Texas Cancer Registry Annual Report 2021

As Required by

Texas Health and Safety Code

Section 82.007

TEXAS
Health and Human Services

Texas Department of State Health Services

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Executive Summary

The Department of State Health Services maintains the Texas Cancer Registry (TCR), as required by the Texas Cancer Incidence Reporting Act (Health and Safety Code, 82.001). The TCR is a statewide population-based registry serving as the foundation for measuring the cancer burden in Texas. Data generated by the TCR assesses comprehensive cancer control efforts, health disparities, and progress in prevention, diagnosis, treatment, and survivorship. Cancer-related research cannot be adequately addressed by state and local government, academic institutions, or the private sector without the timely, complete, and accurate data provided by the TCR.

Section 82.007 requires DSHS to publish information obtained under the Act in an annual report to the Legislature. The following are key findings discussed in this report.

- In 2021, an estimated 131,610 new cases of cancer will be diagnosed in Texas, and an estimated 46,353 Texans will die from cancer.
- In 2021, an estimated 1,319 new cases and 160 cancer deaths are expected to occur in Texas children – birth to 14 years. An additional 580 new cases and 77 cancer deaths are expected in Texas adolescents – 15 to 19 years.
- Breast cancer is the most commonly diagnosed cancer in women and prostate cancer for men.
- Lung cancer is the leading cause of cancer death in Texas. An estimated 10,602 lung cancer deaths are expected to occur in 2021.
- During the past two decades, lung, colorectal, and prostate cancer incidence rates have decreased. Incidence rates are increasing for uterine, thyroid, and liver cancer.
- Cancer is the second most common cause of death in Texas for adults; however, cancer was the leading cause of death in 40 Texas counties from 2015 to 2019.
- Cancer is the leading cause of disease-related death in Texas past infancy among children and adolescents ages 1 to 19 years.
- Sixty-six percent of Texans survive five years or more after being diagnosed with cancer.

- Cancer survivorship continues to increase; as of January 1, 2018, 866,712 Texans who were diagnosed with cancer in the last 23 years are alive today.

1. Introduction

The Department of State Health Services maintains a cancer registry for the state which includes a record of cancer cases that are diagnosed or treated in Texas. The Department also collects information used for prevention, early detection, diagnosis, treatment, and survivorship of cancer, as required by the Texas Cancer Reporting Act (Health and Safety Code, Section 82.004). This report summarizes information collected by the Texas Cancer Registry (TCR) and reports the material to the Legislature each year by requirement of Section 82.007.

This report highlights the role of the TCR in collecting, maintaining, and disseminating accurate and current information. Cases diagnosed through 2018 – the most current data available – are used to provide an overview of key cancer statistics and estimate the number of new cases and deaths expected in 2021. Additionally, the report includes information on the different ways TCR data are used.

2. Background

Cancer Causes and Prevention

Cancer is not a single disease but rather a group of related diseases characterized by uncontrolled growth and spread of abnormal cells.[1] If the spread of abnormal cells is not controlled, cancer can invade other organs and tissues. Some cancer cells spread within the body through the blood or the lymphatic system and form new tumors. Uncontrolled growth and spread of cancer can result in serious health problems and death.

Cancer is caused by both internal and external factors. Internal factors are conditions and characteristics that exist within the body, such as genetics, hormones, and immune conditions. External factors are behaviors and environmental conditions that affect health, such as tobacco use, excess body weight, infectious organisms, chemicals, and ultraviolet radiation. Often 10 or more years pass between exposure to external factors and detectable cancer. These causal factors may act together to start the development of cancer.

The American Cancer Society (ACS) estimates that at least 42 percent of cancers are preventable. This includes 19 percent that are caused by smoking and 18 percent that are attributable to a combination of excess alcohol consumption, poor nutrition, body weight, and physical inactivity.[1] Certain cancers are caused by infectious agents such as viruses and bacteria, which could be prevented through treatment of the infection, behavioral changes, or vaccination.

Cancer screening can reduce the risk of developing and dying from cancer by detecting cancers early at more treatable stages. Screening has been shown to reduce mortality from cancers of the colon and rectum, breast, uterine, cervix, prostate, and lung.[2] Additionally, screening for colorectal and cervical cancers can find and remove growths before they have a chance to turn into cancer.

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[1] American Cancer Society. Cancer Facts & Figures 2021. Atlanta: American Cancer Society; 2021.

[2] American Cancer Society. Cancer Prevention & Early Detection Facts & Figures 2019–2020. Atlanta: American Cancer Society; 2019.

For more information on the types, causes, and prevention of cancer, visit the ACS website cancer.org.

The Texas Cancer Registry

The TCR was first established by the 66th Texas Legislature in 1979 and reauthorized by the Texas Cancer Incidence and Reporting Act in 1989.

Cancer registries collect information about cancer cases, including the location of the cancer in the body, the specific type(s) of cells affected, the spread of the disease, patient demographics, mortality rates, and the ultimate cause of death. This information is used to monitor the cancer burden in the population, identify trends and patterns, and high-risk groups and behaviors. This information is also used by public health officials and policymakers to guide the planning of cancer control programs and prioritize resources.

The TCR is one of the largest cancer registries in the United States. Over 305,876 reports of cancer were received in 2020 from more than 550 hospitals, cancer treatment centers, ambulatory surgery centers, and pathology laboratories across Texas. Of these, 12,578 reports were for out-of-state residents. 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 diagnosed with cancer outside of Texas from other state cancer registries.

The TCR first met the Centers for Disease Control and Prevention's (CDC) "high quality" data standards in 2004 and achieved Gold Certification from the North American Association of Central Cancer Registries (NAACCR) in 2006. The data standards and gold certification have been maintained each year since, except in 2013 when the TCR received NAACCR Silver Certification.

In 2021, the TCR joined the National Cancer Institute's Surveillance, Epidemiology and End Results (SEER) Program. The TCR is one of twelve state registries funded by both SEER and CDC's National Program of Cancer Registries. The SEER contract provides about $8.9 million in funding for TCR over seven years. The Cancer Prevention and Research Institute of Texas also provides funding to the TCR.

More information can be found at dshs.texas.gov/tcr.

3. Cancer in Texas

The Texas Cancer Registry (TCR) examines cancer incidence, mortality, survival, and prevalence to assess the burden of cancer in Texas.

Incidence is the number of new cancers diagnosed, and *mortality* is the number of new cancer deaths occurring in a specified population during a year. Incidence and mortality rates are most often expressed as the number of new cases or deaths, respectively, per 100,000 individuals in the population at risk. Childhood cancer rates are typically presented as the number of cases or deaths per one million children.

Because cancer incidence and mortality increase with age, incidence and mortality are commonly expressed as age-adjusted rates. Age-adjusted rates allow for fairer evaluations between groups with different age distributions. The age-adjusted incidence rate in 2018 of all cancers in Texas is 409 cases per 100,000 population.

Cancer survival is assessed using the percentage of cancer patients who have survived for a certain period of time after their cancer diagnosis for example, *five-year relative survival* is a commonly used measure of cancer survival. This represents the percentage of cancer patients who have survived for five years after diagnosis compared to the expected survival of people without cancer.

Cancer prevalence estimates the number of people alive on a certain date who have ever been diagnosed with cancer.

Cancer Incidence

The TCR used Texas cancer incidence data from 1995 to 2018 to estimate the number of new invasive cancer cases expected to be diagnosed in 2021. 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.[3]

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[3] Zhu L, et al. Predicting US- and state-level cancer counts for the current calendar year. Cancer 2012; 118(4):1100-9.

In 2021, an estimated 131,610 new cancer cases are expected to be diagnosed in Texas. Although cancer incidence rates overall are declining, the number of newly diagnosed cancer cases continues to increase with the aging and growth of the Texas population. This trend is seen throughout the United States (US).

For women in both the US and Texas, breast cancer is the most commonly diagnosed cancer. In Texas women, an estimated 18,968 cases are expected to be diagnosed in 2021, followed by lung cancer (7,140 cases) and colorectal cancer (5,313 cases). The fourth and fifth leading cancers in women are cancers of the uterus and thyroid.

Among men in both the US and Texas, prostate cancer is the most commonly diagnosed cancer. In Texas men, an estimated 15,459 cases are expected to be diagnosed in 2021, followed by lung cancer (8,528 cases) and colorectal cancer (6,725 cases). The fourth and fifth most commonly diagnosed cancers in men are urinary bladder cancer and kidney and renal pelvis cancer.

Over the past two decades, lung, colorectal, and prostate cancer incidence rates have markedly decreased due to reduced smoking rates and increased screenings. Though incidence rates continue to decline for many cancer types, rates are increasing for uterine, thyroid, and liver cancer. Again, similar trends are seen in the US population.

Cancer Mortality

Cancer is the second most common cause of death in both the US and Texas. From 2015 to 2019, cancer was the leading cause of death in 40 Texas counties.[4] The age-adjusted cancer mortality rate is 142 cancer deaths per 100,000 population. In 2021, an estimated 46,353 Texans, or over 125 people per day, are expected to die from cancer.

Lung cancer is the leading cause of cancer death in the US and Texas for males and females, accounting for 23 percent of all cancer deaths in Texas in 2021. Cigarette smoking is the leading risk factor for lung cancer. The duration of smoking and number of cigarettes smoked per day significantly impacts cancer risk. According to

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[4] Centers for Disease Control and Prevention, National Center for Health Statistics. Underlying Cause of Death 1999–2019 on CDC WONDER Online Database, released in 2020. Accessed May 2021. http://wonder.cdc.gov/ucd-icd10.html

the Centers for Disease Control and Prevention (CDC), 14.4 percent of adult Texans and 7.4 percent of Texas high school students currently smoke cigarettes.[5]

Colorectal cancer is expected to be the second leading cause of cancer death in Texas in 2021, with an estimated 4,342 deaths. Breast, pancreatic, and liver (including intrahepatic bile duct) cancers are expected to be the third, fourth, and fifth leading causes of cancer deaths in Texas.

Cancer Survival

Cancer survivors are individuals diagnosed with cancer between 1995-2017 who were alive as of January 1, 2018. An estimated 866,712 Texans are cancer survivors. Some of these individuals were cancer free, while others may have been receiving ongoing treatment.

Overall, 66 percent of Texans will meet the five-year relative survival metric. In the US, the equivalent five-year relative survival is 68 percent. However, survival rates vary significantly by cancer type and stage at diagnosis.

The following key statistics highlight five-year relative survival rate variation in Texas.

- For patients diagnosed with localized cancer the survival rate is 89 percent.
- If cancer has spread to surrounding tissues, organs and/or regional lymph nodes the survival rate is 65 percent.
- If cancer has spread to distant organs or tissues the survival rate is 34 percent.
- Lung and bronchus, liver, and pancreatic cancers have the lowest relative survival rates among all cancers (21 percent, 19 percent, and 13 percent, respectively).
- In contrast, survival rates for the most commonly diagnosed cancers, prostate and female breast cancers, are 97 percent and 89 percent, respectively.

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[5] Centers for Disease Control and Prevention. State Tobacco Activities Tracking and Evaluation (STATE) System. State Highlights. Accessed March 2021. https://www.cdc.gov/statesystem/statehighlights.html.

Cancer Prevalence

Prevalence is a useful indicator in determining disease presence within a community, specifically assessing the number of people alive in relation to a specified time frame. An estimated 866,712 Texans were alive as of January 1, 2018 after being diagnosed with cancer between 1995-2017. 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 female breast, prostate, colorectal, thyroid, kidney and renal pelvis, non-Hodgkin lymphoma, and melanoma. Prostate and female breast cancers constitute about 42 percent of the cancer survivor population.

4. Cancer in Children and Adolescents

Cancers that develop in children are often different than those that develop in adults. Unlike many cancers in adults, childhood cancers are not strongly linked to lifestyle or environmental risk factors.[6] The causes of most childhood cancers are unknown. Only a small percentage of childhood cancers are attributed to inherited genetic alternations, making identification of molecular and genetic targets for treatment options particularly challenging.[7] Developing less toxic treatment with fewer long-term adverse effects is another key challenge for childhood cancers and a focus of current research.[7]

Cancer is the leading cause of disease-related death in Texas past infancy among children (birth to 14 years) and adolescents (15 to 19 years). In 2021, an estimated 1,319 new cases and 160 cancer deaths are expected to occur among children-), and an additional 580 new cases and 77 cancer deaths are expected among adolescents.

The annual cancer incidence rate among children in Texas is 195 cases per 1 million population. The five most prevalent childhood cancers in the US and Texas are leukemias, followed by brain and central nervous system cancers, lymphomas, soft tissue sarcomas, and neuroblastoma.

The annual cancer incidence rate among adolescents in Texas is 264 cases per 1 million population. Among this group, the most common cancers are

- Brain and central nervous system cancers;

- Other malignant epithelial neoplasms and melanomas (of which thyroid carcinoma is the predominant cancer in this category);

- Lymphomas;

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[6] American Cancer Society. What Are the Differences between Cancers in Children and Adults? 2019. Accessed March 2021. https://www.cancer.org/cancer/cancer-in-children/differences-adults-children.html.

[7] National Cancer Institute. Childhood Cancer Research. 2019. Accessed March 2021. https://www.cancer.gov/research/areas/childhood.

- Leukemias; and

- Germ cell, trophoblastic tumors, and neoplasms of the gonads.

These five cancer types are also the most common among adolescents in the US.

The relative five-year survival rate among children and adolescents diagnosed with cancer is approximately 85 percent. An estimated 23,987 Texans are survivors of childhood and adolescent cancer. These are Texans diagnosed with childhood and adolescent cancer between 1995–2017 who were alive as of January 1, 2018.

5. Texas Cancer Registry Data Uses

The following section outlines the many uses of Texas Cancer Registry (TCR) data. More information can be found at dshs.texas.gov/tcr.

Health Care Management

Hospital and cancer treatment center administrators use TCR data to evaluate patient services and identify patterns. These data are crucial for planning resource allocation and staff recruitment. Administrators can examine reports that identify changes in care over time and evaluate referral patterns to see when patients are directed or choose to be treated at health care centers.

Cancer Surveillance

Cancer surveillance enables health professionals to evaluate and address the cancer burden in a population. Public health professionals, health care providers, researchers, policy makers, and others use TCR data to assess patterns in cancer occurrence, detect important trends, evaluate the impact of cancer prevention programs, and allocate resources.

Cancer Research

In 2020, TCR staff completed 435 data requests from customers both in state and across the country. There were also 12,808 web-based queries for TCR cancer statistics in 2020. The web-based query system provides cancer incidence and mortality rates, counts, and maps.[8]

TCR data are requested and queried for the following primary purposes.

- Comprehensive cancer control planning
- Health event investigations
- Epidemiologic studies
- Collaboration with cancer screening programs
- Study of incidence and mortality by stage, geographic area, or other factors

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[8] Web Query Tool: Selectable Cancer Incidence/Mortality Rates and Mapping. Texas Cancer Registry, Texas Department of State Health Services. http://www.cancer-rates.info/tx/.

- Comparative effectiveness of various cancer care interventions
- Needs assessments and program planning and evaluation

Epidemiology Studies

Epidemiologic studies are crucial for identifying risk factors and determining optimal treatment approaches to clinical practice. The TCR provides data that support epidemiologic studies on the causes of cancer, cancer prevention and control, and cancer survivorship. While the TCR does not provide financial support for research, TCR data makes a significant amount of cancer epidemiology research possible.

TCR data are used to describe the demographic characteristics of people who develop a specific type of cancer, compare the cancer burden to other public health issues, evaluate trends in cancer incidence and mortality over time, and examine factors affecting cancer survival outcomes.[9,10,11,12,13] For example, a recent study identified that Non-Hispanic populations in Texas had a higher risk of developing any type of blood cancer compared with Hispanic populations, while Hispanic population had a higher incidence of acute lymphoblastic leukemia.[14]

Some of the largest, longest, and most well-known cohort studies statewide, nationally and internationally are supported with TCR data. For these epidemiologic studies, TCR staff conduct regular data linkages to provide accurate and high-

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[9] El-Serag H, et al. Texas Has the Highest Hepatocellular Carcinoma Incidence Rates in the USA. Digestive Diseases and Sciences 2021; 66:912–916.

[10] Ambe, S, et al. Incidence of Primary Central Nervous System Tumors Among the Hispanic Population in Texas 1995–2013. Cureus 2020; 12(9), e10235.

[11] Murphy C, et al. Disparities in Cancer Survival among Adolescents and Young Adults: A Population-Based Study of 88,000 Patients. JNat Cancer Inst 2021; doi: 10.1093/jnci/djab006.

[12] Durmus N, et al. Characteristics of Cancer Patients in the World Trade Center Environmental Health Center. Int. J. Environ. Res. Public Health 2020; 17(19), 7190.

[13] Schraw, J, et al. Area deprivation is associated with poorer overall survival in children with acute lymphoblastic leukemia. Pediatr Blood Cancer 2020; e28525.

[14] Bencomo-Alvarez, AE, et al. Ethnic and border differences on blood cancer presentation and outcomes: A Texas population-based study. Cancer 2020; 127(7): 1068–1079.

quality cancer outcome data. Many of these large cohort studies are examining the effect of lifestyle factors and modifiable behaviors on cancer risk.[15,16,17]

For example, the National Institutes of Health-American Association of Retired Persons (NIH-AARP) Diet and Health Study is designed to examine the relationship between diet and cancers.[18] To help the researchers achieve their study aims, TCR staff conduct a data linkage approximately every two years. A recent publication from this study showed that diets high in whole grains and other foods containing fiber are associated with lower rates of colorectal cancer.[19]

TCR staff conduct data linkages to examine other research topics, including the risk of childhood cancer among children conceived via in vitro fertilization, the association between birth defects and cancer risk, and the risk of cancer among individuals infected with human immunodeficiency virus.[20,21,22]

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[15] Shah SC, et al. Magnesium intake is associated with a reduced risk of incident liver cancer, based on an analysis of the NIH-American Association of Retired Persons (NIH-AARP) Diet and Health Study prospective cohort. Am J Clin Nutr 2021; 113(3); 630–638.

[16] Fraser GE, et al. Dairy, soy, and risk of breast cancer: those confounded milks. International Journal of Epidemiology 2020; 49(5); 1526–1537.

[17] Petrick, JL, et al. A Prospective Analysis of Intake of Red and Processed Meat in Relation to Pancreatic Cancer among African American Women. Cancer Epidemiology, Biomarkers & Prevention 2020, 29(9); 1775–1783.

[18] National Cancer Institute. NIH-AARP Diet and Health Study. 2021. Accessed July 2021. https://dietandhealth.cancer.gov/

[19] Hullings A, et al. Whole grain and dietary fiber intake and risk of colorectal cancer in the NIH-AARP Diet and Health Study cohort. Am J Clin Nutr 2020; 112(3):603–612.

[20] Luke, B, et al. Assessment of Birth Defects and Cancer Risk in Children Conceived via In Vitro Fertilization in the US. JAMA Network Open 2020; 3(10), e2022927.

[21] Schraw, JM, et al. (2020). Cancer diagnostic profile in children with structural birth defects: An assessment in 15,000 childhood cancer cases. Cancer 2020; 126(15), 3483–3492.

[22] Coghill AE, et al. Risk of breast, prostate, and colorectal cancer diagnoses among HIV-infected individuals in the United States. J Natl Cancer Inst 2018; 110(9): 959–966.

Additionally, TCR data have been used in tandem with data from 322 other population-based registries in 71 countries to better understand worldwide survival rates for different cancers as a part of the CONCORD-3 study.[23]

Community Efforts

TCR staff work locally with a diverse group of partners to provide data in support of community efforts, such as public awareness, education, and fundraising. Partner examples include the following organizations.

- Cancer Prevention and Research Institute of Texas
- American Cancer Society
- Susan G. Komen Foundation
- Make a Wish Foundation
- MD Anderson's Center for Community Engagement
- Leukemia and Lymphoma Society

Cancer Cluster Investigations

An important activity performed by cancer registries includes providing data to respond to community concerns about suspected cancer clusters. The Centers for Disease Control and Prevention (CDC) defines a cancer cluster as a greater-than-expected number of cancer cases occurring within a group of people, geographic area, or period-of-time.[24]

Between 2016 and 2020, TCR data were used to complete 20 cancer cluster investigation reports. Investigation reports can be found at dshs.texas.gov/epitox/CancerClusters.shtm.

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[23] Girardi F, Rous B, Stiller CA, Gatta G, Fersht N, Storm HH, Rodrigues JR, Herrmann C, Marcos-Gragera R, Peris-Bonet R, Valkov M, Weir HK, Woods RR, You H, Cueva PA, De P, Di Carlo V, Johannesen TB, Lima CA, Lynch CF, Coleman MP, Allemani C. The histology of brain tumours for 67,331 children and 671,085 adults diagnosed in 60 countries during 2000-2014: a global, population-based study (CONCORD-3). Neuro Oncol. 2021 Mar 19:noab067. doi: 10.1093/neuonc/noab067. Epub ahead of print. PMID: 33738488.

[24] Centers for Disease Control and Prevention, 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(RR08):1–14.

Accessing Texas Cancer Data

To aid in state, national, and international efforts, the Department has made significant efforts to make TCR data available and accessible. Data tables and summaries with detailed information about cancer incidence, mortality, survival and prevalence in Texas, are available at dshs.texas.gov/tcr/data/cancer-statistics.aspx

6. Conclusion

From information collected through the Texas Cancer Registry (TCR), DSHS estimates that in 2021, 131,610 new cases of cancer will be diagnosed in Texas and 46,353 Texans will die from cancer. Of these cases, 1,319 new cases and 160 cancer deaths are expected to occur among children (birth to 14 years), and an additional 580 new cases and 77 cancer deaths are expected among adolescents (15 to 19 years). Cancer is the second most common cause of death in Texas for adults and the most common cause of disease-related death past infancy among children and adolescents.

Lung cancer is the leading cause of cancer death in Texas. The most common cancers diagnosed in Texas are breast cancer for women and prostate cancer for men. Incidence rates have markedly decreased for lung, colorectal, and prostate. However, incidence rates are increasing for uterine, thyroid, and liver cancers.

The number of cancer survivors continues to increase. An estimated 866,712 Texans are cancer survivors. These are Texans diagnosed with cancer between 1995–2017 who were alive as of January 1, 2018.

Cancer continues to have a significant impact on Texans, those seeking care in the state, and institutions providing cancer care. Accurate and complete collection and analysis of high-quality cancer data is central to the fight against cancer. The TCR continues to play a critical role in assessing the cancer burden in Texas and contributing to national and international cancer surveillance, research, control, and prevention.

List of Acronyms

Acronym	Full Name
ACS	American Cancer Society
CDC	Centers for Disease Control and Prevention
DSHS	Department of State Health Services
NAACCR	North American Association of Central Cancer Registries
SEER	Surveillance, Epidemiology and End Results Program
TCR	Texas Cancer Registry