Cancer in Oklahoma Data Brief Series:

Pancreatic Cancer in Oklahoma

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Introduction

In 2019, pancreatic cancer accounted for 3.1% of all new cancer cases and the was 5th leading cause of cancer death in the United States (US).[1] Pancreatic cancer is one of the deadliest cancers, with a case fatality rate of 99% and five-year survival of 11.5%.[2,3] In 2022, it is estimated that there will be 62,210 new cases and 49,830 deaths from pancreatic cancer.[2] Several risk factors are associated with the development of pancreatic cancer, such as smoking, age, sex, obesity, alcohol consumption, several hereditary conditions (listed at the end of this brief), diabetes, and dietary fat and meat intake.[2,3] Smoking and age are major risk factors, with smoking contributing to approximately 20% of all cases.[3]

Also, the role of diabetes and obesity as major risk factors in the development of pancreatic cancer has gained attention. Recent studies have found that obese individuals (BMI>30) have a 19% increased risk of pancreatic cancer compared to those of normal weight.[3,4] Additionally, diabetic individuals have a 50% increased risk of pancreatic cancer compared to non-diabetic individuals and those already diagnosed with pancreatic cancer.

Pancreatic cancer is difficult to diagnose in its early stages because the disease may not cause signs and symptoms.[2] Presenting symptoms tend to appear as the disease progresses. Symptoms may include jaundice (yellowing of the skin and whites of the eyes), pain in the upper or middle abdomen and back, and weight loss.[2] Treatment modalities, including surgery, radiation therapy, chemotherapy, chemoradiation therapy, and targeted therapy are selected based on the type/stage of pancreatic cancer diagnosed.[2] Clinical trials are in progress to identify and evaluate additional treatments. Difficulties with early diagnosis and a lack of effective treatment at all but the earliest stages of the disease account for the low survival rate.[3]

This data brief focuses on pancreatic cancer incidence and mortality rates in Oklahoma, and concludes with a discussion of the significance of findings on clinical practice and public health policy.

Methods

Data for pancreatic 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). All data sources used in this brief were publicly available.

Pancreatic cancer in this brief is defined according to the International Classification of Disease for Oncology (ICD-O-3 C25_). To ensure the stability of estimates and confidentiality, CDC and SEER rates were suppressed if fewer than 16 counts were reported in a specific category and all rates were age-adjusted to the 2000 US standard population. All incidence and mortality rates are per 100,000 population. Staging for this data brief used the SEER summary staging classification and excludes unknown stage.

In this brief, Hispanic persons were categorized as being Hispanic regardless of race. All individuals in the sample were categorized into one of the following ethnic and racial groups: Hispanic, Non-Hispanic (NH) White, NH Black or African American, NH American Indian or Alaska Native, or NH Asian or Pacific Islander.

*Multiple endocrine neoplasia type 1 (MEN1) syndrome, hereditary nonpolyposis colon cancer (HNPCC; Lynch syndrome), von Hippel-Lindau syndrome, Peutz-Jeghers syndrome, hereditary breast and ovarian cancer syndrome, familial atypical multiple mole melanoma (FAMMM) syndrome, and ataxia-telangiectasia

Results

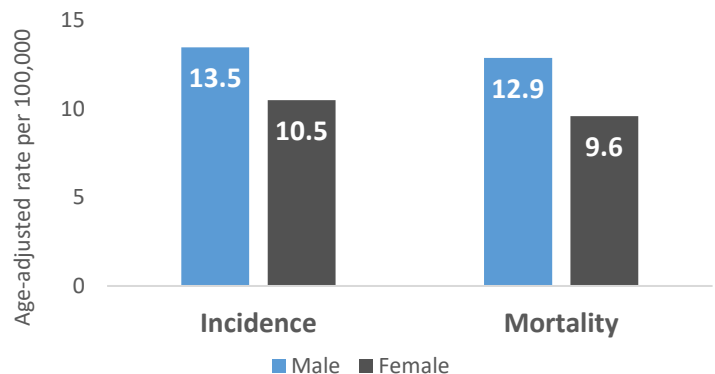### Figure 1: Pancreatic cancer incidence and mortality in Oklahoma and the US, 2015-2019
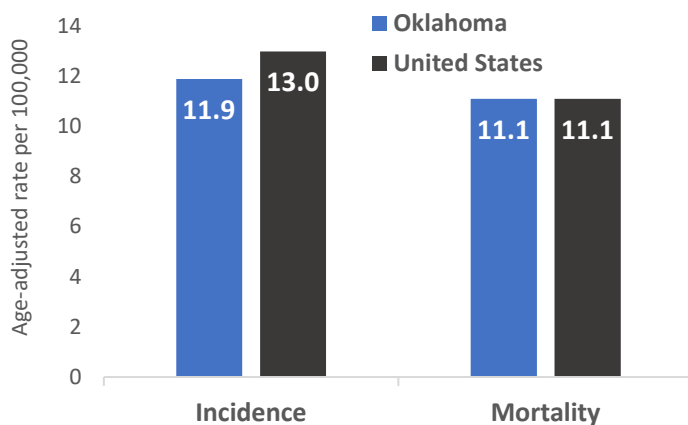
Source: SEER and CDC (NPCR and NVSS)

Overall, there were 259,253 cases of pancreatic cancer diagnosed between 2015 and 2019 in the US (3.0% of all cancers cases). Of these cancers, 2,804 cases were in Oklahoma. For mortality in the US, there were 219,182 pancreatic cancer deaths between 2015 and 2019 (7.3% of all cancer deaths). Of these cancer deaths, 2,607 deaths were in Oklahoma. From 2015-2019, the age-adjusted pancreatic cancer incidence rate in the US was higher than in Oklahoma, with rates of 13.0 per 100,000 and 11.9 per 100,000 people respectively (**Figure 1**). During this timeframe, the age-adjusted pancreatic cancer death rate for both Oklahoma and the US was 11.1 per 100,000 people.
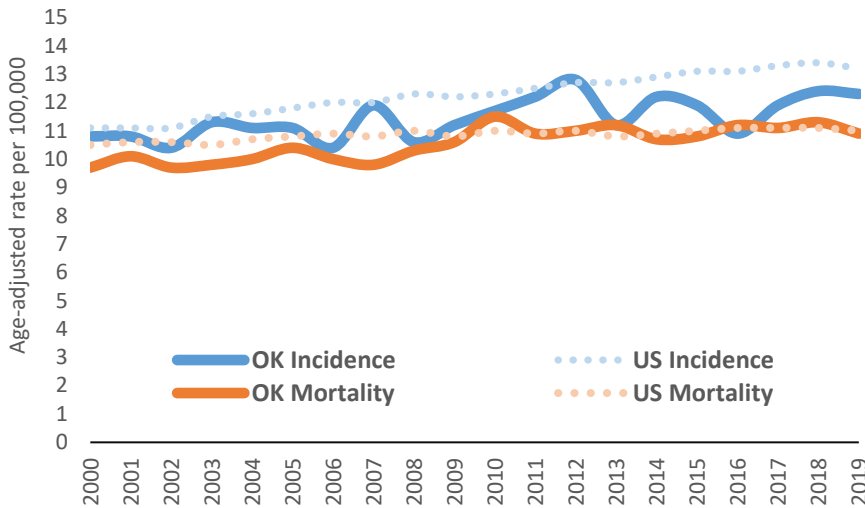
Figure 2 shows age-adjusted pancreatic cancer incidence and mortality rates by sex in Oklahoma from 2015-2019. Overall, both incidence and mortality rates are higher among men compared to women.

Figure 2: Pancreatic cancer incidence and mortality by sex in Oklahoma, 2015-2019

Source: OCCR and Oklahoma Vital Statistics

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

Source: SEER and CDC (NPCR and NVSS)

Figure 3 shows age-adjusted pancreatic cancer incidence and mortality rates in Oklahoma and the US by year from 2000 to 2019. Overall, both incidence and mortality in Oklahoma and the US have gradually increased over time. For incidence, Oklahoma has had lower rates than the US. For mortality, Oklahoma initially had lower mortality rates than the US, but as mortality rates in Oklahoma have been increasing, rates have converged in recent years. Over the interval, the absolute increase in pancreatic cancer incidence in Oklahoma was +14%, compared to +19% for the US. For pancreatic cancer mortality, the absolute change in Oklahoma was +12%, compared to +5% for the US.

Figure 4 shows pancreatic cancer incidence and mortality rates by sex in Oklahoma from 2015 to 2019. For both incidence and mortality, American Indians and Alaska Natives have the highest rates compared to all other groups. Black Oklahomans have the second highest incidence and mortality rates compared to all other groups.

Source: OCCR and Oklahoma Vital Statistics

Abbreviations: AI/AN: American Indian/Alaska Native; PI: Pacific Islander

Figure 4: Pancreatic cancer incidence and mortality by race/ethnicity in Oklahoma, 2015-2019
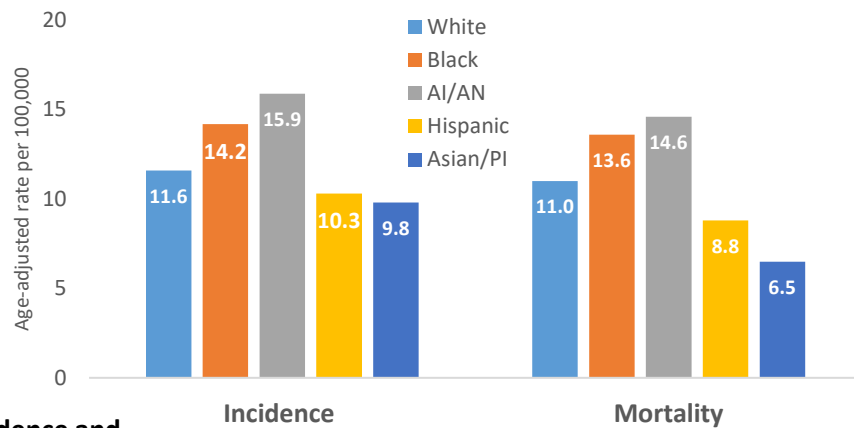

Figure 5: Pancreatic cancer age-adjusted incidence and mortality rates by age group, 2015-2019
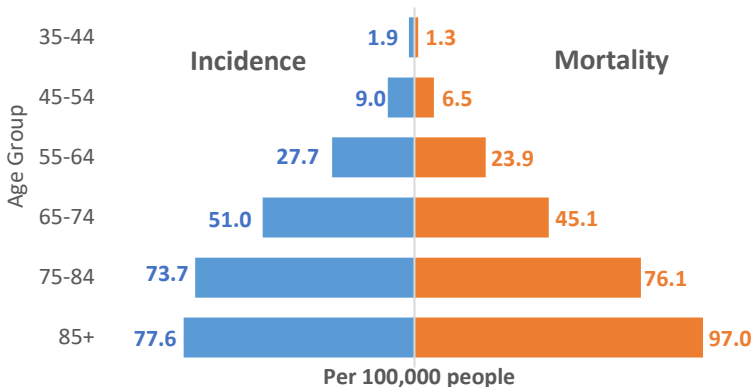

Figure 5 shows pancreatic cancer incidence and mortality by 10-year age groups in Oklahoma from 2015 to 2019. The highest incidence and mortality rate is observed among those 85 years and older. Both incidence and mortality rates increase with age.

Source: OCCR and Oklahoma Vital Statistics

Figure 6: Pancreatic Cancer Stage at Diagnosis compared to 5-Year Relative Survival by Stage in Oklahoma and the US
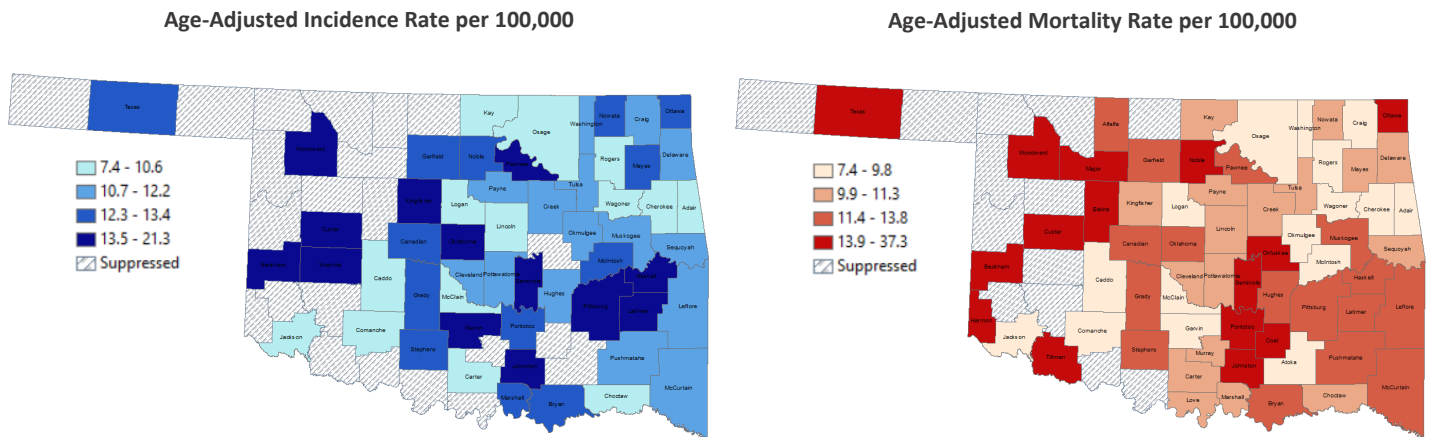
Oklahoma

United States
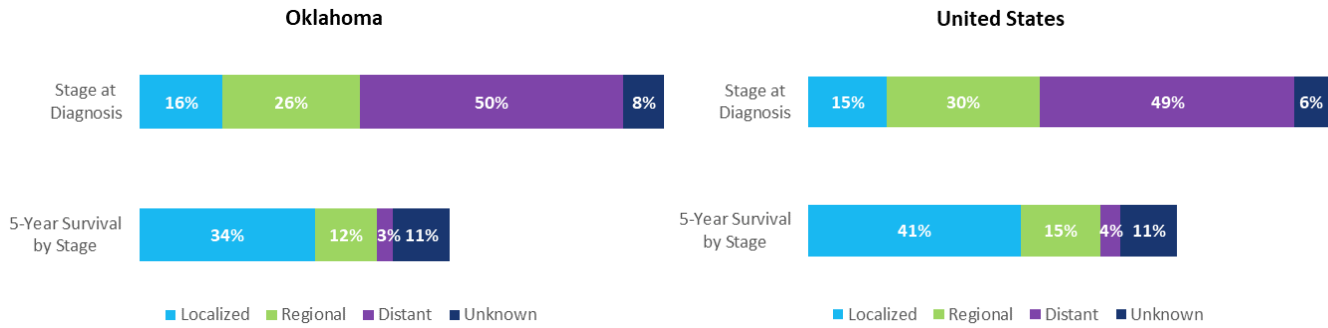
Source: SEER and CDC (NPCR and NVSS)

Figure 6 shows the percent stage at diagnosis from 2015-2019 compared to the 5-year relative survival by stage from 2012-2018 for pancreatic 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 pancreatic cancers diagnosed in Oklahoma and the US are at the distant stage, notably, it is also the stage with the lowest survival. For both Oklahoma and the US, the localized stage is the least common stage at diagnosis but has the highest survival. Overall, as the stage at diagnosis increases, the 5-year relative survival decreases. Oklahoma and the US have similar percentages for each stage at diagnosis and they also have similar percentages for 5-year survival, however, the 5-year relative survival for pancreatic cancer in Oklahoma is lower than the US at all stages of diagnosis.

Figure 7: Age-Adjusted Pancreatic Cancer Incidence and Mortality by County in Oklahoma, 2015-2019

Age-Adjusted Incidence Rate per 100,000

Age-Adjusted Mortality Rate per 100,000

Source: OCCR and Oklahoma Vital Statistics

Figure 7 presents maps of age-adjusted pancreatic cancer incidence and mortality rates by county in Oklahoma. Higher incidence rates are seen in the western and central areas of the state, while several contiguous counties have higher

mortality rates in the western and southeastern areas of the state. See **Appendix 1** for the underlying number of cancer cases, deaths and age-adjusted incidence and mortality rates for each county in Oklahoma.

Conclusions and Implications for Practice and Policy

Pancreatic is one of the deadliest cancers with only 11.5% surviving five years. Thus, diagnosing and treating pancreatic cancer early is critical for the health and economic productivity of Oklahoma. Moreover, pancreatic cancer incidence and mortality rates are worsening in Oklahoma and the US, hence the need to provide recommendations to reduce the burden of pancreatic cancer in Oklahoma.

First, as tobacco use is a preventable risk factor for many cancers including pancreatic cancer, we must continue to support tobacco prevention and cessation programs and policies. The Oklahoma Tobacco Helpline, a program funded by the Oklahoma Tobacco Settlement Endowment Trust (TSET), provides free services and customized plans to help individuals quit smoking. Free services include counseling and nicotine replacement therapy. Also, the Helpline queries individuals to determine eligibility for a no-cost lung cancer screening, and provides referrals to the eligible. In 2021, 29,591 Oklahomans used the Helpline to quit cigarette smoking and the use of other tobacco products.

Second, as obesity increases the risk of pancreatic cancer, we must continue to support efforts to reduce obesity through programs and policies. TSET's Healthy Living Program grants are designed to prevent diseases such as cancer by reducing unhealthy behaviors and risk factors such as tobacco use and obesity at the local level. The program works in collaboration with schools, businesses, and communities on gardens, food pantries, and farmers markets to create opportunities for healthy eating. The impact of the program ranges from providing directions to grocery and convenience stores to stock healthy food options, to improving zoning, urban design and transportation to facilitate healthier lifestyles.

Third, because pancreatic cancer is diagnosed at later stages and has very low survival, there is an urgent need to develop pancreatic cancer screening. However, universal screening for this cancer has not been shown to be efficient or even effective. Emerging technologies, including Multi-Cancer Detection (MCD) assays that evaluate cell-free DNA or other biological components, may be able to detect early-stage pancreatic cancer. However, it is not yet known whether screening for pancreatic cancer by MCD assay is effective, and if effective, whether it should be performed in the general population or in narrower cohorts of individuals who are at increased risk of developing pancreatic cancer.

Finally, there is a need to ensure that all Oklahomans diagnosed with pancreatic cancer have access to the newest treatments. This can be accomplished by providing funds to help patients address the financial challenges of treatment and funds to help defray the costs of traveling for care, including transportation and lodging costs. Also, patients who participate in clinical trials tend to have the best outcomes. Efforts to help increase clinical trials awareness and increase participation in clinical trials, especially among members of high-risk groups, will ultimately improve pancreatic cancer outcomes.

References

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2. Surveillance, Epidemiology, and End Results Program (SEER). Cancer Stat Facts: Pancreatic Cancer (n.d.). Accessed June 6, 2022, from https://seer.cancer.gov/statfacts/html/pancreas.html

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4. Berrington de Gonzalez A, Sweetland S, Spencer E. A meta-analysis of obesity and the risk of pancreatic cancer. *Br J Cancer*. 2003;89(3):519-523. doi:10.1038/sj.bjc.6601140

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Data Sources:

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Oklahoma State Department of Health (OSDH), Disease, Prevention, & Preparedness Service, Chronic Disease Service, Oklahoma Central Cancer Registry (OCCR), on Oklahoma Statistics on Health Available for Everyone (OK2SHARE). https://www.health.state.ok.us/stats/Registries/cancer/Final/Statistics.shtml

Surveillance, Epidemiology, and End Results (SEER) Program (www.seer.cancer.gov) SEER*Stat Database: U.S. Population (1990-2019). National Cancer Institute, DCCPS, Surveillance Research Program, Surveillance Systems Branch, released June 2022.