# Cancer in Texas 2016

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## Executive Summary

The Department of State Health Services' (DSHS) Texas Cancer Registry (TCR) is a population-based cancer registry that serves as the foundation for measuring the burden of cancer in Texas. The TCR collects, maintains, and disseminates complete, accurate, quality cancer data. The registry also supports a wide variety of cancer-related research and studies.

Each year, the TCR receives approximately 250,000 reports of cancer from over 500 hospitals, cancer treatment centers, ambulatory surgery centers, and pathology laboratories across Texas. About 20,000 of those reports are from out-of-state residents seeking care in Texas. These reports are sent to their residing state cancer registry, providing a significant contribution to the national cancer surveillance system. Similarly, the TCR receives reports of Texans with cancer from other state registries.

The information collected by the TCR includes the type and site of diagnosed cancers, cancer stage, the kinds of treatment patients receive, survival of patients following cancer diagnosis, and patient characteristics and demographics. This information is used to measure comprehensive cancer control efforts, health disparities, and progress in prevention, diagnosis, treatment, survival, and quality of life for cancer patients.

The TCR currently meets the Centers for Disease Control and Prevention's National Program of Cancer Registries (CDC NPCR) high quality data standards, and Texas' data is gold certified by the North American Association of Central Cancer Registries (NAACCR).

This report highlights the role of the TCR as a central data bank of accurate, precise, and current information that serves as a tool in the early recognition, prevention, cure, and control of cancer. Information is presented on the number of new cases and deaths expected in 2016, and an overview of cancer statistics is provided using the most current data available (cases diagnosed in 2013). The three-year delay is due to the time required for data collection, compilation, and quality control.

Key points discussed in this report include:

- In 2016, it is estimated that over 110,830 new cancer cases will be diagnosed in Texas, and about 36,000 Texans will die from cancer.
- During the past two decades, there have been marked decreases in prostrate, lung, and colorectal cancer rates in men, and in women breast, lung, colorectal, and cervical cancer. Reduced numbers of smokers and increased screenings have contributed to the declines.
- In contrast to the stable decline for most cancer types, incidence rates are increasing for melanoma, thyroid, kidney, and liver cancer.
- African Americans in Texas have higher incidence and mortality rates than whites for many types of cancer.
- Cancer in adults is the second most common cause of death in Texas (following heart disease), and for children (following fatal injuries).
- Lung cancer is the leading cause of cancer death in Texas for males and females, with about 10,000 deaths expected to occur in 2016.

- The number of cancer survivors has been increasing (more than 600,000 Texans who were diagnosed with cancer since 1995 were alive in 2013). Breast and prostate cancers constitute nearly half of this population.

## Introduction

The Texas Cancer Incidence Reporting Act (Health and Safety Code, Chapter 82) requires the Department of State Health Services (DSHS) to maintain a cancer registry that includes a record of the cases of cancer that occur in the state and collects information that can be used for early recognition, prevention, cure, and control of cancer.

Health and Safety Code Section 82.007 requires DSHS to publish an annual report to the Legislature of the information obtained under the Act.

## Background

Cancer registries collect information about cancer cases, including information about types, extent of illness, treatments, patient data, vital status, and causes of death. The information is used to monitor the cancer burden, identify trends and patterns in populations, and identify high-risk groups and behaviors. Public health officials and policymakers use the data to guide the planning of cancer control programs and set priorities for allocating resources.

The Texas Cancer Registry (TCR) was first established by the 66th Legislature in 1979. It was reauthorized in 1989 by the Texas Cancer Incidence and Reporting Act. The TCR is the nation's fourth largest cancer registry. It achieved gold certification from the North American Association of Central Cancer Registries (NAACCR) in 2003, and has maintained gold level certification each year data through 2013 (most recent data) with the exception of 2011, which achieved silver certification.

## Cancer in Texas

Cancer is a group of diseases characterized by the uncontrolled growth and spread of abnormal cells. If the spread is not controlled, it can result in death.

The TCR uses cancer incidence (number of new cases) and mortality (number of deaths) to assess the burden of cancer in Texas. To assess the cancer incidence, state law requires that health facilities report all new cancer cases diagnosed in Texas to the TCR. To assess mortality, the TCR reviews death certificate information to determine the number of individuals who died from cancer. Because cancer is strongly associated with age, measures of cancer burden are expressed as age-adjusted incidence and mortality rates.

The TCR used Texas cancer incidence data from 1995 to 2013 to estimate the number of new invasive cancer cases expected to be diagnosed in 2016. This method accounts for expected delays in case reporting and considers geographic variations in sociodemographic and lifestyle factors, medical settings, and cancer screening behaviors as predictors of incidence.[1]

In 2016, over 110,830 new cancer cases are expected to be diagnosed in Texas. Breast and prostate cancer are the most commonly diagnosed cancers in women and men, respectively, with

[1] Zhu, L., et al., *Predicting US- and state-level cancer counts for the current calendar year.* Cancer, 2012. **118**(4): p. 1100-1109.

more than 15,000 cases of breast cancer and nearly 13,000 cases of prostate cancer expected to be diagnosed in 2016. Lung and colorectal cancer are the second and third most commonly diagnosed cancers in women (more than 6,000 and 4,000 new cases expected in 2016, respectively) and men (about 7,000 and 5,500, respectively).

Cancer is the second most common cause of death in Texas.[2] In 2016, more than 39,500 Texans are expected to die of cancer, more than 100 people per day. Lung cancer is the leading cause of cancer death in Texas for males and females, accounting for about 9,400 (24 percent) of all expected cancer deaths in 2016. Cigarette smoking is the leading risk factor for lung cancer; how much and how long a person smokes impacts the risk. According to the latest Centers for Disease Control and Prevention (CDC) Smoking and Tobacco Use study, Texas ranks 14th among 44 states in the U.S. for cigarette smoking in adults, with 19.2 percent of all adults reportedly smoking cigarettes at the time of the report. [3] Texas ranked 23rd among 44 states for smoking in youths. In 2016, the TCR estimates that there will be nearly 4,000 deaths from colorectal cancer, making it Texas' second leading cause of cancer death.

Nearly 638,000 Texans diagnosed with cancer between 1995 and 2013 were alive on January 1, 2013. Some of these individuals were cancer free, while others may have been receiving ongoing treatment. The cancer sites with the highest number of survivors in Texas are breast, prostate, colorectal, thyroid, non-Hodgkin lymphoma, melanoma, and kidney. Breast and prostate cancers constitute nearly half of this population.

## Cancer Health Disparities in Texas

According to the U. S. Department of Health and Human Services' Office of Minority Health, a "health disparity is a type of health difference that adversely affects groups of people who have systematically experienced greater social and/or economic obstacles to health" based on characteristics historically linked to discrimination or exclusion. [4] These groups are defined in terms of racial or ethnic group, religion, socioeconomic status (SES), gender, age, mental health, disability (cognitive, sensory, or physical), sexual orientation and/or geographic location.

Health disparities are associated with social, economic, cultural, environmental, and health system factors. Disparities predominantly arise from varying access to high-quality cancer prevention, early detection, and treatment services.

Lower SES is associated with financial and structural barriers to health care, including inadequate health insurance coverage, reduced access to preventive services, and lower health literacy. Individuals with inadequate health insurance are more likely to be diagnosed with advanced cancer and less likely to survive the disease. People with lower SES are more likely to engage in behaviors that increase cancer risk, such as tobacco use, physical inactivity, and poor diet because of environmental and community factors that provide fewer opportunities for physical activity and less access to fresh fruits and vegetables. In 2014, according to the U.S.

[2]Texas Department of State Health Services. *Leading Causes of Death by Race Ethnicity in Texas*. 2015; Available from: http://www.dshs.texas.gov/chs/vstat/vs13/t16.aspx.
[3]CDC. *Smoking & Tobacco Use: State Highlights.* 2012.
[4]Health, U.S.D.o.H.a.H.S.O.o.M. *Health Inequality and Disparities*. 2011.

Census Bureau, 26 percent of African Americans and 24 percent of Hispanic Americans in the U.S. lived below the poverty line, compared to only 10 percent of non-Hispanic white people.[5]

African American individuals in Texas have higher cancer incidence and mortality rates than white individuals for several cancers. During the past two decades (1995 to 2013), African American women had the highest rates of colorectal (43.7 per 100,000) and pancreatic cancer 14.9 per 100,000) cancer. African American men had the highest rates of several cancer types:

- Prostate (165.6 per 100,000)
- Lung (95.7 per 100,000)
- Colorectal (60.7 per 100,000)
- Pancreatic (16.7 per 100,000)

African Americans are also more likely to die from cancer, with uterine cancer mortality rate in African American women being more than two fold higher than in white women (7.0 versus 3.2 per 100,000, respectively). African American women had the highest rates of mortality related to several cancer types:

- Breast (32.3 per 100,000)
- Colorectal (18.6 per 100,000)
- Pancreatic (12.6 per 100,000)

African American men also had the highest cancer related mortality rates for several cancer types:

- Lung (76.2 per 100,000)
- Prostate (39.3 per 100,000)
- Colorectal (29.3 per 100,000)
- Pancreatic (14.8 per 100,000)

The mortality rate for prostate cancer was over two times higher among black males than any other group.

During the same time period, Hispanics had the highest liver cancer incidence and mortality rates. Liver cancer incidence rates were more than twice as high as that of white men (25.1 versus 11.7 per 100,000) and women (9.9 versus 4.1 per 100,000). Cervical cancer incidence and mortality rates were also higher among Hispanic women compared to white women.

Asians and Pacific Islanders have the lowest overall cancer incidence and mortality rates. However, this population has among the highest rates for cancers of the liver and the stomach, possibly due to higher prevalence of infections with hepatitis B virus and *H pylori*.

Cancer information for Asians, Pacific Islanders, American Indians, and Native Alaskans is known to be incomplete because the racial/ethnic status of many of these individuals is not correctly identified in medical and death records. The TCR has made efforts to collect more accurate information through linkage with other data sources, such as the Indian Health Service (IHS), however, available statistics may not represent the true cancer burden for this population.

[5]DeNavas-Walt, C., Procter, B.D. Income and Poverty in the United States. Bureau, U.S.C., *Current Population Reports.* 2014.

## Cancer in Children & Adolescents

Although advances in treatment have increased, cancer is still the second leading cause of death (following fatal injuries) in Texas children 5 to 14 years old.[6] In 2016, an estimated 1,060 new cases and 219 cancer deaths are expected to occur among children (birth to 14 years), and an additional 456 new cases and 55 cancer deaths are expected among adolescents (15 to 19 years). The overall 5-year survival rate for childhood cancers is approximately 80 percent.

The most common cancers among children and adolescents in Texas vary by age. Among children from birth to 14 years, the most common cancers are brain and central nervous system (CNS) at 33 percent, and acute lymphocytic leukemia at 30 percent. Among adolescents 15 to 19 years, the most common cancers were brain and CNS (28 percent) and Hodgkin's lymphoma (14 percent).

## Causes and Prevention of Cancer

Cancer is caused by both external factors (tobacco use, obesity, infectious organisms, chemicals, and radiation) and internal factors (genetics, hormones, and immune conditions). These causal factors may act together to initiate the development of cancer. Ten or more years often pass between exposure to external factors and detectable cancer.

A substantial number of cancer cases could be prevented. Cancers caused by cigarette smoking, for instance, could be completely prevented. The observed declining lung cancer incidence in men and women is a direct result of the reduced number of smokers.[7] In Texas since 1995, the incidence of lung cancer has decreased by 41 percent in men and 20 percent in women. Differences in the decline of lung cancer incidence rates between men and women reflect historical differences in tobacco use; cigarette smoking peaked about 20 years later in women than in men.[8] In the U.S., there have been approximately 18 million deaths between 1964 and 2012 due to smoking, with a substantial number of deaths occurring before 65 years of age.[9]

The World Cancer Research Fund estimates that one-third of the cancer cases that occur in economically developed places, like Texas, are related to being overweight or obese and could be prevented.

Many of the melanoma cases that are diagnosed annually also could be prevented. Individuals with exposure to excessive sun or indoor tanning are at higher risk of developing skin cancer.

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[6] Xu JQ, Murphy SL, Kochanek KD, Bastian BA. *Deaths: Final data for 2013*. National vital statistics reports. 2016 **64**(2).

[7] Howlader, N., A. Noone, and M. Krapcho, *SEER Cancer Statistics Review 1975-2010.* 2013.

[8] Thun, M.J., et al., *50-Year Trends in Smoking-Related Mortality in the United States.* New England Journal of Medicine, 2013. **368**(4): p. 351-364.

[9] Services, U.S.D.H.a.H., *The health consequences of smoking—50 years of progress: a report of the Surgeon General.*, U.S.D.H.a.H. Serrvices, Editor. 2014, US Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health: Atlanta, GA.

Children, in particular, should be protected from the sun because severe sunburns in childhood greatly increase the risk of developing melanoma later in life.

In contrast to the stable decline for most cancer types, incidence rates are increasing for melanoma, thyroid, kidney, and liver cancer. In Texas, melanoma incidence rates have increased by 17 percent in men and 15 percent in women since 1995. Thyroid cancer is the most rapidly increasing cancer in the U.S. and has been increasing worldwide over the past few decades.[10] The incidence rate for thyroid cancer in Texas women has increased 121 percent since 1995 and 108 percent in men. The rise is thought to be partly due to increased detection through more sensitive diagnostic procedures.

Liver cancer incidence rates are about three times higher in men than in women. The incidence rate of liver cancer in Texas men has nearly doubled from 8 per 100,000 men in 1995 to 17 per 100,000 men in 2013. Mortality also increased by approximately 71 percent in men and 29 percent in women since 1990. The majority of liver cancer cases are due to alcohol-related cirrhosis and non-alcoholic fatty liver disease associated with obesity. Screening for liver cancer has not been shown to reduce mortality, but many doctors screen high-risk people with ultra-sound and blood tests.

Screening offers the ability for secondary prevention by detecting cancer early, before symptoms appear. Screening for colorectal and cervical cancers can prevent cancer by allowing the removal of precancerous lesions.[11] For example, the recent decline in colorectal cancer incidence and mortality rates has been attributed to the introduction and uptake of colonoscopy.[12]

## Texas Cancer Registry (TCR) Data Uses

### Hospital Management

Data routinely collected by the TCR helps hospital administrators evaluate services being offered and identify patterns in cancer care to plan accordingly. For example, administrators can examine frequency reports to identify changes in care over time. Administrators can also evaluate referral patterns to see when patients are directed or chose to be treated at other facilities. These data are crucial for planning resource allocation and staff recruitment.

### Cancer Surveillance

Cancer surveillance enables health professionals to evaluate and address the cancer burden. Public health professionals, health care providers, researchers, policy makers, and others use TCR data to assess patterns in the occurrence of cancer, detect important trends within populations, and assess the impact of cancer prevention programs. Cancer registry data can be

[10]American Cancer Society. *Cancer Facts and Figures 2016.* 2016.

[11]Siegel, R., C. DeSantis, and A. Jemal, *Colorectal cancer statistics, 2014.* CA: A Cancer Journal for Clinicians, 2014. **64**(2): p. 104-117.

[12]Edwards, B., E. EWard, and B. Kohler, *Annual report to the nation on the status of cancer, 1975-2006, featuring colorectal cancer trends and impact of interventions (risk factors, screening, and treatment) to reduce future rates.* Cancer, 2010(107): p. 1142-1152.

used to conduct needs and capacity assessments that allow evidence-based decision-making for allocating limited cancer resources.

## Cancer Research

The TCR receives data requests from a diverse audience for a wide range of uses. In 2015, the TCR saw a dramatic increase of almost 50 percent in the number of data requests as compared to 2014. The majority of the difference was driven by an increase in the number of requests for epidemiologic research studies. This trend is expected to continue.

### *Epidemiology Studies*

Epidemiology studies are crucial for identifying risk factors and determining optimal treatment approaches to clinical practice.

The TCR provides data that currently support a wide variety of cancer research. While the TCR does not provide financial support for research, data from the TCR makes cancer epidemiology research possible. Data from the TCR is used in epidemiologic studies in a variety of ways. TCR data is used to describe the demographic characteristics of individuals who develop a specific type of cancer, compare the cancer burden to other public health issues, and evaluate trends in cancer incidence and mortality over time. [13, 14, 15] For instance, TCR data contributed to the evidence of a continuous drop in incidence and mortality of cervical cancer after an increase in Pap test screening, which underscores the importance of preventive strategies.[16]

TCR data can also be linked to other datasets to evaluate the impact of lifestyle factors that may contribute to cancer and identify preventive strategies to reduce those risks.[17 18 19] Linked data can also be used to evaluate whether cancer patients have appropriate access to care. Researchers can evaluate how regional differences in access to cancer treatment affect patient survival, look at treatment disparities for specific groups of patients, or check whether diagnostic evaluations are being performed according to the guidelines.[20 21 22]

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[13]Wyatt, S., et al., *All-Cancers Mortality Rates Approaching Diseases of the Heart Mortality Rates as Leading Cause of Death in Texas.* Southern Medical Journal, 2014. **107**(1): p. 19-23.

[14]Ostrom, Q.T., et al., *CBTRUS Statistical Report: Primary Brain and Central Nervous System Tumors Diagnosed in the United States in 2006-2010.* Neuro-Oncology, 2013. **15**(suppl 2): p. ii1-ii56.

[15]Wyatt, S., et al., *All-Cancers Mortality Rates Approaching Diseases of the Heart Mortality Rates as Leading Cause of Death in Texas.* Southern Medical Journal, 2014. **107**(1): p. 19-23.

[16]Jemal, A., et al., *Annual Report to the Nation on the Status of Cancer, 1975–2009, Featuring the Burden and Trends in Human Papillomavirus (HPV)–Associated Cancers and HPV Vaccination Coverage Levels.* Journal of the National Cancer Institute, 2013. **105**(3): p. 175-201

[17]Bosire, C., et al., *Coffee consumption and the risk of overall and fatal prostate cancer in the NIH-AARP Diet and Health Study.* Cancer Causes & Control, 2013. **24**(8): p. 1527-1534.

[18] Kabat, G.C., et al., *Lifestyle and Dietary Factors in Relation to Risk of Chronic Myeloid Leukemia in the NIH-AARP Diet and Health Study.* Cancer Epidemiology Biomarkers & Prevention, 2013. **22**(5): p. 848-854.

[19] Lynch, B.M., et al., *Sedentary Behavior and Prostate Cancer Risk in the NIH–AARP Diet and Health Study.* Cancer Epidemiology Biomarkers & Prevention, 2014. **23**(5): p. 882-889.

[20]Kneuertz, P.J., et al., *Regional disparities affect treatment and survival of patients with intrahepatic cholangiocarcinoma—A Texas Cancer Registry analysis.* Journal of Surgical Oncology, 2014. **110**(4): p. 416-421.

TCR data was used in tandem with data from 278 other population-based registries in 67 countries to better understand the worldwide survival rates for different cancers as a part of the CONCORD-2 study.[23]

Cancer registry data is often used to investigate health disparities. For example, in 2014, TCR data was used to evaluate disparities in the cancer burden by region, such as increased incidence of liver cancer in South Texas, differences in breast cancer mortality based on the racial and ethnic composition of neighborhoods, as well as disparities by race and by health insurance coverage.[24, 25, 26, 27, 28]

*Clinical Trials*

A clinical trial is a research study designed to test the safety and/or effectiveness of drugs, devices, treatments, or preventive measures in humans. TCR data is often used to calculate the percentage of patients diagnosed with a specific type of cancer who have enrolled in a clinical trial, or to recruit patients to clinical trials.

*Community Efforts*

TCR data supports a variety of community efforts, including public education to increase cancer awareness, fundraising events, and outreach activities. The TCR works with a diverse group of partners and organizations to provide data that supports and informs community efforts. In recent years, the TCR has provided data and worked together with Texas Kids Count, Relay for Life (American Cancer Society), Susan G. Komen Foundation, Make a Wish Foundation, Center for Community Engagement at the MD Anderson Cancer Center, the Cancer Prevention and Research Institute of Texas, and the Leukemia and Lymphoma Society.

*Cancer Cluster Investigations*

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[21] Suneja, G., et al., *Cancer Treatment Disparities in HIV-Infected Individuals in the United States.* Journal of Clinical Oncology, 2014.

[22] Ost, D.E., et al., *Quality gaps and comparative effectiveness in lung cancer staging and diagnosis.* Chest, 2014. **145**(2): p. 331-345.

[23]Allemani, C., Weir, H.K., Carreira, H., Harewood, R., Spika, D., Wang, X-S., Bannon, F., Ahn, J.V., Johnson, C.J., Bonaventure, A., Marchos-Gragera, R., Stiller, C., Silva, G.A., Chen, W-Q., Ogunbiyi, O.J., Rachet, B., Soeberg, M.J., You, H., Matsuda, T., Bielska-Lasota, M., Storm, H., & Tucker, T.C. , *Global surveillance of cancer survival 1995–2009: analysis of individual data for 25 676 887 patients from 279 population-based registries in 67 countries (CONCORD-2).* The Lancet, 2015. **385**(9972): p. 977-1010.

[24]Ramirez, A., et al., *Incidence of Hepatocellular Carcinoma in Texas Latinos, 1995–2010: An Update.* PLoS One, 2014.

[25]Pruitt, S.L., Simon J Craddock Lee, Jasmin A. Tiro, Lei Xuan, John M. Ruiz, *Residential Racial Segregation and Mortality Among Black, White, and Hispanic Urban Breast Cancer Patients in Texas, 1995 to 2009* Cancer, 2015.

[26]DeSantis, C., D. Naishadham, and A. Jemal, *Cancer statistics for African Americans, 2013.* CA: A Cancer Journal for Clinicians, 2013. **63**(3): p. 151-166.

[27] White, M.C., et al., *Disparities in Cancer Mortality and Incidence Among American Indians and Alaska Natives in the United States.* American Journal of Public Health, 2014. **104**(S3): p. S377-S387.

[28]Highfield, L., *Spatial Patterns of Breast Cancer Incidence and Uninsured Women of Mammography Screening Age.* The Breast Journal, 2013. **19**(3): p. 293-301.

Responding to communities' cancer concerns is one of the most important activities performed by cancer registries. The CDC defines cancer clusters as a greater-than-expected number of cancer cases that occurs within a group of people, in a geographic area, over a period of time.[29]

Cancer clusters may be suspected when people learn about multiple family members, friends, neighbors, or coworkers who have been diagnosed with cancer. While most suspected clusters are not found to be true cancer clusters, each inquiry is thoroughly evaluated. TCR data were used to complete two cancer cluster investigations in 2015 and another two in 2016. Reports on these DSHS Environmental and Injury Epidemiology and Toxicology Unit investigations can be found at http://www.dshs.texas.gov/epitox/CancerClusters.shtm.

### Accessing Texas Cancer Data

The TCR has made significant efforts to make its data available and accessible. Information about cancer statistics in Texas is available on the TCR webpage: http://www.dshs.texas.gov/tcr/. In addition to information about incidence and mortality in adults, the webpage also has information about childhood and adolescent cancers, cancer estimates, and information about cancer clusters.

## Conclusion

Cancer has, and will continue to have a significant impact on Texans, those who seek care in the state, and institutions providing care. Collecting and disseminating cancer data is crucial in the fight against cancer. TCR activities are an important component in assessing Texas' cancer burden and contributing to national and international cancer control and prevention.

[29]Prevention, C.f.D.C.a., *Investigating Suspected Cancer Clusters and Responding to Community Concerns Guidelines from CDC and the Council of State and Territorial Epidemiologists.* Morbidity and Mortality Weekly Report, 2013. **62**.