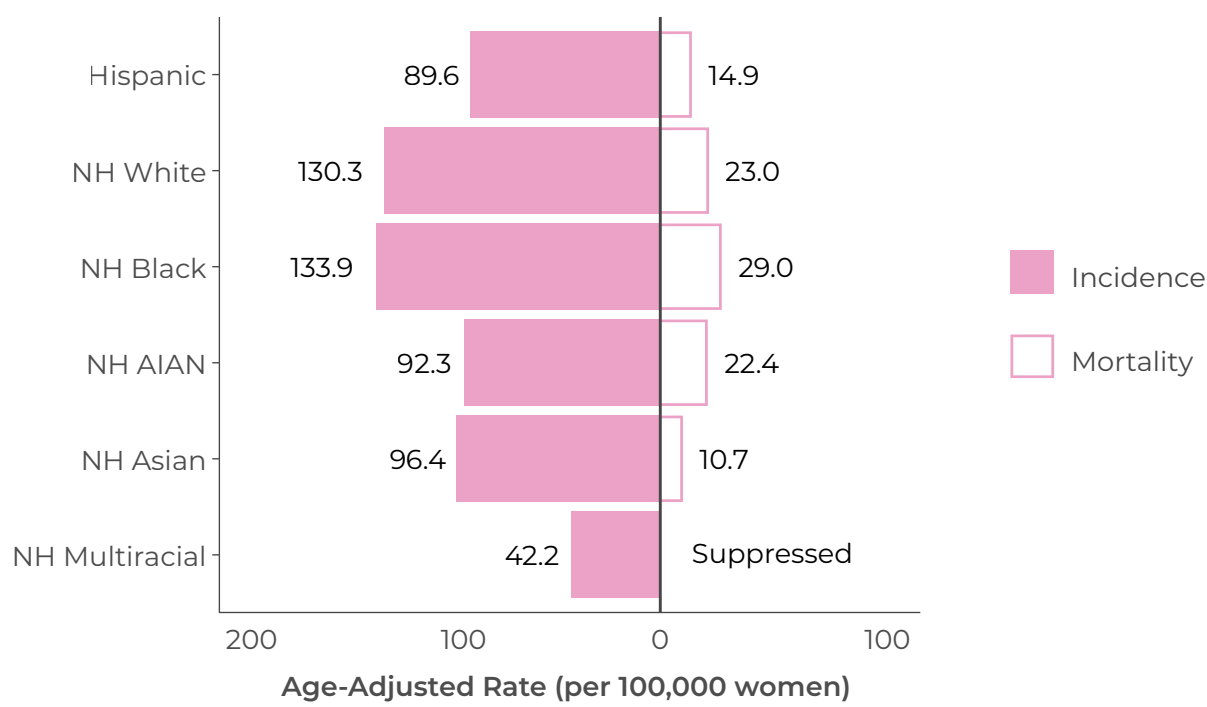
From 2017-2021, five counties in Oklahoma had a higher age-adjusted incidence rate than the overall state rate (Figure 12). Greer County (198.9 cases per 100,000 women) had the highest rate, followed by Pawnee (160.8) and Nowata (152.1) counties. Love County had the lowest age-adjusted incidence rate (49.2), with Woodward County having the second lowest rate (82.0). In Oklahoma County, northern and northeastern sections of the Oklahoma City metro had the highest breast cancer incidence rates. For Tulsa County, the southern side of the Tulsa metro area had the highest rates for that county.

Figure 12
FEMALE BREAST CANCER INCIDENCE
2017-2021

Age-Adjusted Cancer Rate per 100,000 women

	49.2 - 97.5
	97.6 - 107.4
	107.5 - 121.0
	121.1 - 133.6
	133.7 - 198.9

Suppressed
Unstable Rate
Highways

STAGE AT DIAGNOSIS

From 2017 to 2021, in Oklahoma, 61.9% of breast cancers were diagnosed at the localized stage. This was slightly below the U.S. rate of 66.3% for the same time period. Over a quarter of breast cancers (26.6%) in Oklahoma were diagnosed at the regional stage and 6.8% at the distant stage (Figure 13).

Figure 13

STAGE AT DIAGNOSIS

Female Breast Cancer (excluding in situ)

2017 - 2021, Oklahoma
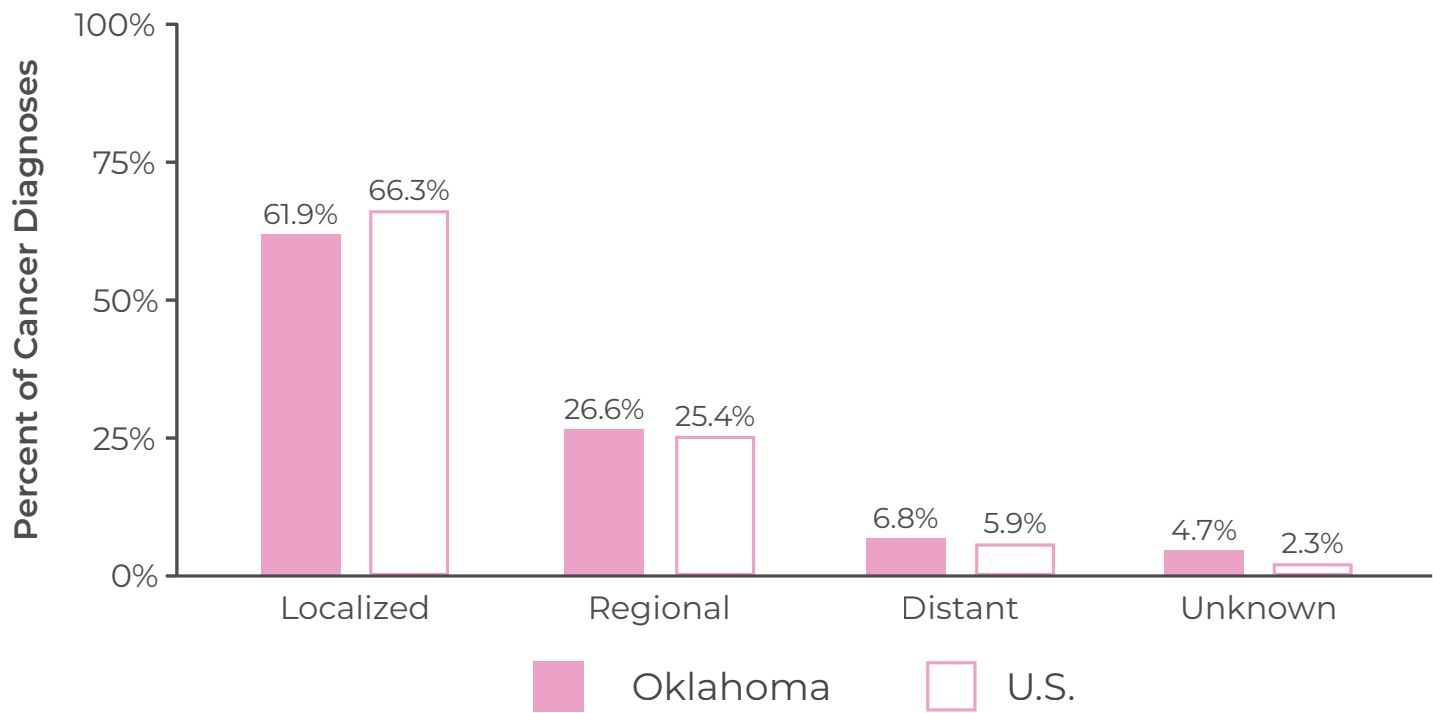
LUNG & BRONCHUS CANCER

64.2% were late stage

at the time of diagnosis.

Non-Hispanic Whites and American Indian/Alaska Natives have

twice the mortality rate

 of Asians.

Over 1 in 4 cancer deaths,

more than any other cancer.

15.9% of ever-smokers

have had a CT or CAT scan for screening purposes.

Lung & Bronchus Cancer

INCIDENCE

There were 15,374 new cases of lung and bronchus cancer diagnosed in Oklahoma between 2017 to 2021 which represented 14.4% of all cancers. In 2021, lung and bronchus cancer had an age-adjusted rate of 60.7 cases per 100,000 population which was lower than in 2017 (64.0). For the combined years of 2017 to 2021, the Oklahoma incidence rate (60.7) was above the national rate of 49.1 cases per 100,000 population for the same time period (Figure 14).

In Oklahoma in 2021, lung and bronchus cancer were the second most diagnosed cancer for men (age-adjusted incidence rate of 66.8 cases per 100,000 men) behind prostate cancer. For women, lung and bronchus cancer was also the second most diagnosed cancer (age-adjusted incidence rate of 56.4 cases per 100,000 women) behind breast cancer.

Lung and bronchus cancer incidence rates decreased about 10% in Oklahoma from 2017 to 2021 (from 67.4 to 60.7 per 100,000) compared to a 21% decrease nationally (62.3 to 49.1 per 100,000). For men in Oklahoma, incidence rates for lung cancer decreased by 9.6% from 2017 to 2021. While rates remained about the same for Oklahoma women from 2017 to 2021 (56.3 and 56.4 new cases per 100,000 population, respectively), female lung cancer rates dropped about 13.9% nationally in the same time period.

MORTALITY

Lung and bronchus cancers are the leading cause of cancer death among Oklahomans. In 2022, 2,152 Oklahomans died from lung and bronchus cancers, an age-adjusted mortality rate of 42.9 deaths per 100,000 population. In 2022, over half (52%) of lung and bronchus cancer deaths occurred in men which is a lower proportion than occurred in men in 2017 (57%). From 2018 to 2022, the lung and bronchus age-adjusted mortality rate decreased for males from 57.3 to 49.5 per 100,000 men, a 13.6% decrease. However, among women, from 2018 to 2022, the mortality rate decreased only slightly from 38.8 deaths to 38.0 deaths per 100,000 population. Nationally, the mortality rate decreased among women from 29.3 in 2018 to 26.0 deaths per 100,000 population in 2022 (Figure 14).

<u>Figure 14</u>

OKLAHOMA VS. U.S. LUNG AND BRONCHUS CANCER RATES

Incidence and Mortality Rates

2000-2021
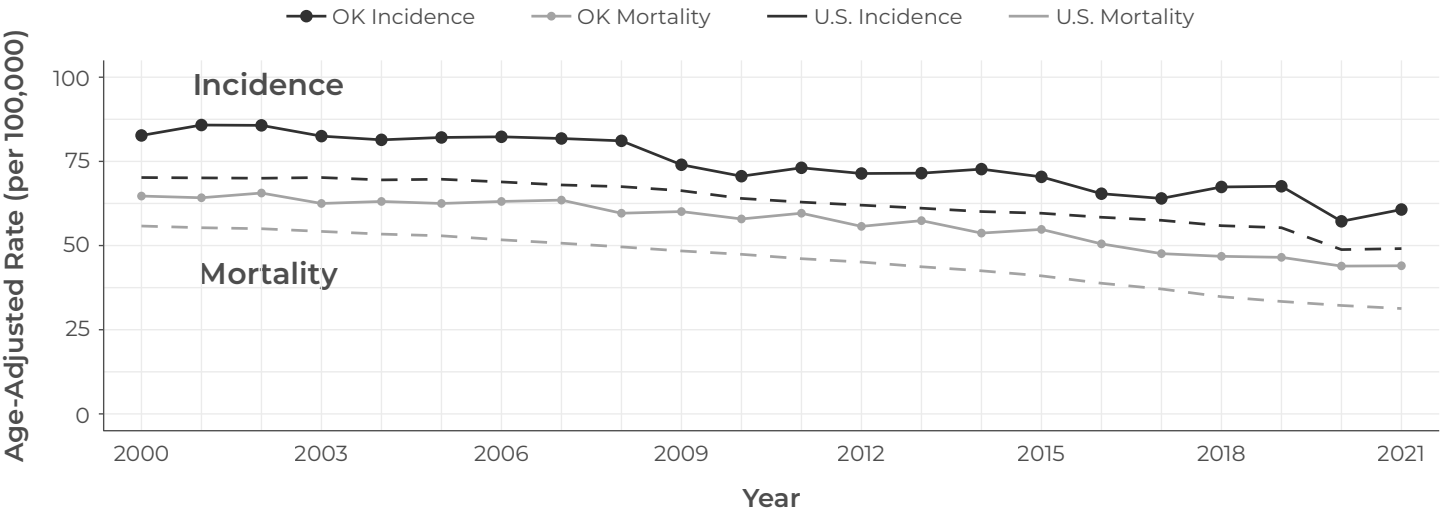
WHO GETS LUNG AND BRONCHUS CANCERS IN OKLAHOMA?

Figure 15 shows the age-adjusted incidence rates from the combined years 2017 to 2021 for lung and bronchus cancer among Oklahomans by race and ethnicity. Those who identified as Hispanic or Non-Hispanic (NH) Asian had the lowest incidence rates for the time period while NH Multiracial Oklahomans reported an incidence rate that more than doubled (2.6 times) that of NH Asians.
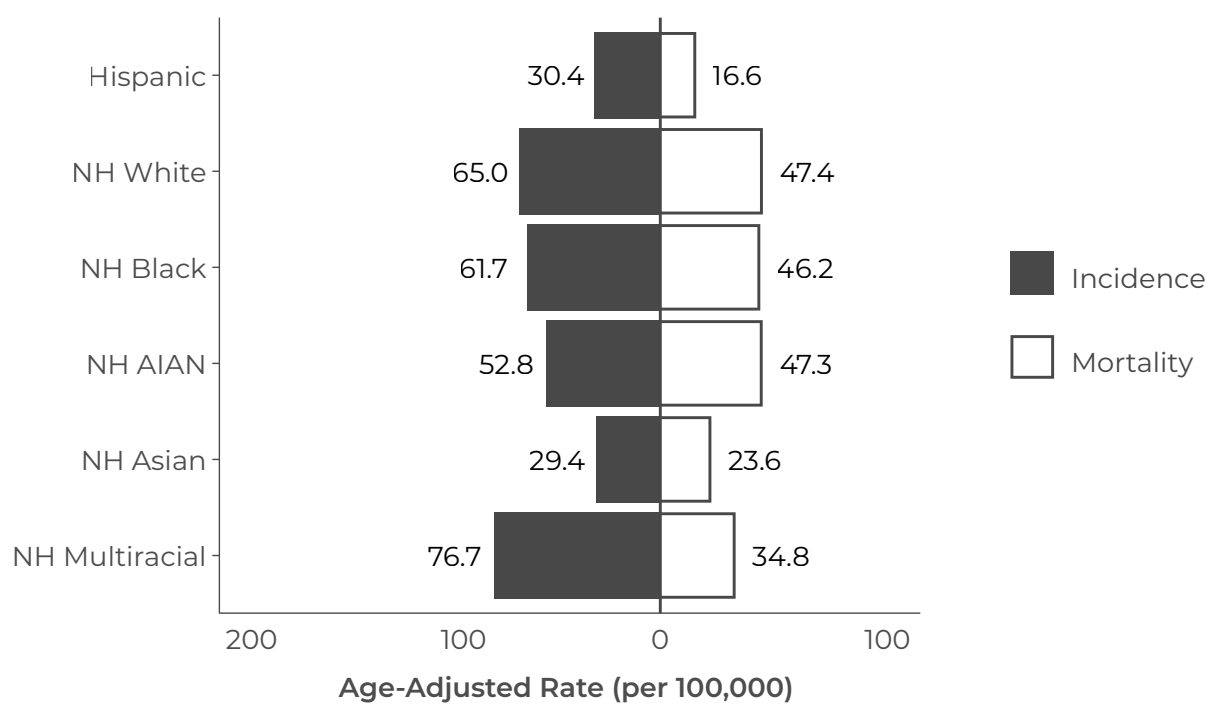
The mortality rates in Figure 15 follow a similar pattern to incidence apart from the NH Multiracial category. In 2021, Hispanics had the lowest age-adjusted mortality rate at 16.6 whereas NH Whites and NH American Indian and Alaska Native (AIAN) had almost a three times higher rate of 47.4 and 47.3 death, respectively, due to lung cancer per 100,000 population than Hispanics.

A similar pattern continued in 2022, NH AIAN had the highest mortality rate (46.5) followed by NH White (43.7), NH Black (39.1), NH Multiracial (33.0), NH Asian (30.4), and Hispanic (19.2).

Lung and bronchus cancer mortality increases with age. The mortality rate in Oklahoma in 2022 for those 55 years or older was 180.5 deaths per 100,000 population compared to a rate of 3.6 for those younger than 55.

<u>Figure 15</u>
LUNG AND BRONCHUS CANCER RATES BY RACE AND ETHNICITY
2017 - 2021, Oklahoma

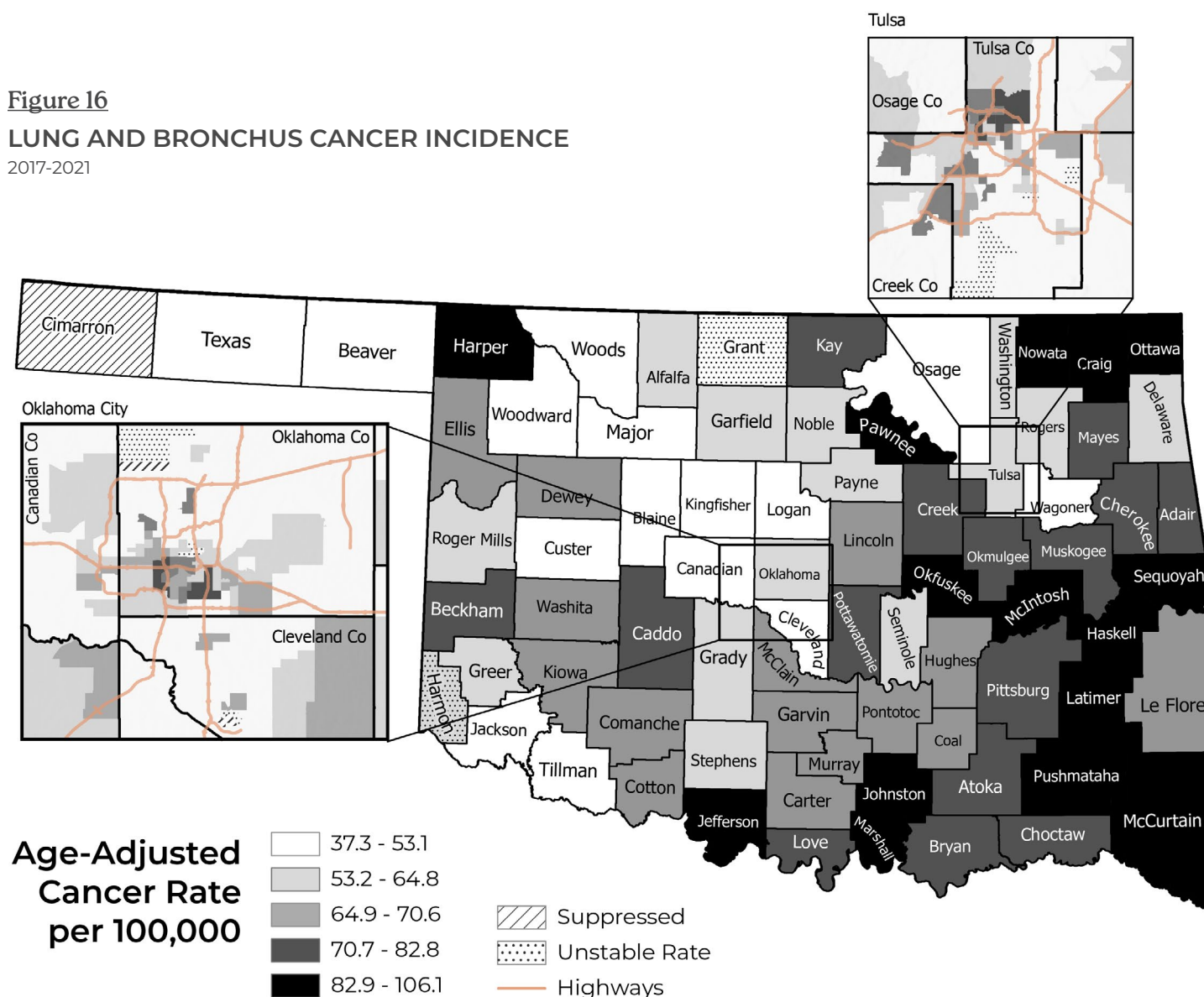| Race/Ethnicity	Incidence	Mortality
Hispanic	30.4	16.6
NH White	65.0	47.4
NH Black	61.7	46.2
NH AIAN	52.8	47.3
NH Asian	29.4	23.6
NH Multiracial	76.7	34.8

Age-Adjusted Rate (per 100,000)

LOCATION

From 2017 to 2021, 50 counties in Oklahoma had a higher age-adjusted lung and bronchus cancer incidence rate than the overall state rate of 60.7 new cases per 100,000 population (Figure 16). Haskell County (106.1 cases per 100,000) had the highest rate followed by Harper County (100.7) and Pawnee County (96.9). Of the counties with stable rates and unsuppressed data, Beaver (41.1) and Texas (38.6) counties had the lowest incidence rates. Higher rates of lung and bronchus cancer were generally found in eastern Oklahoma. In Oklahoma County, higher rates of lung and bronchus cancer were found in the southern sections of Oklahoma City. Northern parts of Tulsa County had higher incidence of lung and bronchus cancer compared to the rest of the county.

Figure 16

LUNG AND BRONCHUS CANCER INCIDENCE

2017-2021

Age-Adjusted Cancer Rate per 100,000

- 37.3 - 53.1
- 53.2 - 64.8
- 64.9 - 70.6
- 70.7 - 82.8
- 82.9 - 106.1

- Suppressed
- Unstable Rate
- Highways

STAGE AT DIAGNOSIS

From 2017 to 2021, in Oklahoma, 23.3% of lung and bronchus cancers were diagnosed at the localized stage, 20.7% at the regional stage, and 43.5% at the distant stage. Nationally, these numbers are 28.1%, 22.3%, and 44.8%, respectively (Figure 17).

In 2021, the U.S. Preventative Services Task Force expanded screening guidelines for lung and bronchus cancer that broadened eligibility to include more people, which may have resulted in improvements in staging at diagnosis. Currently, guidelines for preventative screening only include current or former tobacco smokers who are considered at high risk for lung and bronchus cancer. The percentage of lung cancers diagnosed in the localized stage in Oklahoma has increased 27.3% since 2000 to 2004, while the percentage of regional and distant lung cancers has decreased 11.9% and 3.3%, respectively.

Figure 17
STAGE AT DIAGNOSIS
Lung and Bronchus Cancer
2017 - 2021, Oklahoma
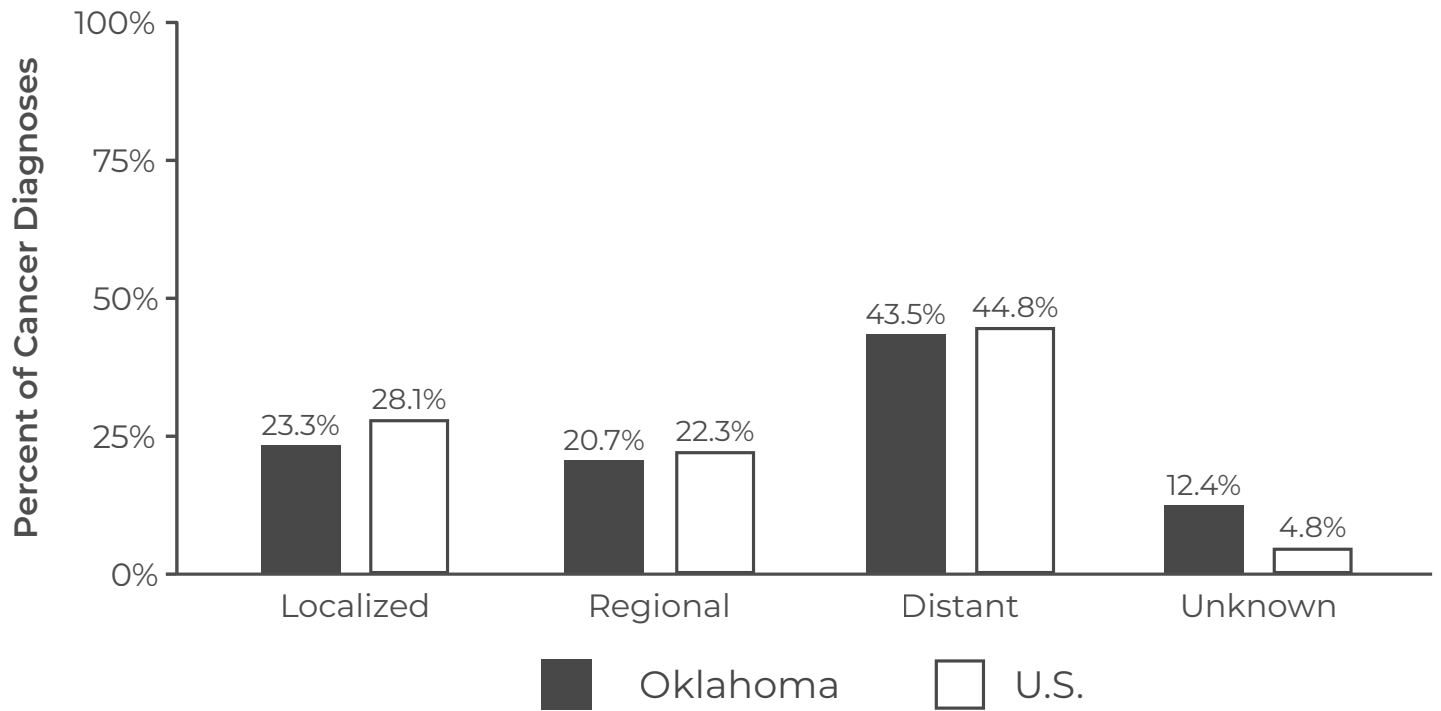
PROSTATE CANCER

IN OKLAHOMA (2017-2021)

The most commonly diagnosed cancer in men.

Non-Hispanic Black men have a risk

1.7 times higher

than non-Hispanic White men.

Among all cancers

2nd highest mortality rate

responsible for 9% of male cancer deaths.

Non-Hispanic Black men have a mortality rate that is

2.3 times higher

than Non-Hispanic White men.

Prostate Cancer

INCIDENCE

Between 2017 and 2021, there were 12,183 new prostate cancers diagnosed in Oklahoma. Prostate cancer is the third most common cancer overall and the most frequently diagnosed cancer in men in Oklahoma. Prostate cancer diagnoses were 11.4% of cancers diagnosed in Oklahoma from 2017 to 2021. Oklahoma's prostate cancer incidence has remained below the national rate since 2011. From 2017 to 2021, prostate cancer incidence in Oklahoma decreased 39% compared to 37% nationwide (Figure 18).

MORTALITY

In 2022, 447 Oklahomans died from prostate cancer equating to nearly 10% of overall cancer deaths in men that year. After lung and bronchus cancer, prostate cancer was the second leading cause of cancer deaths among men that same year.

Prostate cancer mortality has been declining in both the United States and Oklahoma since 2000. In 2022, the age-adjusted prostate cancer mortality rate in Oklahoma (21.8 deaths per 100,000 men) was higher than the U.S. (18.6 deaths per 100,000 men). From 2000 to 2022, there was a 41% decline in the national prostate cancer mortality rate compared to a 27% decline in the Oklahoma rate (Figure 18).

Figure 18

OKLAHOMA VS. U.S. PROSTATE CANCER RATES

Incidence and Mortality Rates

2000-2021
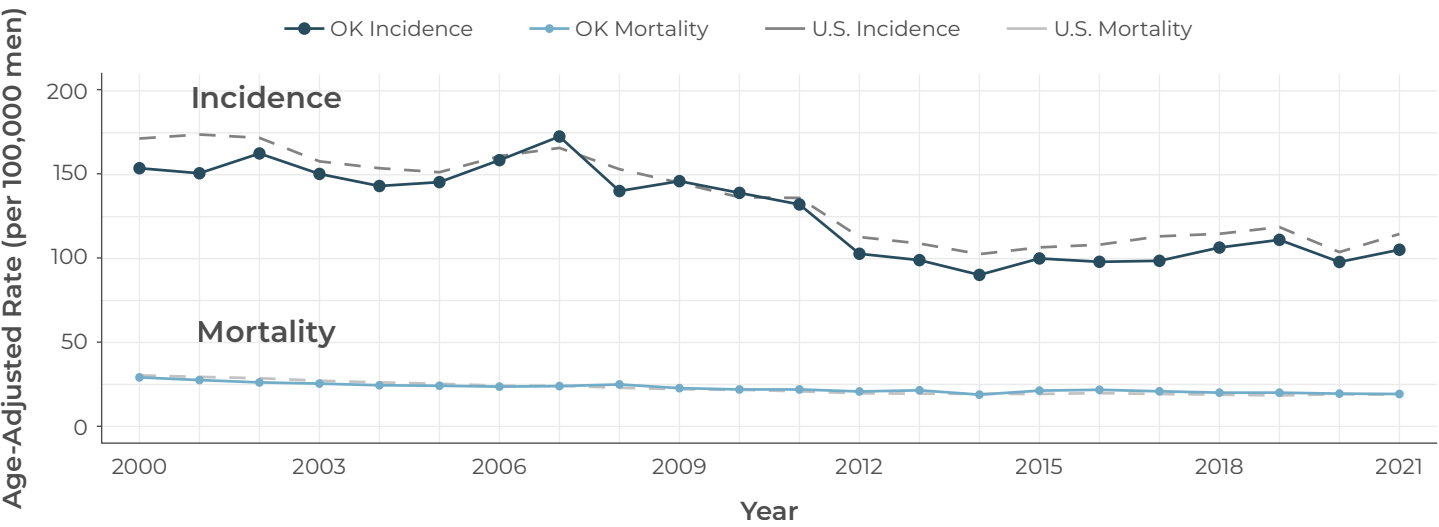
WHO GETS PROSTATE CANCER IN OKLAHOMA?

As shown in Figure 19, incidence rates for prostate cancer differ by racial and ethnic groups. For the years 2017 to 2021, Non-Hispanic Black men in Oklahoma diagnosed with prostate cancer had a rate that was more than double that of Hispanic men (166.9 vs. 71.3 deaths per 100,000 men, respectively).

In 2022 in Oklahoma, prostate cancer mortality rates increased as age increased, and the highest rates were found to be among older men. Table 1 shows mortality rates by age for prostate cancer in Oklahoma from 2018 to 2022.
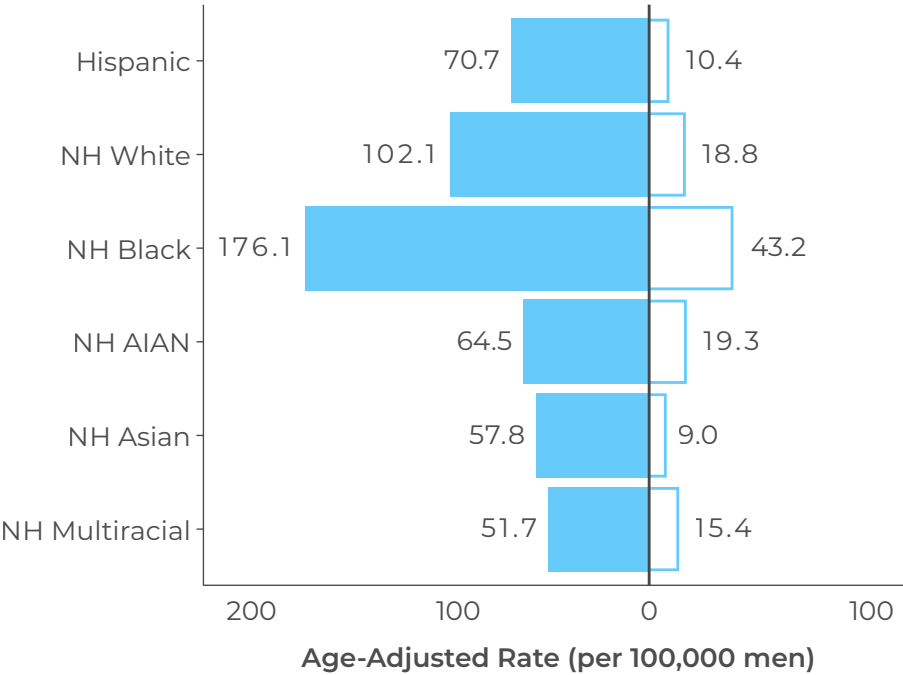
Distinct disparities in prostate cancer mortality exist when examined by race and ethnicity. As with incidence rates, mortality rates for NH Black men are higher than any other racial and ethnic group in 2022. Similar to incidence trends, NH Black males experienced the greatest rate of mortality at 44.4 deaths per 100,000 population from prostate cancer compared to 20.6 deaths per 100,000 in the white population in 2022. The difference is even larger between the races for mortality than incidence. With a nearly five times higher rate than NH White men, NH Black men have the highest age-adjusted mortality rate (4.8 per 100,000).

Table 1

PROSTATE CANCER MORTALITY RATE

2018-2022, Oklahoma

Age Range	Mortality rate per 100,000 population
55-64 years	13.7
65-74 years	71.0
75-84 years	180.5
85 and older	491.5

Figure 19

PROSTATE CANCER RATES BY RACE AND ETHNICITY

2017 - 2021, Oklahoma

- Incidence
- Mortality

Hispanic — 70.7 | 10.4
NH White — 102.1 | 18.8
NH Black — 176.1 | 43.2
NH AIAN — 64.5 | 19.3
NH Asian — 57.8 | 9.0
NH Multiracial — 51.7 | 15.4

200   100   0   100

Age-Adjusted Rate (per 100,000 men)

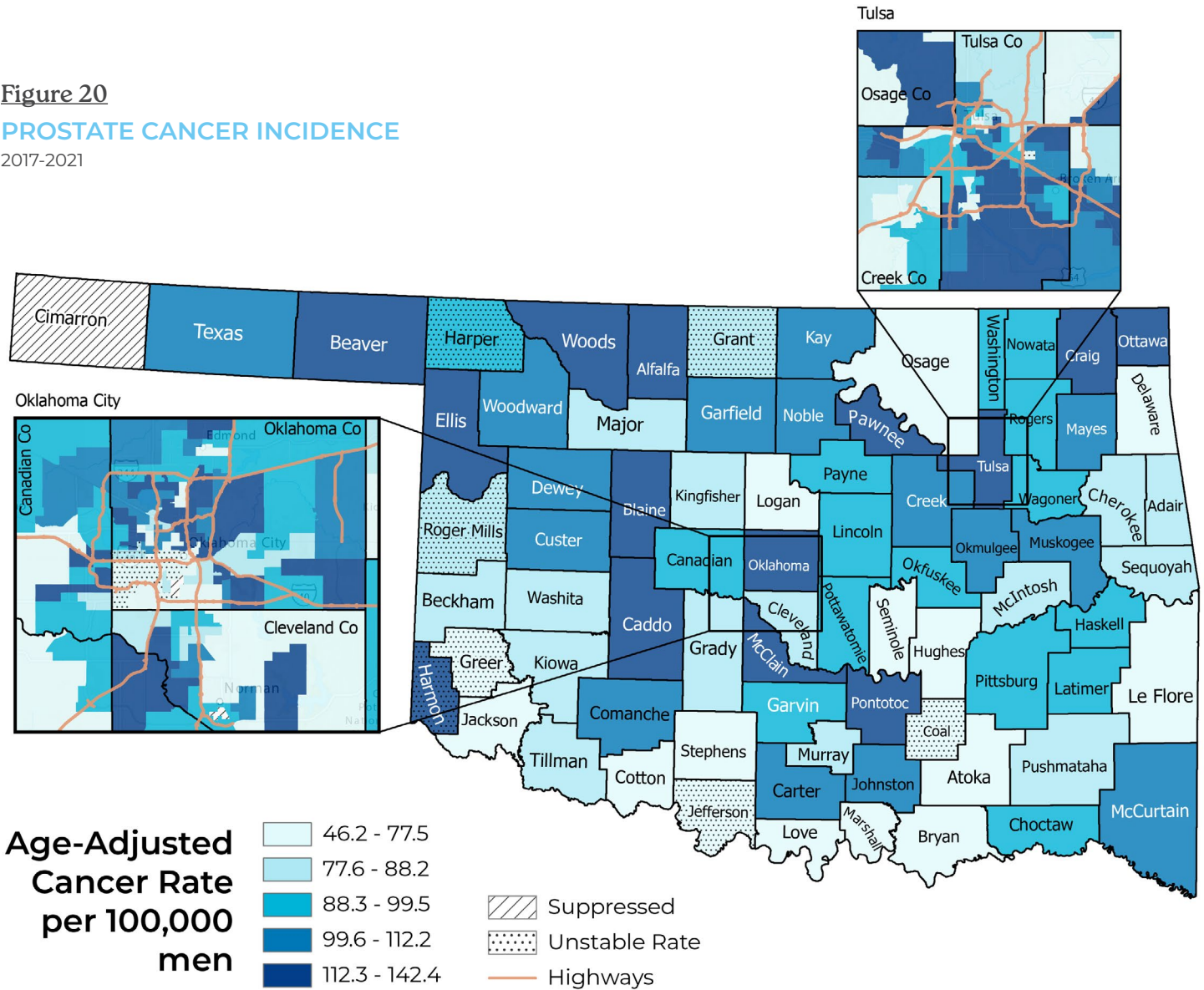## LOCATION

From 2017 to 2021, 23 counties in Oklahoma had a higher age-adjusted incidence rate than the state (Figure 20). Woods, Beaver, and Ellis Counties had the highest prostate cancer incidence rates (142.4, 142.3, and 142.0 cases per 100,000 men, respectively). Of the counties with stable, unsuppressed rates, Osage County (46.2) had the lowest followed by Logan County (60.9). Within Oklahoma County, the highest prostate cancer incidence rates were in northern Oklahoma City.

Figure 20
PROSTATE CANCER INCIDENCE
2017-2021

Age-Adjusted Cancer Rate per 100,000 men

	46.2 - 77.5
	77.6 - 88.2
	88.3 - 99.5
	99.6 - 112.2
	112.3 - 142.4

▨ Suppressed
⣿ Unstable Rate
— Highways

STAGE AT DIAGNOSIS

Over two thirds of prostate cancer cases diagnosed among men in Oklahoma from 2017 to 2021 were diagnosed at the localized stage.

Due to the slow growing nature of prostate cancers, the majority of cases are found in the localized stage.[16] As shown in Figure 21, in Oklahoma for the years 2017 to 2021, 68.1% of prostate cancers were diagnosed at the localized stage, 11.7% at the regional, and 8.0% at the distant stage. Nationally, 70.3% of prostate cancers were diagnosed at the localized stage for the same years.

<u>Figure 21</u>

STAGE AT DIAGNOSIS
Prostate Cancer

2017 - 2021, Oklahoma
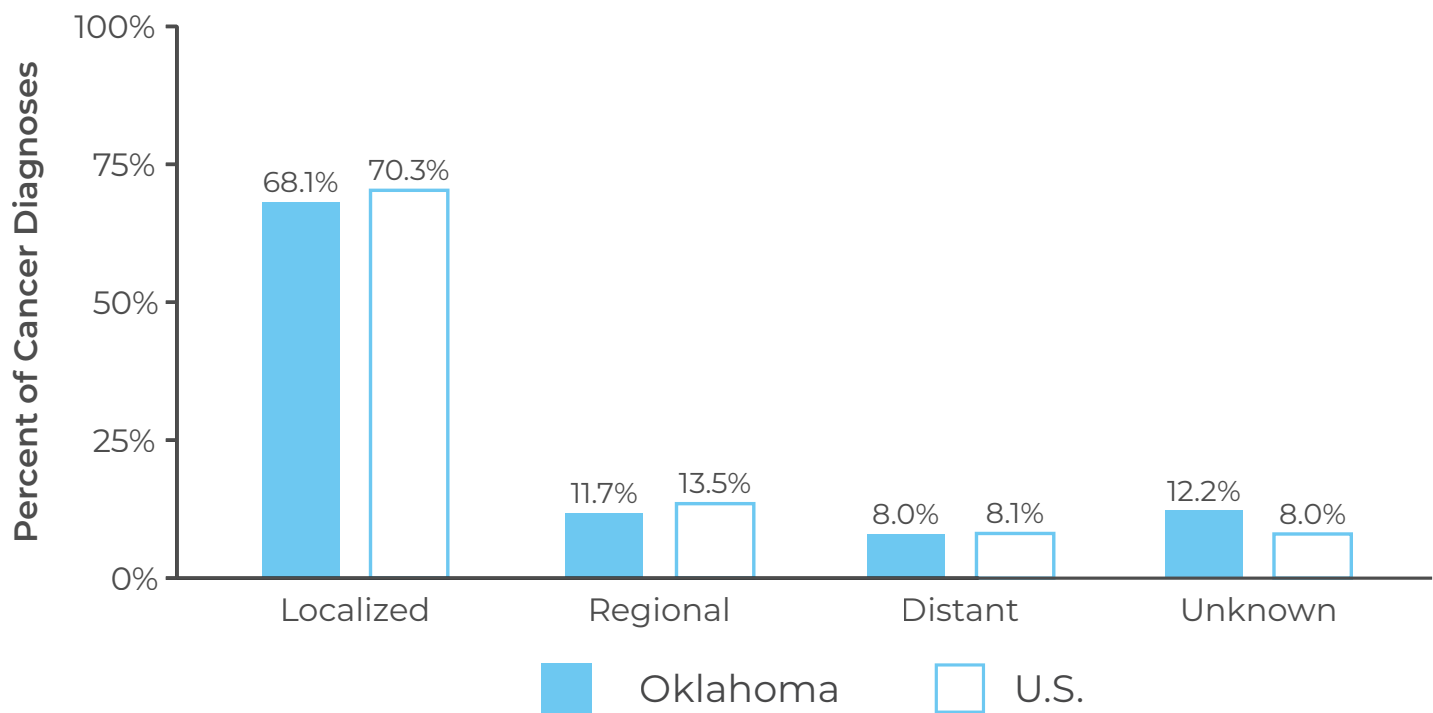
COLORECTAL CANCER

The overall

2nd highest mortality rate

among all cancers.

Regular screenings and following a healthy lifestyle

lower the risk

of developing colorectal cancer.[14]

The 4th most common cancer diagnosis.

70.4% of adults aged 50+

have never had a colonoscopy or sigmoidoscopy.

Colorectal Cancer

INCIDENCE

There were 9,665 new colorectal cancers diagnosed in Oklahoma, making it the fourth most diagnosed cancer which includes cancers of the colon, rectum, and rectosigmoid junction. Nearly 10% of colorectal cancer diagnoses occurred in Oklahomans younger than the USPSTF screening age of 45 years (2021).

Both in Oklahoma and nationally, more than half of colorectal cancer diagnoses were in men. Nationally, the age-adjusted colorectal cancer incidence rate for men was 42.9 and in Oklahoma 47.6 per 100,000 male population (2017 to 2021). The incidence rate for Oklahoma women was 37.7 cases compared with 34.6 cases per 100,000 women nationwide (Figure 22).

MORTALITY

From 2018 to 2022, there were 3,777 Oklahomans who died from colorectal cancer. Oklahomans died from colorectal cancer at a slightly higher rate than nationally (16.0 versus 12.8 deaths per 100,000, population, respectively). The age-adjusted colorectal cancer mortality rate among women in Oklahoma was 13.4 deaths per 100,000 women, compared with 11.1 deaths per 100,000 women nationwide for the same time period. Oklahoma men had an age-adjusted mortality rate of 19.1 compared to 15.5 per 100,000 men nationally. Mortality rates for both have remained relatively stable since the previous five-year period (Figure 22).

Figure 22
OKLAHOMA VS. U.S. COLORECTAL CANCER RATES
Incidence and Mortality Rates
2000-2021
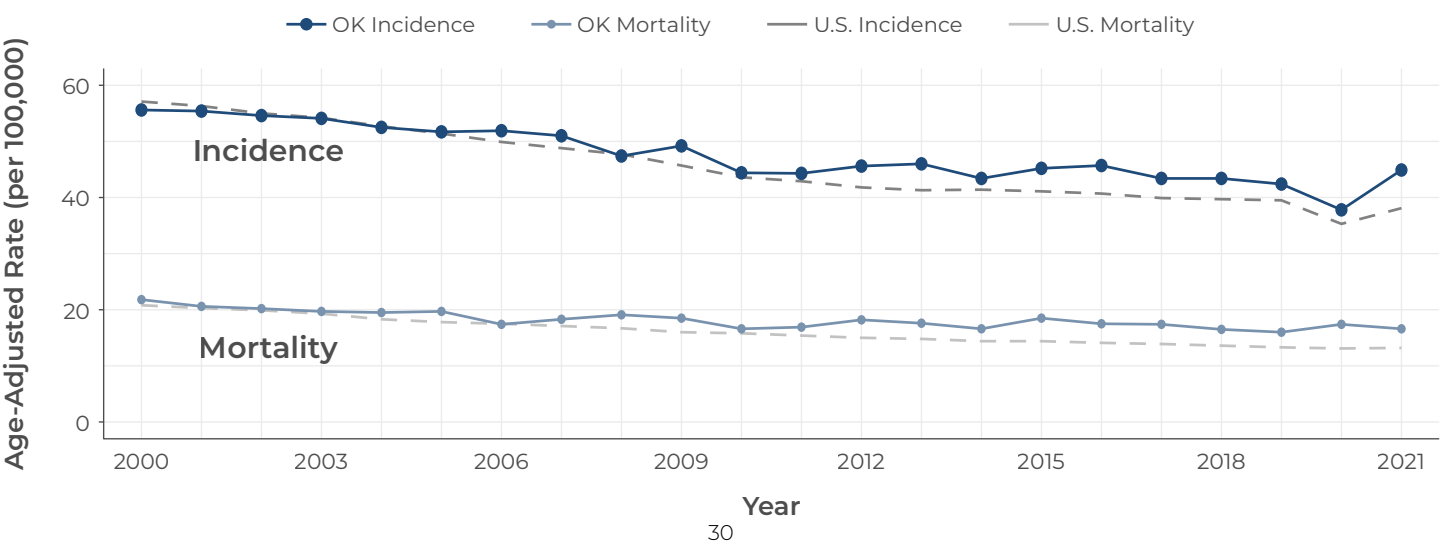
In 2022, colorectal cancer was the fourth leading cause of cancer death among Oklahomans. Since 2000, overall colorectal cancer mortality has been declining (Figure 22). Notably, the U.S. colorectal cancer mortality rate is decreasing faster than the Oklahoma rate.
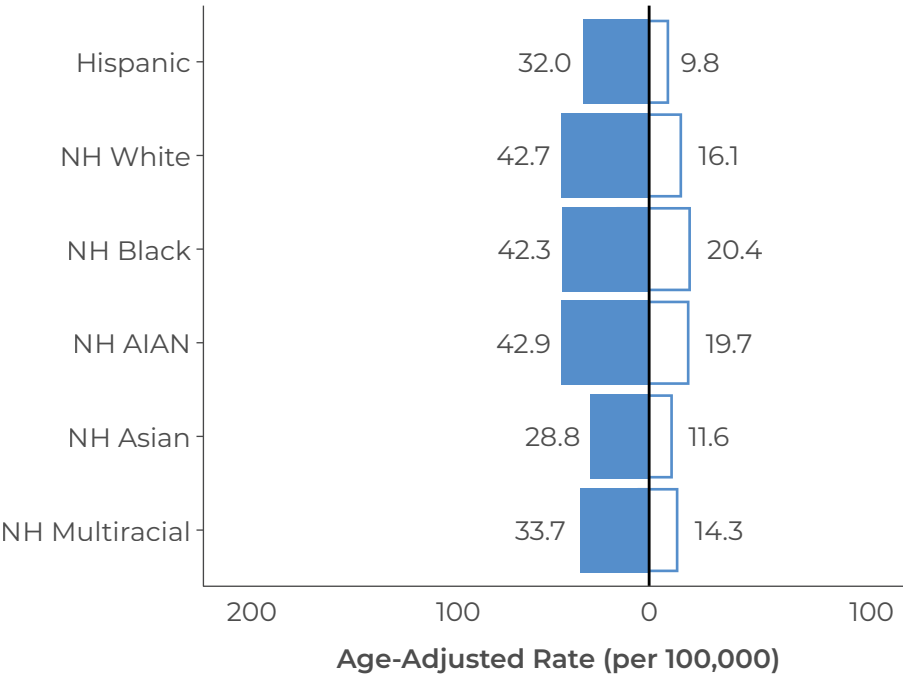
WHO GETS COLORECTAL CANCER IN OKLAHOMA?

As shown in Figure 23, colorectal cancer has the least variability in rates between reported races. Notably, Non-Hispanic (NH) American Indian and Alaska Natives (AIAN) have only a 1.5 times higher age-adjusted rate than NH Asians.

In 2022, NH Black males had the highest age-adjusted colorectal cancer mortality rate among Oklahoma men at 26.0 deaths per 100,000 population. This is a change from the previous report (2017) where NH AIAN males had the highest colorectal cancer mortality rate. In 2022, NH AIAN females had the highest colorectal cancer mortality rate among the female population in Oklahoma at 17.1. Non-Hispanic Black females had 2.1 times greater age-adjusted mortality rate than Hispanic females in Oklahoma in 2022.

In 2021, among all age groups, the highest colorectal cancer incidence rate was among Oklahomans aged 80 years and older at 228.5 new cases per 100,000 population. This is compared to an incidence rate of 109.9 among Oklahomans aged 45 to 79 years in 2021. Oklahoma males experienced a higher colorectal cancer incidence rate in 2021 with 20 cases per 100,000 more than the combined gender rate of 228.5. Mortality from colorectal cancer among Oklahomans aged 80 years and older was 132.2 deaths per 100,000 population and 149.2 for males in this age group.

Figure 23

COLORECTAL CANCER RATES BY RACE AND ETHNICITY

2017 - 2021, Oklahoma

Incidence

Mortality

Race/Ethnicity	Incidence	Mortality
Hispanic	32.0	9.8
NH White	42.7	16.1
NH Black	42.3	20.4
NH AIAN	42.9	19.7
NH Asian	28.8	11.6
NH Multiracial	33.7	14.3

Age-Adjusted Rate (per 100,000)
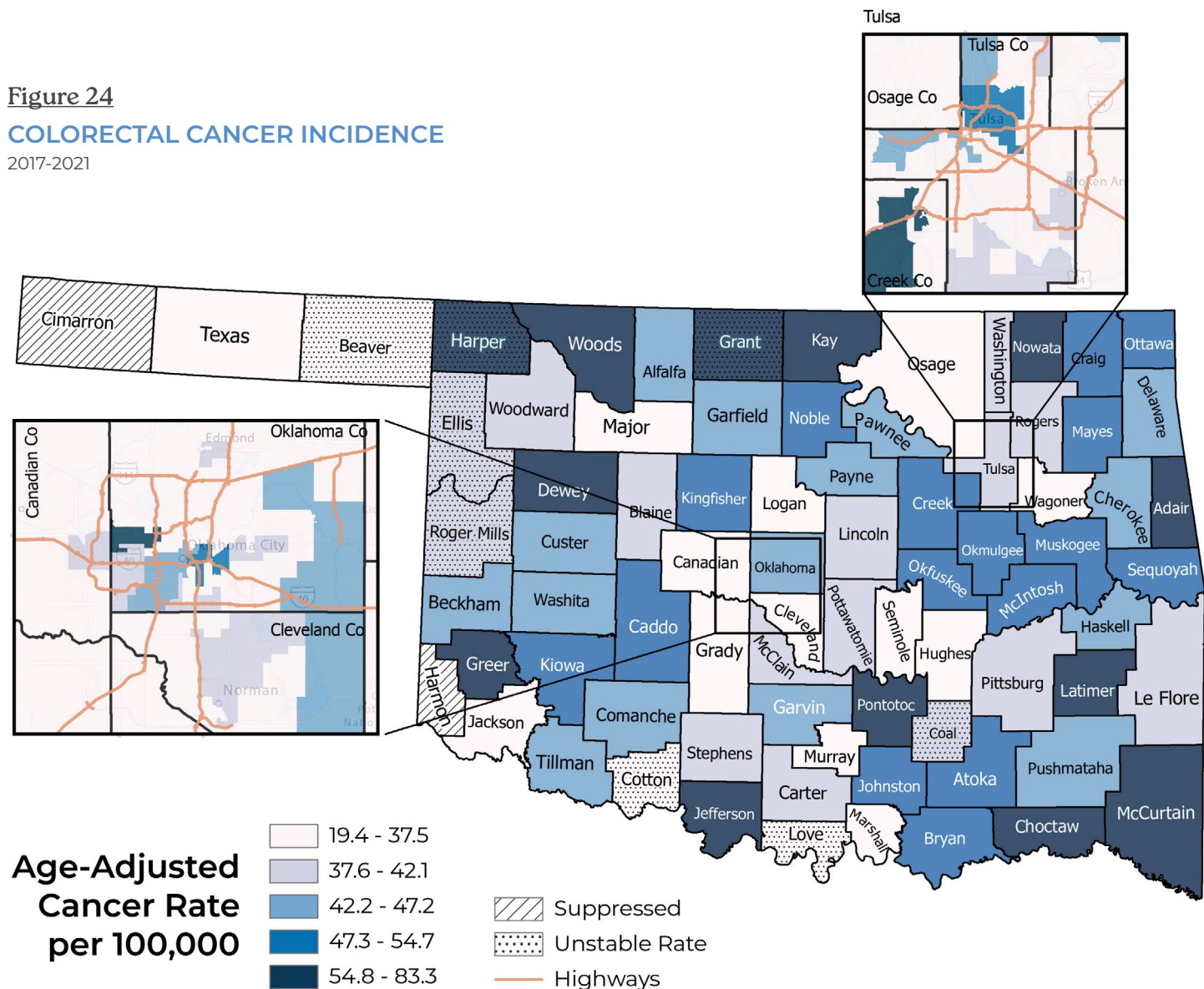
LOCATION

There were 43 counties in Oklahoma with a higher incidence rate than the state rate (Figure 24) from 2017 to 2021. Dewey County (83.3 per 100,000) had the highest rate followed by Woods (68.2) and Latimer Counties (68.0). Seminole and Major Counties had the lowest, stable incidence rates (28.0 per 100,000). Within Oklahoma County, higher colorectal cancer incidence rates were found in the southwestern part of Oklahoma City, while in the Tulsa metropolitan area there were higher rates in northern Tulsa County and Creek County.

Figure 24

COLORECTAL CANCER INCIDENCE
2017-2021

Age-Adjusted Cancer Rate per 100,000

19.4 - 37.5
37.6 - 42.1
42.2 - 47.2
47.3 - 54.7
54.8 - 83.3

Suppressed
Unstable Rate
Highways

STAGE AT DIAGNOSIS

For the combined years of 2017 to 2021, nearly a third (32.6%) of colorectal cancers were diagnosed at the localized stage, 34.8% at the regional stage and 21.5% at the distant stage in Oklahoma. Nationally, about a third of colorectal cancers (32.8%) were diagnosed at the regional stage for the same time period (Figure 25).

Figure 25

STAGE AT DIAGNOSIS

Colorectal Cancer

2017 - 2021, Oklahoma
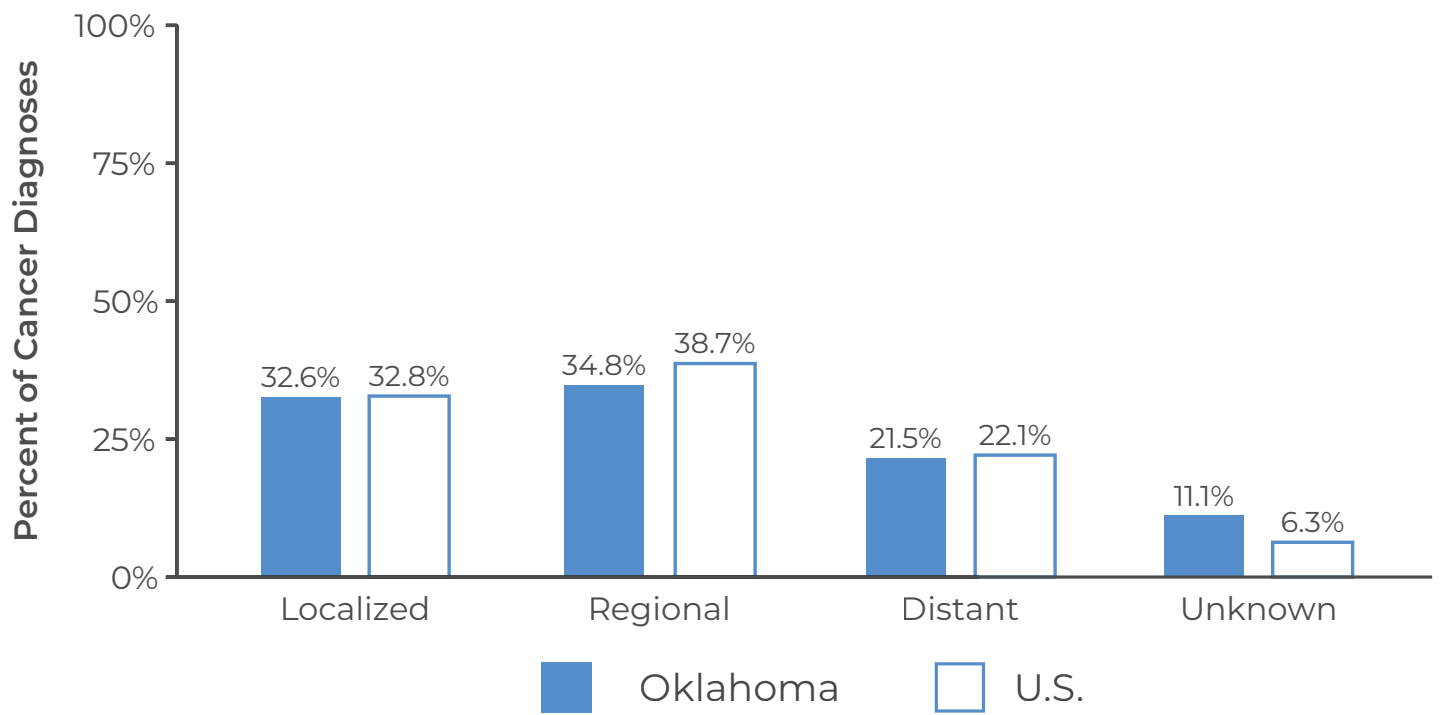
KIDNEY AND RENAL PELVIS CANCER

IN OKLAHOMA (2017-2021)

4,873 newly diagnosed cases.

Incidence rate has

more than doubled

in the last 20 years.

Mortality rate for Non-Hispanic American Indians and Alaska Natives is

1.5 times higher

than the overall state rate.

Over 60% of cases are in males.

Kidney and Renal Pelvis Cancer

INCIDENCE

There were 4,873 new cases of kidney and renal pelvis cancer diagnosed in Oklahoma from 2017 to 2021. Oklahoma's age-adjusted kidney and renal pelvis cancer incidence rate was 21.3 cases per 100,000 population compared to the national incidence rate of 17.3 new cases diagnosed per 100,000 population (Figure 26). Kidney and renal pelvis cancer was the fifth most diagnosed cancer both overall and among men (27.0) and the seventh most diagnosed cancer among women (16.3) in Oklahoma for this time period. Kidney and renal pelvis cancers made up 4.5% of all new cancer diagnoses. There was not much change in the incidence rate for kidney and renal pelvis cancers between 2017 and 2021 (20.2 vs. 21.3 new cases per 100,000 population, respectively).

MORTALITY

From 2018 to 2022, there were 1,150 deaths from kidney and renal pelvis cancer in Oklahoma. The age-adjusted mortality rate was 4.8 deaths per 100,000 population. This rate is higher than the national mortality rate for this time period of 3.4 deaths per 100,000 population (Figure 26).

In 2022, men died at over twice the rate of women in Oklahoma from kidney and renal pelvis cancer (7.3 versus 2.8 deaths per 100,000 population, respectively).

Figure 26

OKLAHOMA VS. U.S. KIDNEY AND RENAL PELVIS CANCER RATES

Incidence and Mortality Rates

2000-2021
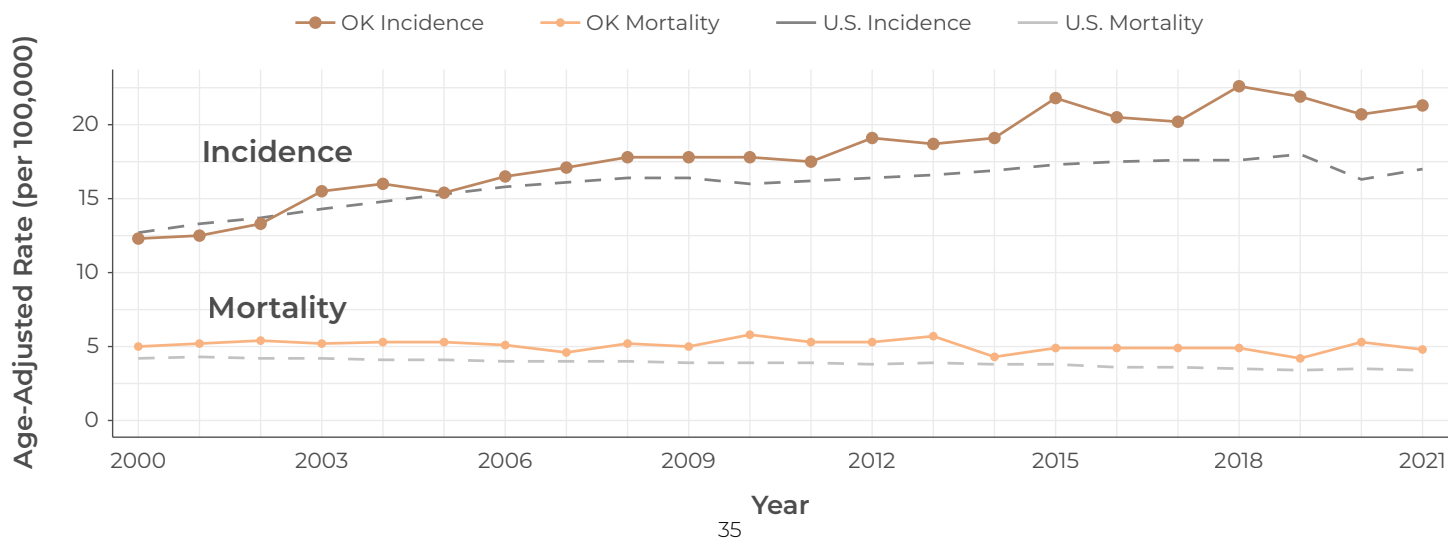
WHO GETS KIDNEY AND RENAL PELVIS CANCER IN OKLAHOMA?

As shown in Figure 27, from 2017 to 2021, Non-Hispanic (NH) American Indian and Alaska Natives (AIAN) had an over four times greater age-adjusted kidney and renal pelvis cancer incidence rate than NH Asians (32.7 versus 8.0, respectively).
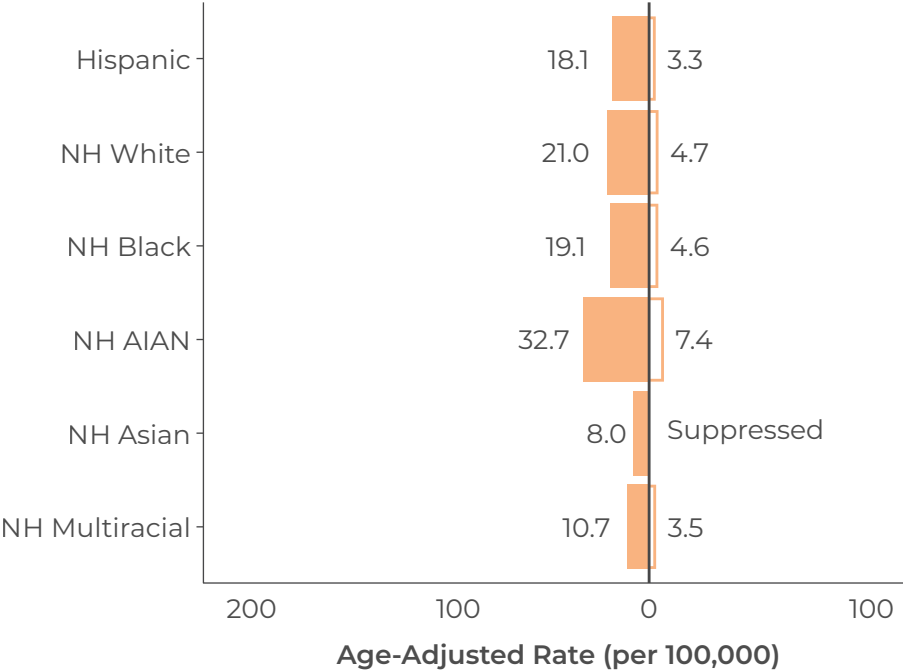
For kidney and renal pelvis cancer, men are more frequently diagnosed and die at higher rates compared to females across all racial and ethnic groups in Oklahoma and nationally. Tables 2 and 3 show that NH AIAN men in Oklahoma had higher mortality rates from kidney and renal pelvis cancer than their NH White counterparts (12.0 versus 6.4 deaths per 100,000 population, respectively).

While not as large a difference as the age-adjusted incidence rate, the age-adjusted mortality rate is 2.2 times higher in NH AIAN men than Hispanic men in Oklahoma.

Figure 27
KIDNEY AND RENAL PELVIS CANCER BY RACE AND ETHNICITY
2017 - 2021, Oklahoma

Incidence
Mortality

	Incidence	Mortality
Hispanic	18.1	3.3
NH White	21.0	4.7
NH Black	19.1	4.6
NH AIAN	32.7	7.4
NH Asian	8.0	Suppressed
NH Multiracial	10.7	3.5

Age-Adjusted Rate (per 100,000)

Table 2
KIDNEY AND RENAL PELVIS
AGE-ADJUSTED INCIDENCE RATE
Per 100,000 Population
2017-2021, Oklahoma

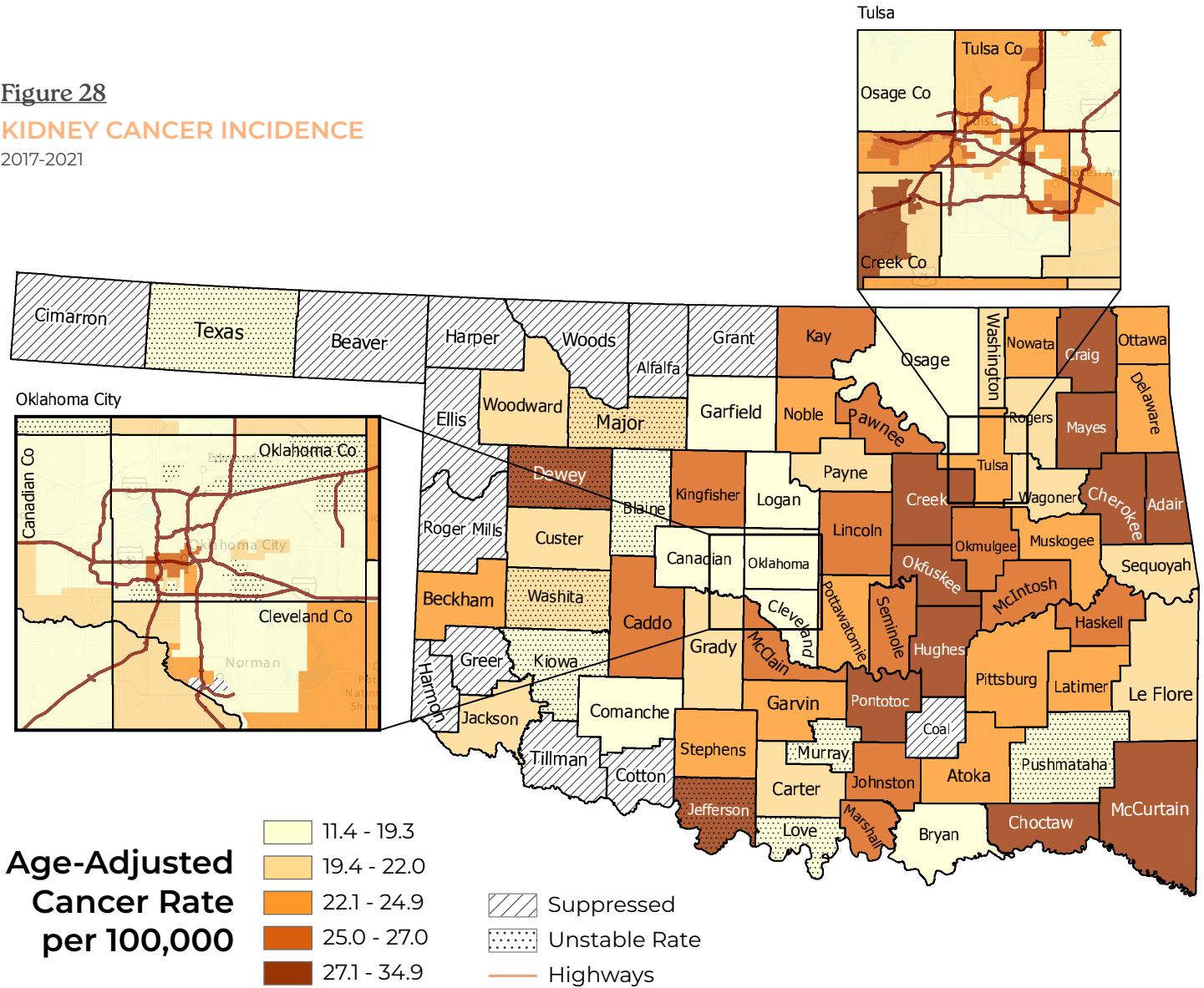| Race/Ethnicity	Male	Female
NH White	26.5	15.6
NH Black	23.1	15.7
NH AIAN	44.2	26.4
NH Asian	11.0	7.1
Hispanic	22.3	15.6

Table 3
KIDNEY AND RENAL PELVIS
AGE-ADJUSTED MORTALITY RATE
Per 100,000 Population
2018-2022, Oklahoma

Race/Ethnicity	Male	Female
NH White	7.1	2.8
NH Black	10.3	Suppressed
NH AIAN	13.5	3.9
NH Asian	Suppressed	Suppressed
Hispanic	6.4	Suppressed

LOCATION

Between 2017 to 2021, 34 counties in Oklahoma had a higher incidence rate than the state as a whole (Figure 28). Okfuskee County had the highest rate at 34.9 per 100,000, followed by Craig (33.6) and Adair (32.3). Texas County had the lowest rate at 11.4 per 100,000 followed by Osage County (12.9). The highest kidney and renal pelvis cancer incidence rates were generally found in eastern Oklahoma and the lowest in western Oklahoma. In Oklahoma County, there were more kidney and renal pelvis cancer diagnoses in the southern parts of Oklahoma City.

Figure 28
KIDNEY CANCER INCIDENCE
2017-2021

Age-Adjusted Cancer Rate per 100,000

- 11.4 - 19.3
- 19.4 - 22.0
- 22.1 - 24.9
- 25.0 - 27.0
- 27.1 - 34.9

- Suppressed
- Unstable Rate
- Highways

STAGE AT DIAGNOSIS

For the combined years of 2017 to 2021, nearly two thirds (65.5%) of kidney and renal pelvis cancers were diagnosed at the localized stage in Oklahoma, which was similar to the U.S. rate of 67.5% for the same time period. More than fifteen percent (15.1%) of kidney and renal pelvis cancers were diagnosed at the regional stage and 14.0% at the distant stage (Figure 29).

Figure 29
STAGE AT DIAGNOSIS

Kidney and Renal Pelvis Cancer

2017 - 2021, Oklahoma
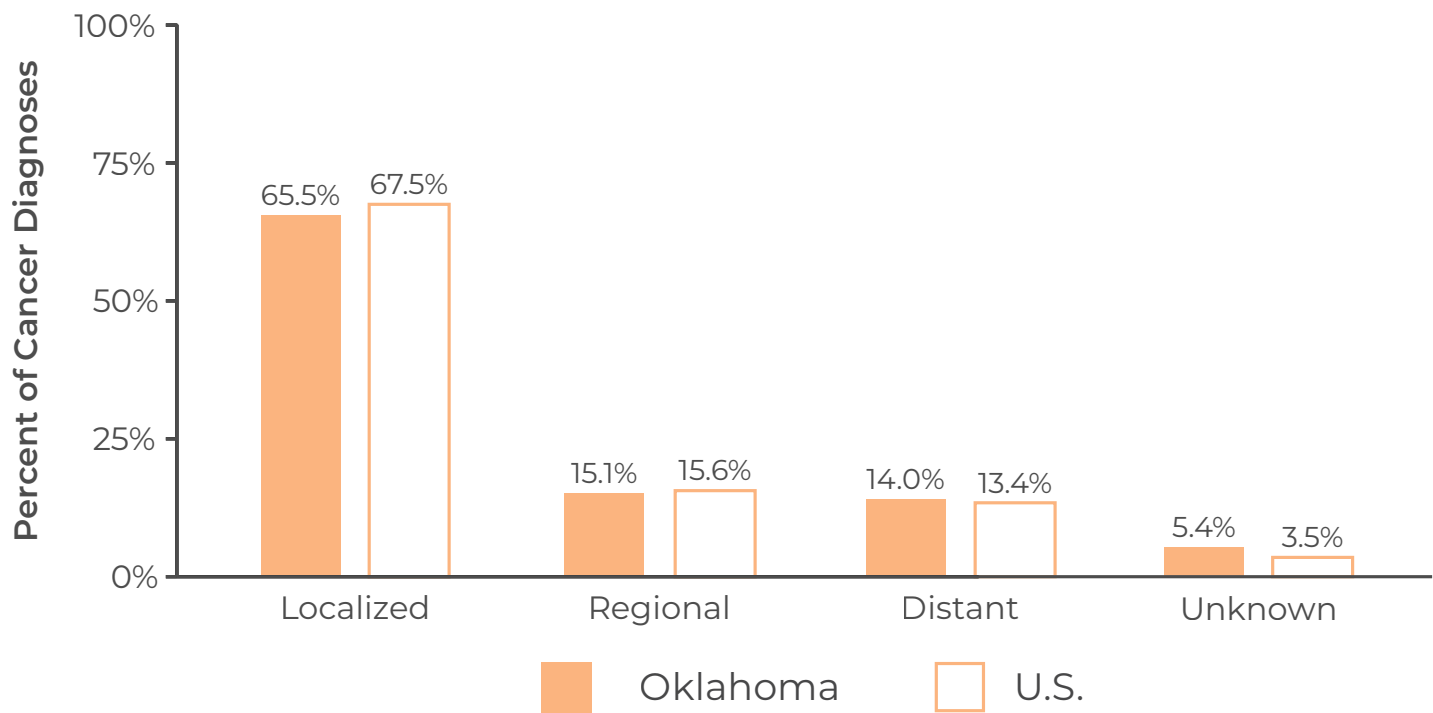
CERVICAL CANCER

The mortality rate is

59% higher

than than the U.S. rate.

91% of cervical cancers are caused by HPV infection which is

preventable through vaccination.[18]

Less than half of teens

were vaccinated in 2022.

Nearly 3 in 4 women

reported being current on their cervical screenings in 2023.

Cervical Cancer

While cervical cancer is not one of the five most frequently diagnosed cancers in Oklahoma, this report highlights it due to the ongoing efforts of multiple stakeholders and organizations across the state actively working to increase access to screenings and HPV vaccinations to prevent cervical cancer and improve patient outcomes. In addition to the Oklahoma Central Cancer Registry, the Centers for Disease Control and Prevention also provides funding for the Oklahoma Breast and Cervical Cancer Early Detection Program (also known as Take Charge) and the Oklahoma Comprehensive Cancer Control Network that focus on cervical cancer screening and prevention.

INCIDENCE

Between the years of 2017 and 2021, there were 983 new cervical cancers diagnosed in the state, resulting in an age-adjusted cancer rate of 10.2 new cases diagnosed per 100,000 Oklahoma women. This rate is higher than the national rate of 7.5 cases per 100,000 women over the same time period.

MORTALITY

From 2018 to 2022, 367 women died from cervical cancer in Oklahoma, an age-adjusted mortality rate of 3.4 deaths per 100,000 women. In 2022, the mortality rate was 2.5 deaths per 100,000 women in the population, accounting for 1.4% of all cancer deaths among the same population. This rate was lower than the rate in 2017 when cervical cancer deaths accounted for nearly 3% of cancer deaths among Oklahoma women.
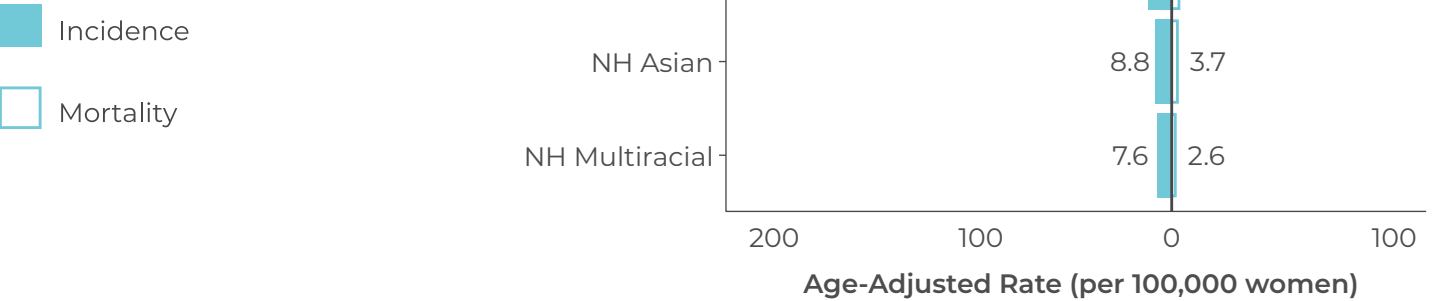
WHO GETS CERVICAL CANCER IN OKLAHOMA?

For the combined years of 2017 to 2021, the age-adjusted cervical cancer incidence rate among Non-Hispanic (NH) American Indian and Alaska Native (AIAN) women (13.0 cases per 100,000 population) was higher than that of both NH White (9.7) and NH Black (8.5) women. Non-Hispanic Asian women had the second highest age-adjusted incidence rate of 11.8 new cases per 100,000 women in the population (Figure 30).

While cervical cancer incidence rates varied among races in Oklahoma (Table 4), the age-adjusted mortality rates from 2018 to 2022 were very similar (Table 5). Non-Hispanic Black women in Oklahoma had a slightly higher mortality rate of 3.7 deaths per 100,000 population, followed by NH AIAN (3.6 deaths per 100,000 population), NH White (3.3 deaths per 100,000 population), and NH Asian (3.2 deaths per 100,000 population) women. The discrepancy between incidence rates and mortality rates could be due to differences in access to care.

For the years 2017 to 2021, the highest age-adjusted incidence rate of cervical cancer was among women aged 40-44 years (23.2 cases per 100,000 population) followed by aged 35-39 years (21.5) and 45-49 years (19.0).

Figure 30
CERVICAL CANCER RATES BY RACE AND ETHNICITY
2017 - 2021, Oklahoma

- Incidence
- Mortality

Race/Ethnicity	Incidence	Mortality
Hispanic	10.6	3.2
NH White	10.2	3.8
NH Black	8.7	4.4
NH AIAN	12.0	4.5
NH Asian	8.8	3.7
NH Multiracial	7.6	2.6

Age-Adjusted Rate (per 100,000 women)

Table 4
CERVICAL CANCER INCIDENCE RATE
Per 100,000 Population
2017-2021, Oklahoma Women

Race/Ethnicity	Age-Adjusted Incidence Rate
NH White	10.2
NH Black	8.7
NH AIAN	12.0
NH Asian	8.8
NH Multiracial	7.6
Hispanic	10.6

Table 5
CERVICAL CANCER MORTALITY RATE
Per 100,000 Population
2018-2022, Oklahoma Women

Race/Ethnicity	Age-Adjusted Mortality Rate
NH White	3.3
NH Black	3.7
NH AIAN	3.6
NH Asian	Suppressed
NH Multiracial	Suppressed
Hispanic	2.7

From 2018 to 2022, the highest five-year cervical cancer mortality rate was among women ages 45-54 years (8.3 deaths per 100,000) followed by 55-64 years (6.9). These rates are relatively stable compared to the previous five-year period (Figure 31).

Figure 31

OKLAHOMA VS. U.S. CERVICAL CANCER RATES
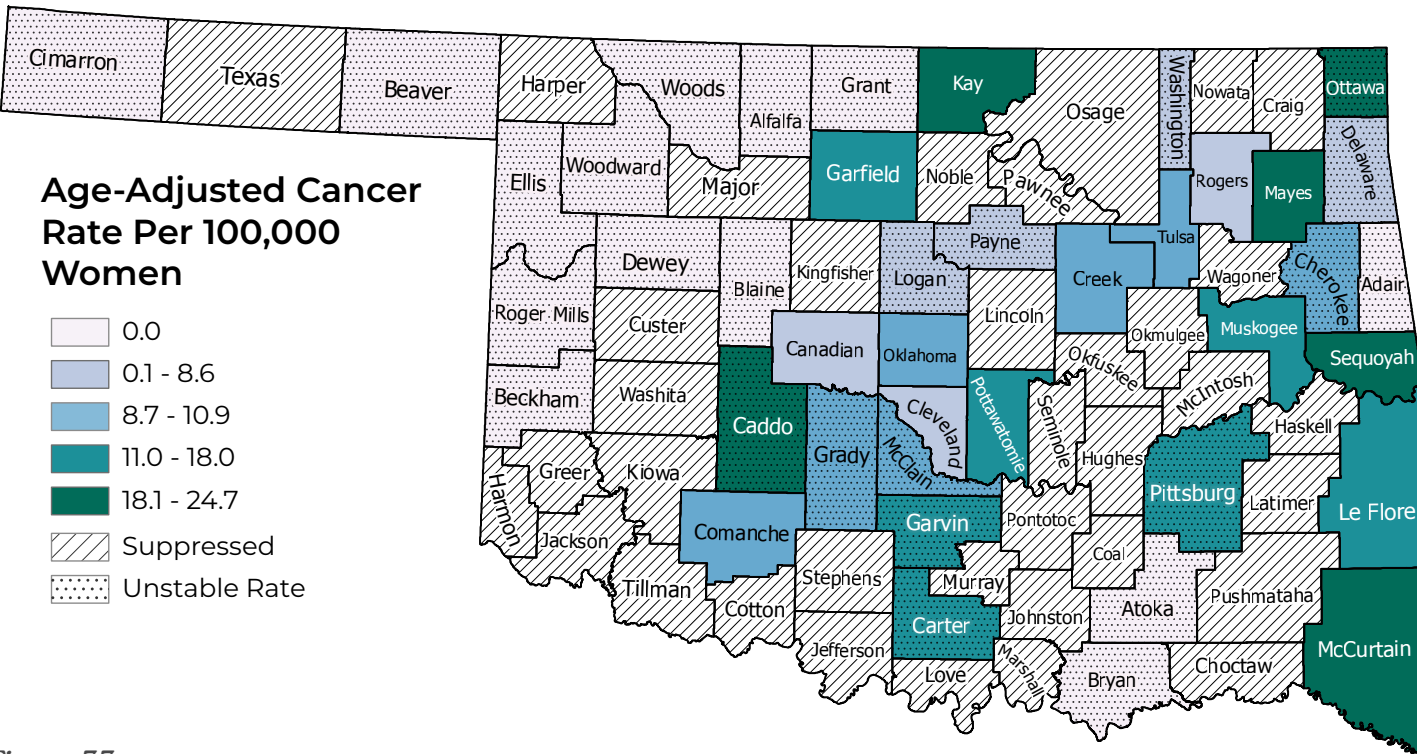
Incidence and Mortality Rates

2000-2021
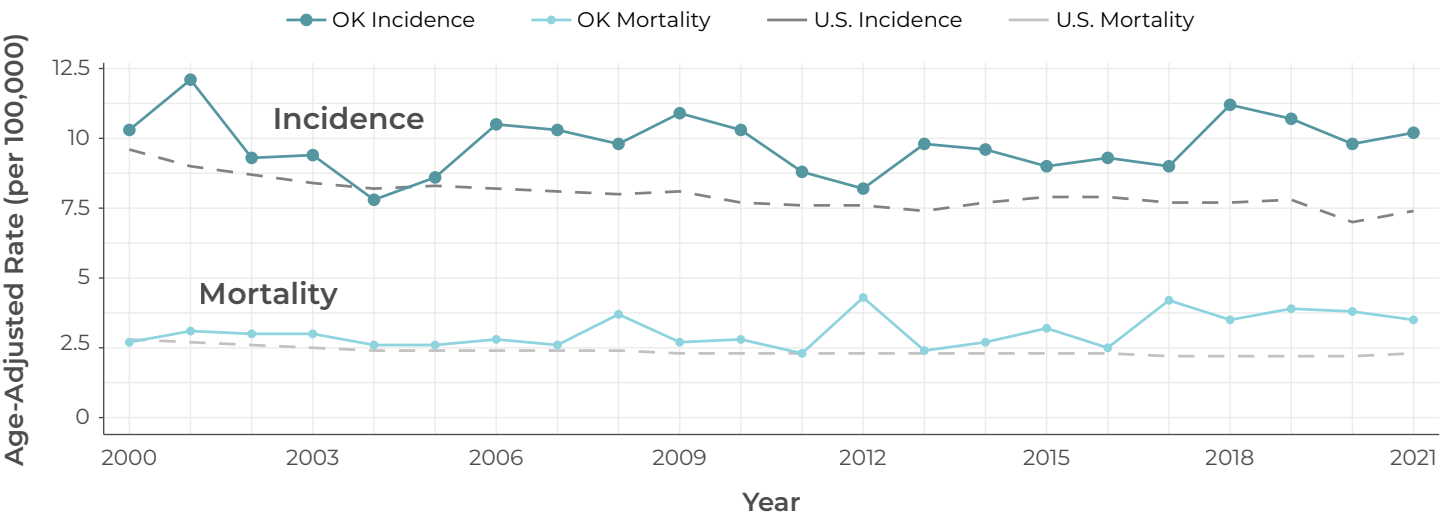
LOCATION

From 2017 to 2021, 63 counties in Oklahoma had at least one reportable cervical cancer case and 27 counties had at least 10 cases. Among the counties with reportable rates, Kay County had the highest age-adjusted cervical cancer incidence rate at 24.7 cases per 100,000 women, followed by McCurtain (22.9) and Mayes (20.8) Counties. Canadian County had the lowest reportable, non-zero rate at 5.0, followed by Rogers County (7.9 cases per 100,000 women), Delaware County, and Payne County (Figure 32).
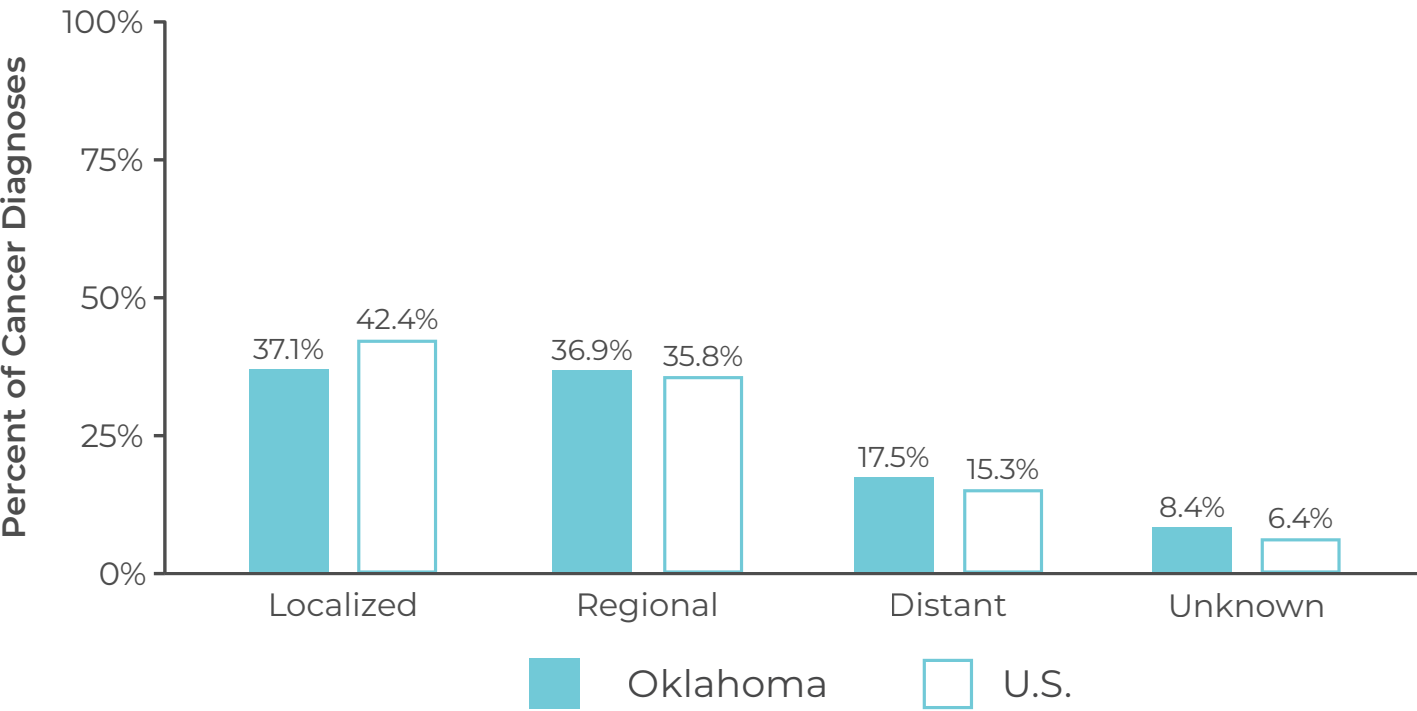
STAGE AT DIAGNOSIS

From 2017-2021, 37.1% of cervical cancers in Oklahoma were diagnosed at the local stage, compared to 42.4% nationally. Over a third (36.9%) were diagnosed at the regional stage and 17.5% at the distant stage in Oklahoma for this time period (Figure 33).

Figure 32

CERVICAL CANCER INCIDENCE

2017-2021

Age-Adjusted Cancer Rate Per 100,000 Women

- 0.0
- 0.1 - 8.6
- 8.7 - 10.9
- 11.0 - 18.0
- 18.1 - 24.7
- Suppressed
- Unstable Rate

Figure 33

STAGE AT DIAGNOSIS

Cervical Cancer

2017 - 2021, Oklahoma

Stage at Diagnosis bar chart showing Percent of Cancer Diagnoses:
- Localized: Oklahoma 37.1%, U.S. 42.4%
- Regional: Oklahoma 36.9%, U.S. 35.8%
- Distant: Oklahoma 17.5%, U.S. 15.3%
- Unknown: Oklahoma 8.4%, U.S. 6.4%

Legend: Oklahoma, U.S.

Data Definitions & Sources

Data in this report represent the most up-to-date data available for Oklahoma cancer incidence (through 2021), and the corresponding cancer mortality (through 2022).

DEFINITIONS

Age-adjusted rate: A rate statistically modified to eliminate the effect of different age distributions in the underlying populations. Unless otherwise indicated age-adjusted rates are expressed as per 100,000 population.

Age adjustment: The method used to calculate the age-adjusted rate. This method that calculates the weighted average of the rates within each age group and uses a standardized population to calculate the rate.

Cancer incidence: The number of new cancer cases occurring in a population during a specified period of time. Unless otherwise indicated, all incidence rates are expressed as cases per 100,000 population.

Cancer mortality: The number of cancer deaths occurring in a population during a specified period of time. Unless otherwise indicated, mortality rates are expressed as deaths per 100,000 population.

Stage at diagnosis: The proportion of cases diagnosed at a specified stage compared with all cases diagnosed during that time period. Cancer staging indicates how far a cancer has spread from its origin.

In situ: Carcinoma in situ, also called in situ cancer, refers to a group of abnormal cells that have not spread from the location where they first formed. In general, it is the earliest form of cancer and is considered stage 0.

SOURCES

The Oklahoma Central Cancer Registry (OCCR) and the Center for Health Statistics (CHS) at the Oklahoma State Department of Health (OSDH) collect data to measure a wide variety of population characteristics, including the incidence and mortality of cancer as well as behaviors related to the risk of developing cancer. The OCCR collects and maintains cancer incidence data. The CHS collects and maintains the following:

Cancer mortality data: Deaths of Oklahoma residents due to cancer.

Hospital discharge data: Reported discharges from inpatient and outpatient hospitals and freestanding ambulatory surgery centers.

Behavioral Risk Factor Surveillance System (BRFSS): A state-based telephone survey that collects data on the health behaviors of Oklahomans, which have been shown to be a major contributor to disease, injury, and premature death.

The United States Census Bureau collects and maintains census data on population, housing, and economic indicators as well as annual estimates used to calculate rates. The United States Cancer Statistics collates cancer registry data from the Centers for Disease Control and Prevention (CDC) National Program of Cancer Registries (NPCR) and the National Cancer Institute's (NCI) Surveillance, Epidemiology, and End Results (SEER) Program, as well as mortality data from CDC's National Center for Health Statistics. The statistics provide information on newly diagnosed cancer cases and cancer deaths for the U.S. population.

SUPPRESSION OF CASE COUNTS AND RATES

Any case counts that are ten or less are suppressed to ensure confidentiality. Cancer rates from these small case counts are also not reported.

DATA NOTES

While 2020 data is included in this report, it should be noted that the COVID-19 pandemic significantly impacted cancer diagnosis, treatment, and screening in 2020 and into 2021. The SEER Program indicated that in 2020 there was a 10% decrease in incidence rates for all cancers combined compared to pre-pandemic rates in 2019.[17]

The Census Bureau's six race categories are displayed for much of the report. For the time periods when these six categories are not available, the four bridged-race categories are presented.

References

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